

**FLPC Wood Shop Safety and
Operation MANUAL**

**Forest Lake Presbyterian Church (FLPC)
6500 North Trenholm Road
Columbia, SC 29206**

April 2023

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Revision History

Document Name	Rev	Author	Reviewer	Date
FLPC Wood Shop Safety and Operations Manual	R1	FLPC Wood Shop Coordinator	FLPC Wood Shop Steering Team	05/03/2023

1. FLPC Wood Shop Ministry

This document contains the FLPC Wood Shop Safety and Operations Manual. It contains the Safety Policies and the procedures under which Members and their Guests can use the FLPC Wood Shop and how to safely setup and operate the tools and equipment therein.

1.1 Mission Statement

The Mission of the FLPC Wood Shop is to:

- **Evangelism**—The FLPC Wood Shop is to provide a functional and safe environment with comprehensive set of equipment so that we can train FLPC members, guests and other individuals in the community to use their head, hearts, and hands in the service of Jesus Christ through woodworking projects.
- **Woodworking Training Classes**—Offering a comprehensive set of Woodworking Classes, which will include a devotional and will allow the FLPC Woodworking Program to:
 - **In-Reach**—Give FLPC members and guests (youth and adult) an opportunity to gain new woodworking skills, deepen their relationship with Christ, and get more involved in the life and work of FLPC.
 - **Outreach**—Give other members of the community (youth and adult) an opportunity to gain new woodworking skills, learn about Christ, become familiar with FLPC's work and mission.
- **Woodworking Projects**—Allow FLPC Wood Shop members and guests to use the FLPC Wood Shop to:
 - Interact and make use of their talents to create useful and beautiful woodwork projects.
 - Work together on FLPC woodwork projects such as advent candle holders, small crosses, stewardship banks for Sunday School, etc. This will Allow individuals of varying age groups to collaborate and form a new sense of cohesiveness.
 - Allow Wood Shop members and guests to create projects that would be helpful to persons assisted by the FLPC Helping Other Presbyterians Everyday (HOPE) program, such as building ramps for mobility impaired.
 - Allow youth, working with adults, to learn woodworking skills, build a bond, learn more about Christ, and get involved in the life of FLPC.

1.2 Definitions

The following terms will have the stated meanings for purposes of this Manual:

1. **Forest Lake Presbyterian Church**—Forest Lake Presbyterian Church is the Presbyterian Church located at 6500 North Trenholm Road, Columbia, SC 29206 and shall be referred to in this Agreement as “FLPC”.
2. **FLPC Property**—The FLPC Property includes all of the FLPC Buildings, parking lots, play grounds, etc. located at 6500 north Trenholm Road, Columbia, SC 29206.
3. **FLPC Education Building**—The real property located at 6500 North Trenholm Road, Columbia, SC 29206 containing the FLPC classrooms, the FLPC Wood Shop and the FLPC Community Outreach Center.
4. **FLPC Wood Shop**—The FLPC Wood Shop is the first room on the right side of the back of the FLPC Education Building labeled FLPC Wood Shop.
5. **FLPC Wood Shop Hours**—The FLPC Wood Shop will be available for use by FLPC Wood Shop Members and their Guests as follows:
 - a. Monday through Saturday: 7:00 am until 9:00 pm
 - b. Sunday: 1:00 pm until 9:00 PM
6. **FLPC Wood Shop Waiver of Liability, Assumption of Risk, and Indemnity Agreement**—defines the FLPC Wood Shop Member’s assumption or risk and releases FLPC, the FLPC Wood Shop Steering Team Volunteers, and all other Volunteers from Liability associated with accidents, injuries, of any other type of incident that occurs in the FLPC Wood Shop in accordance with the terms and conditions set forth in the FLPC Wood Shop Waiver of Liability, Assumption of Risk, and Indemnity Agreement. It is attached as Appendix A of the FLPC Wood Shop Membership Agreement.
7. **FLPC Safety and Operations Manual**—This manual, contains the rules and procedures for safety and the safe setup and operation procedures for each of the power tools/equipment in the FLPC Work Shop. This manual was developed by the FLPC Wood Shop Steering Team and approved by the FLPC Property Committee and FLPC Session.
8. **FLPC Wood Shop Membership Agreement**—The Agreement that sets forth the terms and conditions under which an individual can become a member of and use the FLPC Wood Shop and the tools and equipment contained therein.

9. **FLPC Wood Shop Coordinator**– The FLPC Wood Shop Coordinator is selected by the FLPC Property Committee. The FLPC Wood Shop Coordinator is responsible for the overall operation of the FLPC Wood Shop. He / She is responsible for:
- Short-long term Wood Shop planning
 - Fund Raising
 - The acquisition of equipment
 - Facilities, tools, and equipment maintenance
 - Defining, scheduling, and conducting training classes
 - Providing hands on training to the FLPC Steering Team, Members, and Guests on an as-needed and as-available basis during normal FLPC Wood Shop hours.
 - Certifying FLPC Wood Shop Members when a given Member has met all of the certification requirements
 - Issuing Special Endorsements to Members for Specialized Equipment when a given user has met all of the endorsement requirements.
 - Managing the activities that occur during Shop Work Days
 - Managing the FLPC Wood Shop Steering Team
 - Reporting Wood Shop safety and accomplishments to the FLPC Property Committee.
10. **Wood Shop Steering Team**–The FLPC Wood Shop Steering Team is composed of the FLPC Wood Shop Coordinator and a team of 2-4 other individuals, selected by the FLPC Property Committee, whose responsibilities include but are not limited to:
- Helping with short-long term Wood Shop planning
 - Help with Fund Raising
 - Help with the acquisition of equipment
 - Participating in facilities, tools, and equipment maintenance
 - Helping to defining, schedule, and conduct training classes
 - Providing hands on training to Wood Shop Members and Guests on an as-needed and as-available basis during normal FLPC Wood Shop hours.
 - Certifying FLPC Wood Shop Members when a given Member has met all of the certification requirements

- Issuing Special Endorsements to Members for Specialized Equipment when a given user has met all of the endorsement requirements.
 - Participating in Wood Shop Work Days when possible.
11. **FLPC Wood Shop Member**—An FLPC Wood Shop Member is an individual that has been certified by one of the members of the FLPC Wood Shop Steering Team to be able to use the FLPC Wood Shop and the Standard Tools/Equipment defined in Section 5.1 of this Manual without supervision during standard Wood Shop Operating Hours once they know how to safely setup and operate said tools/equipment.
 12. **FLPC Wood Shop Guest**—Any individual that is not a Member of the FLPC Wood Shop over the age of 11 can work in the FLPC Wood Shop as a Guest under the supervision of a Member of the FLPC Wood Shop or a Member of the FLPC Wood Shop Steering Team. No Guest can work in the FLPC Wood Shop unsupervised whether they are an adult over the age of 18 or a minor.
 13. **FLPC Wood Shop Use Log**—This is a log that Members and their supervised Guest(s) fill out each time that they use the FLPC Wood Shop. The information contained in the FLPC Wood Shop for each Member and each of their supervised Guest(s) includes: Name, Time of Entry, and Time of Exit. The Name and Entry/Exit Time for each Wood Shop User must be printed and be legible.
 14. **Standard Tools and Equipment**—The Standard Tools and Equipment in the FLPC Wood Shop include:
 - All of the nonpower hand tools in the FLPC Wood Shop
 - All of the Power Hand Tools listed in section 5.1 of this FLPC Wood Shop Safety and Operations Manual.
 - All other tools/equipment in the FLPC Wood Shop not listed in the Specialized Equipment (Section 5.2) of this FLPC Wood Shop Safety and Operations Manual.
 15. **Specialized Equipment**—The Specialized Equipment in the FLPC Wood Shop requiring an endorsement by one of the members of the FLPC Wood Shop Steering Team before a Member can set up or operate said piece of equipment. This includes all of the equipment listed in the Section 5.2 of this FLPC Wood Shop Safety and Operations Manual. In order to receive an endorsement to set up and operate a specialized of equipment, an FLPC Wood Shop Member must:
 - Review the Safety and Operations Manual for the piece of equipment the they want to be endorsed to use.

- Pass a written test on said piece of equipment.
 - Demonstrate to one of the FLPC Wood Shop Steering Team members that they are capable of safely setting up and operating said piece of Specialized Equipment in a safe manner.
16. **Wood Shop Members with Special Endorsements**—Is an Individual who is an FLPC Wood Shop Member who has received Special Endorsement(s) from a member of the FLPC Wood Shop Steering Team to use one or more of the Specialized pieces of Equipment listed in Section 5.2 of the FLPC Wood Shop Safety Manual without supervision during standard Wood Shop Operating Hours.
17. **Safety Violations Warning**—A verbal or written Safety Violation Warning given to an FLPC Wood Shop Member if they are not safely setting up and/or operating any of the Tools or pieces of Equipment in the FLPC Wood Shop.

1.3 Procedure for Opening the FLPC Wood Shop

The FLPC Wood shop can only be opened by the FLPC Wood Shop Steering Team or any Member. If the Wood Shop is already open when the Member and their Guest(s) arrive then only step 3 below has to be performed. If the Wood Shop has not been opened, then the following procedure should be used for opening the FLPC Wood Shop:

1. Unlock the door using the combination given to each of the FLPC Wood Shop Members.
2. Turn on the lights using the two switches closest to the door.
3. Fill out the FLPC Wood Shop Use Log. An entry must be made for the Member and each of their supervised Guests.
4. Check the circuit breaker panel to make sure all of the breakers are turned on.
5. Turn off the dehumidifier.
6. Turn on the ceiling dust filters. There is one over the table saw and one over the bench to the right of the Lathe.
7. Place Safety Equipment (safety glasses and ear plugs) on the bench closest to the door.
8. Remove all of the covers from the equipment.
9. This completes the procedure for opening the FLPC Wood Shop

1.4 Procedure for Closing the FLPC Wood Shop

The FLPC Wood Shop can only be closed and secured by a Wood Shop Member. The last Member in the Wood Shop is responsible for closing the FLPC Wood Shop. Provided however, that each of the Members and/or their supervised Guest(s) using the FLPC Wood Shop are responsible for cleaning up the areas of the Wood Shop that they used and returning all of the Tools, Equipment, and other items that they used to their proper locations. The procedure for closing the FLPC Wood Shop is as follows:

1. Remove all of the batteries from the battery powered tools and place them on the charger.
2. Have the users of the Wood Shop put all of the tools that they used away in their designated place. This includes but is not limited to: battery hand tools, corded hand tools, drill bits, router bits, wrenches, screwdrivers, tape measures, etc.
3. Have the users of the Wood Shop thoroughly clean the wood shop. This includes using the Makita battery powered blower to completely clean the Wood Shop. The Wood Shop users should start at the end of the shop by the wood storage area door and use the blower to move all of the saw dust, wood chips, or any other debris on the Wood Shop floor, benches, and shelves to the front door of the wood shop. Then use the broom and dustpan located next to the sink to sweep up the debris and put it in the trash can.
4. Clean the Wood Shop Sink.
5. If the trash cans are more than half full, empty them into the FLPC Dumpster located outside of the Wood Shop in the parking lot.
6. Replace all equipment covers.
7. Turn off the ceiling dust filters. There is one over the table saw and one over the bench to the right of the Lathe.
8. Blow out the dehumidifier filter and turn on the dehumidifier.
9. Place Safety Equipment (safety glasses and ear plugs) back in its designated closet.
10. Make an entry in the FLPC Use Log of the Exit Time for each of the Member(s) and each of their supervised guests.
11. Turn off the lights using the two switches closest to the door.
12. Close the door and make sure that is securely locked before leaving the Wood Shop Area.

1.5 Tool/Equipment Control

All of the tools in the FLPC Wood Shop must remain in the Wood Shop Area. This includes the Wood Shop, adjacent parking lot and any of the FLPC Buildings. No one, including the Wood Shop Coordinator, Wood Shop Steering Team Members, Members or Guests can remove any tool from the Wood Shop Area.

The reason for this is that if someone borrows a tool then other Wood Shop Members and/or their Guests may not have the tools that they need to work on their projects.

1.6 Procedure for an Accident in the Wood Shop

The Member agrees that if an accident occurs in the FLPC Wood Shop, that cannot be treated with basic first aid, that they will immediately:

1. Summon help by using their cell phone to call 911 or pulling the fire alarm located by the FLPC Wood Shop door.
2. Open the FLPC Wood Shop Door so that the first responders can get in.
3. If possible, treat any wound(s) with basic first aid, using one of the first aid kits located by the Wood Shop Door, to treat the wound until help arrives.
4. Report all Accidents, minor or major, to the FLPC Wood Shop Steering Team in writing by sending an email to "FLPC Wood Shop@FLPC.org..

1.7 Procedures for a Fire in the Wood Shop

The Member agrees that if fire occurs in the FLPC Wood Shop, that cannot be put out quickly using the fire extinguisher located by the Wood Shop door, that they will immediately:

1. Summon help by using their cell phone to call 911 or pulling the fire alarm located by the FLPC Wood Shop door.
2. Exit the FLPC Wood Shop and wait for the Fire Department to arrive.
3. Provide the Fire Department with any information that they request.
4. Report all fires, minor or major, to the FLPC Wood Shop Steering Team in writing by sending an email to "FLPC Wood Shop@FLPC.org.

1.8 Getting Help in Other Types of Emergencies

If any type of emergency, other than an Accident or Fire, occurs in the FLPC Wood Shop, a Wood Shop Member or Guest can get help by dialing 911 on their cell phone or if they do not have a cell phone, by activating the Fire Alarm Located by the FLPC Wood Shop Entry/Exit door. All other types of

emergencies must be reported to the FLPC Wood Shop Steering Team in writing by sending an email to "FLPC Wood Shop@FLPC.org.

1.9 Types of Materials Which Can Be Used In the FLPC Wood Shop

This section defines the type of materials that may and may not be worked on in the FLPC Wood Shop.

1.9.1 Wood

Used wood and wood-based materials may be processed in the shop as long as the material is clean, free of dirt, grit, grime or abrasive materials. Material that is excessively contaminated with dirt or grime should not be processed on any of the Wood Shop equipment. Material should also be free of paint or finishes (ex. varnish, enamel) and free of metallic objects (ex. nails, screws, staples). All used material should be analyzed with a metal detector before attempting any machining procedures using the shops tools or equipment. **Shop users using used materials may be found liable for damage to the shops tools and equipment caused by those materials.**

1.9.2 Metal

Metal should be processed on specific equipment or machines for metal. Follow guidelines for each specific tool or machine regarding materials as outlined in the shop manual.

1.9.3 Plastic

Plastic should be processed on specific equipment or machines for plastic. Follow guidelines for each specific tool or machine regarding materials as outlined in the shop manual.

1.9.4 Plaster or cement

Plaster or cement may not be processed with any of the Tools, Equipment or Machines in the FLPC Wood Shop. Grinding tools with specific attachments may be used to work cement or concrete on the outdoor concrete slab.

2. FLPC WOOD Shop Accident Overview

Hand tools and power-driven machine tools have been developed to save time and perform accurate, repeatable work. Hand and power tools consistently perform the same operation hundreds of times if they are properly used, cared for, and understood. In nearly all cases, mistakes and/or injuries are due to operator error, not the machine. Whether the tools are helpful or harmful depends on you.

A study made by the National Safety Council on Wood Shop accidents show the tools that are involved in most accidents are listed below. The most to least dangerous tools in each category are listed in numerical order.

Hand Tools	Power Tools	
1. Chisels	1. Shaper	7. Grinders
2. Saws	2. Table Saw	8. Sanders (Disc/Belt)
3. Knives	3. Jointer	9. Band Saw
4. Hand Plane	4. Radial Arm Saw	10. Jig & Scroll Saws
5. Hammers	5. Wood Lathe	11. Drill Press
	6. Miter Saw	12. Power Planers

2.1.1 GENERAL CAUSES OF ACCIDENTS

According to industry studies the general causes of accidents include but are not limited to the following:

1. Ignorance
2. Carelessness
3. Lack of judgment
4. Rushing a job
5. Making too heavy a cut
6. Overconfidence
7. Talking while working
8. Inadequately guarded machinery
9. Using a dull tool
10. Using an improperly set or adjusted tool
11. Fatigue
12. Using the wrong 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 (with checks, knots, etc.)
18. Eyestrain

2.1.2 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. Not replacing a guard after it has been removed
5. Moving or dropping fingers into moving parts of cutters
6. Failing to stop machinery for measurements
7. Individuals not starting and stopping their own machines
8. Operating machinery without receiving instruction on its proper use
9. Operating machinery that you are not qualified on while the Wood Shop Coordinator is out of the room
10. Showing off while operating machinery
11. Using the wrong machine for a given procedure

3. FLPC Wood Shop General Safety Policies

This section describes the FLPC Wood Shop General Safety Policies.

1. 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.
2. Wear safety glasses and/or a face shield at all times in the shop to prevent flying particles or corrosive substances from entering your eyes.
3. All accidents and injuries, no matter how slight, must be reported to the Wood Shop Coordinator and/or the FLPC Staff immediately.
4. If you feel ill or are on any medication that may affect your ability to operate machinery, inform your Wood Shop Coordinator.
5. With the exception of special set ups, Wood Shop Coordinator-approved, only the operator may start and stop a machine. After the machine is turned off, he or she should control the material and stand by until the machine has come to a complete stop.
6. Wear safe clothing when working in the shop. Fasten or remove loose clothing before you operate any machine. Roll long sleeves above the elbows. Apron fastenings should be made such that they will break if the apron becomes entangled in a machine.
7. Long, loose hair can easily be caught in revolving machinery and ripped out, causing serious scalp laceration. Your hair must be tied back or tightly covered when working with machines.
8. Wearing gloves is forbidden while working with machines within the wood shop. Gloves hinder your dexterity and may be caught in moving machinery.
9. Before operating machinery remove jewelry (bracelets, rings, chains, and beads) and other accessories that, in the judgment of the Wood Shop Coordinator, may be hazardous.
10. Keep machine guards in proper position at all times, unless the Wood Shop Coordinator has approved their removal for a special setup.
11. Report all breakage or damage to tools or machinery to the Wood Shop Coordinator immediately.
12. Overloading or forcing any machine is dangerous and is not permitted.
13. Use only new material or other material approved by your Wood Shop Coordinator for your projects.
14. Keep rags away from machines that are in operation.

15. Rags that have absorbed any amount of linseed oil, solvents, or oil-based finishing products must be disposed of in an approved covered metal container as a precaution against spontaneous combustion.
16. Hang nothing on fire extinguishers. The area around them should be kept clear so that they may be reached immediately if fire breaks out.
17. If a machine makes an unusual sound, is out of adjustment, or is in need of repair, shut off the power at the machine and report it to your Wood Shop Coordinator immediately. Only machines in good repair may be operated.
18. Never talk to or distract individuals using a machine; likewise, do not allow your attention to be diverted while you are using a machine. Such distractions can cause the operator to make serious mistakes and may lead to injuries.
19. Machines must come to a full stop with the power turned off before cleaning or adjusting.
20. If you see oil, grease, or any other liquid on the floor, wipe it up immediately; you may prevent someone from slipping.
21. Floors, aisles, and passageways should be kept clear of pieces of wood, tools, and materials. Objects on the floor may cause someone to slip or fall.
22. Do not use used materials of any kind in any milling process. They may contain metal or other particles that could cause injury or damage machines.
23. Do not use green or treated lumber in any milling process.
24. Always sweep scraps from your workbench or table with a brush or piece of wood rather than with your hands, as there may be sharp or jagged particles among the scraps.
25. Always carry long objects, such as metal rods and long boards, with the front-end high enough to avoid striking someone.
26. Report to your Wood Shop Steering Team any odour of gas in the room. Gas fumes may make you ill or cause an explosion.
27. All portable electric tools and appliances must be disconnected from their power source (battery or building power) when not in use, making adjustments, when inserting cutters or bits, or when changing sandpaper.
28. When unplugging an electric tool, pull on the plug instead of the cord.

29. 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.
30. If it is necessary to use an extension cord, ensure that it hangs from the overhead electrical plug or lies flat on the floor.
31. When using air under pressure, make sure the air stream is not directed toward you or any other person.
32. Use the proper tool for the job.
33. It is good safety practice to be courteous and considerate of others.
34. If you have prescription eyeglasses, wear them; eyestrain is a frequent cause of accidents.
35. Notify the Wood Shop Steering Team if a violation of safety instructions is observed. You may save yourself or someone else from serious injury.
36. If you are in doubt about the use of any tool or machine, or about any shop procedure, ask your Wood Shop Steering Team for help.
37. Sharp tools are safest: use them whenever possible. Dull tools are dangerous because they are hard to control and require excess pressure by the operator.
38. CO2 extinguishers should be used to extinguish all fires in the wood shop.
39. Sharp edges or points of tools should be directed down and/or away from the body.
40. Students must be instructed in the correct and safe use of any machine before they can operate that machine.
41. Do not lift anything in the shop that is too heavy for you; seek help. Use more personnel or employ mechanical help such as a lever, dolly, jack, forklift, wheels, or rollers.
42. When lifting, keep your back straight and lift with your legs. Do not strain yourself; injury can occur easily.
43. Vises or other work-holding devices should not be overtightened. Use only enough force to hold the workpiece.
44. Bench Vises not in use should be left loose with the handle in a vertical orientation. This will prevent injury to those walking past the workbench.

4. Equipment Setup and Operation

This section describes the equipment currently in the FLPC Wood Shop and how to operate it.

4.1 Standard Equipment (Certification Required)

This section describes the FLPC Wood Shop Tools that Standard FLPC Members and their supervised guests can use after attending the FLPC Wood Shop Orientation, passing the FLPC Wood Shop Certification Test, signing the Waiver of Liability Agreement and Membership Agreement.

4.1.1 General Safety for Standard Power Tools and Equipment

The general safety requirements for all handheld power tools are as follows:

1. **Eye protection is required when using any of the tools or pieces of equipment described in this section. Hearing protection and dusk masks are required for specific pieces of equipment. These requirements are defined for each tool or piece of equipment in this section.**
2. **Stay focused on the tool and the work being performed.**
3. Keep work area clear of other tools and materials.
4. Use the right tool for the job.
5. Seek help if you are unsure of tool operating procedures.
6. Keep hands and fingers clear of the tools blade or bit and cutting path.
7. Secure work to bench when using electric hand tools.
8. Do not over-reach with electric hand tools.
9. Make all adjustments on the tool with the power cord unplugged.
10. Do not carry plugged in tools with finger on power switch.
11. Use only grounded extension cords.
12. Always keep tool guards in place.
13. Let the tools bits and the blades do the work. Do not force tools into the material.
14. Unplug or remove the battery and clean and put away tools when finished working.

4.1.2 Oscillating Orbital Sanders

There are two Orbital Sanders in the FLPC Wood Shop. The Makita battery powered Orbital Sander and the Skill chorded Orbital Sander. Electric Oscillating Orbit Sanders are used for final finish sanding and may be used

on wood or wood composite material and some plastic materials. Random Orbit Sanders use disposable sandpaper discs that are available in the shop.



Figure 1–Oscillating Portable Sanders

Safety and Use

The Safety and use of the chorded and battery powered orbital sanders is as follows:

1. Eye protection is required when using Random Orbit Sanders. Dust masks are recommended but not required.
2. Stay focused on the tool and the work being performed.
3. Sandpaper disc must be attached to bottom of sander before using Random Orbit Sander.
4. For the Skill Orbital Sander be sure switch is in “OFF” position before plugging in.
5. Only use discs from shop supply cabinet. Ask Shop staff for assistance.
6. The use of a dust mask is encouraged when using this tool.
7. Connect vacuum to dust collection port.
8. Start sander on material to be sanded.
9. Hold handle firmly.
10. Sander should “float” on top of material. **Do not bear down on sander or push sander into material.**
11. When pausing or stopping sanding operation lift sander off material and hold away from any surfaces until disc coasts to a complete stop.
12. Do not place spinning or coasting sander directly on downdraft work bench.

4.1.3 Belt Sander

The Skill Electric Portable Belt Sander is used for flattening and smoothing flat material in preparation of final sanding. With the appropriate belts it will quickly remove large amounts of material or smooth a surface in preparation for final finish sanding with other sanders.



Figure 2–Portable Belt Sander

Safety and Use Procedure

The Safety and use of the chorded orbital sanders is as follows:

1. **Eye protection and hearing protection are required when using this tool. Dust masks are recommended but not required.**
2. **Stay focused on the tool and the work being performed.**
3. The use of a dust mask is encouraged when using this tool.
4. Loose clothing, hair and or jewelry should be removed, tucked back and or restrained.
5. All sanding with belt sanders should be performed on downdraft tables or outside on the concrete pad
6. Use appropriate sandpaper belt for sander and for work to be performed ask attendant for assistance if you are not sure which belt to use.
7. Attach vacuum to dust collection port.
8. Belt Tension Lever must be retracted before using.
9. Be sure switch is "OFF" before plugging it in.
10. Always keep finger or exposed flesh away from sanding belt.
11. Hold handles firmly before starting sander.
12. Start sander on material to be sanded.
13. When pausing or stopping sanding operation allow sander to decelerate by releasing trigger switch, wait for sander to come to a complete stop before placing it on the work surface.

14. Do not place running or coasting sander directly on downdraft table.
15. Sander should "float" on top of material. **Do not bear down on sander or push sander into material.**

4.1.4 Disc and Belt Combination Sanders

There are currently two Disc/Belt Combination Sanders in use in the FLPC Wood Shop:

- Craftsman 6" Disc and 3" wide Belt Combination Sander
- Craftsman 9" Disc and 6" wide Belt Combination Sander

The combination disc/belt sander consists of a Disc Sander which is a reference table with a circular plate mounted to a motor shaft. A cloth or paper-backed abrasive disc is cemented to the plate. The diameter of the disc indicates the size of the machine. The combination sander includes a vertical belt sander as part of the machine.



Figure 3–Craftsman Disc and Belt Sander

Safety and Use

1. **Safety glasses are required. Dust masks and hearing protection are recommended but not required.**
2. **Stay focused on the tool and the work being performed.**
3. Hold the work securely.
4. On the disc sander, always sand on the downward-traveling side of the disc.
5. Do not sand stock that puts your fingers within 2" of the abrasive.
6. Apply moderate pressure to the stock against the abrasive and keep it moving. Excessive pressure can overheat and damage the abrasive.
7. Keep the stock moving to avoid overheating the abrasive material.
8. Be sure the work is held firmly against the table.
9. Use the disc/belt sanders only for sanding straight edges or outside (convex) curves.

10. Do not use the sanders for joinery, squaring stock or other similar applications.
11. On the disc sander, make sure the disc is secured properly. Notify the Wood Shop Steering Team if the disc is loose or worn.
12. On the belt sander, make sure the belt is tracking properly. Notify the Wood Shop Steering Team if the belt is loose or worn.

4.1.5 Oscillating Spindle Sander

The Oscillating Spindle Sander is used to sand inside (concave) curves. The spindle rotates while simultaneously oscillating up and down. This helps keep the abrasive from loading up and overheating, which would happen if the spindle did not move up and down. Various spindle sizes can be used on the machine to accommodate different work radii.



Figure 4–Oscillating Spindle Sander

Safety and Use

1. **Safety glasses are required. Dust masks and hearing protection are recommended but not required.**
2. **Stay focused on the tool and the work being performed.**
3. Always use the largest spindle possible for the radius being sanded. Using a smaller spindle makes it more difficult to get a smooth curve, takes longer, and results in excessive abrasive wear.
4. Always feed against or into the direction of the spindle rotation.
5. Avoid excessive pressure on the spindle. Too much pressure generates heat and will quickly damage the abrasive.
6. Use the throat plate that leaves the smallest opening around the spindle.
7. Hand-tighten the spindles only. Do not use wrenches to tighten spindles; this can result in the spindle becoming stuck in the collet.

8. Every component of the Oscillating Spindle Sander has a home on the tool rack. Do not leave spindles, throat plates, or wrenches lying around; return them to their proper location in the tool rack.
9. Notify the Wood Shop Steering Team if the spindle abrasives are excessively worn.

4.1.6 Circular Saws

Two Types of Circular Saws are available in the FLPC Wood Shop, chorded and battery powered. The Portable Circular Saw is used to make straight cuts when the material is too large or awkward to cut on other stationary equipment. With the appropriate blade various materials may be cut such as: wood, wood composites, paper, plastics, and masonry type materials (requires a special blade).



Figure 5–Circular Saws

Safety and Use

The safety and use procedures of the chorded and battery powered Circular Saws are as follows:

1. **Eye protection and hearing protection are required at all times when using this tool. Dust masks are recommended but not required.**
2. **Stay focused on the tool and the work being performed.**
3. The use of a dust mask is encouraged when using this tool.
4. The use of hearing protection is encouraged when using this tool.
5. Keep fingers away from line of cut in front of and in back of saw.
6. Ask for staff assistance if tool adjustments are needed.
7. Find a clear area to work with this tool and secure the material with clamps if needed.
 - Avoid binding the blade in line of cut by supporting work properly using either method:
 - Material should be fully supported on both sides of cut line (large pieces).

- Material may be supported on only one side of cut with waste falling away (shorter pieces)
- 8. Area underneath line of cut should be free of any obstructions. Do not cut into bench-top.
- 9. Line up front edge of blade with line of cut.
- 10. Back circular saw away from material slightly (about 1/2"). Squeeze trigger switch and push saw through material with only moderate force.
- 11. Never start saw with front edge of blade pressed up against material.
- 12. Keep saw base flat on material when in use.

4.1.7 Plunge Circular Saw (Track Saw)

The Plunge Circular Saw (Track Saw) is used to make straight cut in material that is too large to process on any of the stationary equipment. With various blades and a specially designed track, this saw can make straight and miter cuts in a variety of materials. This saw also has the added feature that allows cuts to be made within the interior areas of a work-piece.



Figure 6–Plunge Circular Saw (Track Saw)

Safety and Operation

1. Eye protection is required at all times when using this tool. Dust masks and hearing protection are recommended but not required.
2. Stay focused on the tool and the work being performed.
3. For best results, cut material with the back side up, facing the operator. This will provide the smoothest possible cut on the face side of the panel.
4. Set up the track for the desired cut. This includes installing the track on the piece of material to be cut and clamping the workpiece down so that it will not move during the cutting operation.
5. Set the track saw cut depth to the proper setting for the thickness of the workpiece.

6. Place the saw on the track 1" or 2" from the beginning of the workpiece
7. Use the on/off buttons to start/stop the Track Saw motor.
8. The thickest material this machine can safely cut is 2.25".
9. Sheet material measuring 4' x 8' or 5' x 5' can be easily cut using the Track Saw and proper track.
10. Never cut materials that contain screws, nails or staples. They may eject from the material or damage the blade. Pay special attention to the ends of panels as often shop labels are stapled there.
11. Never cut more than one piece of material at one time.
12. Do not place your hands on the track in front of the saw.
13. Do not try to retrieve a piece of cut material while the blade is rotating.
14. Do not force the tool. Let the saw do the work. A saw is more easily controlled and will do a better job when used in the manner for which it is designed.
15. If the saw binds, shut the machine off and check how the material is supported. Warped, bowed or other misshaped pieces might pinch on the blade causing this to happen. Ask the Wood Shop Steering Team for guidance if necessary.
16. Thin material (less than 1/8", like plastic laminate) should be cut with the help of the Wood Shop Steering Team.
17. Once your material is small enough to be cut on a table saw, it is safer and more efficient to utilize the table saw.

4.1.8 Reciprocating Saw (Saws All)

There is one battery powered Reciprocating Saw in the Wood Shop. The Reciprocating Saw utilizes an oscillating blade to make rough cuts where a high degree of precision is not needed. It is primarily a power tool used in the construction industries. And with a wide array of blades available it can be used to cut through wood, metal, plastic, rubber, plaster, etc.



Figure 7–Reciprocating Saw (Saws All)

Safety and Operation

1. Eye protection is required at all times when using this tool. Dust masks and hearing protection are recommended but not required.
2. **Stay focused on the tool and the work being performed.**
3. Restrain loose clothing, tie back long hair, remove or restrain loose jewelry.
4. Keep fingers away from blade and line of cut.
5. Always securely clamp or hold material in position.
6. Remove the battery or disconnect the power from the Reciprocating Saw before changing the blade or performing any other type of adjustment.
7. Use appropriate blade for material to be cut. Ask for help from shop staff.
8. When cutting material on bench-tops be aware of where bench surface is underneath. Securely clamp material down. Avoid cutting into bench-top.
9. Blade motion control switch should be horizontal for cutting wood and vertical for use in metal.
10. Line up blade and place shoe firmly against material to be cut.
11. Start saw with blade and shoe pressed up against material.
12. Apply moderate pressure while cutting.
13. Never use a bent blade.

4.1.9 Scroll Saws

There are two Craftsman scroll saws in the FLPC Wood Shop. Scroll Saws use a slender blade that moves in an up-and-down movement. The movement ranges from 400 to 1,800 strokes per minute. The blade cuts through various materials such as wood plastic, glass, and thin metal.



Figure 8–Craftsman Scroll Saw

Safety and Use

1. Eye protection is required at all times when using this tool. Dust masks are recommended but not required.
2. **Stay focused on the tool and the work being performed.**
3. Restrain loose clothing, tie back long hair, remove or restrain loose jewelry.
4. Keep fingers away from blade and line of cut.
5. Disconnect the power from the saw before changing the blade or performing any other type of adjustment. To change the blade:
 - a. Release blade tension
 - b. Loosen blade mounts
 - c. Insert the blade paying attention to the direction of the teeth
 - d. Tighten the blade mounts
 - e. Re-tension the blade
 - f. Plugin the saw
 - g. Run test cuts
6. Use appropriate blade for material to be cut. Ask for help from shop staff.
7. Start saw with blade away from the material to be cut.
8. Make a test cut and adjust the speed and blade tension as necessary.
9. Apply moderate pressure while cutting.
10. Never use a bent blade.

4.1.10 Blade Runner Portable Saw

A Rockwell Blade Runner is a versatile, variable speed bench top portable saw that can be used for a variety of projects. It supports a variety of blades, including jig saw blades and oscillating blades, allowing users to make precise and clean cuts. It is similar in functionality to a Scroll Saw. It can be used to cut wood, metal plastic, and other types of material depending on the blade that is installed. It is the only saw in the FLPC Wood Shop that can be used to cut metal.



Figure 9–Rockwell Blade Runner Saw

Safety and Use

1. Eye protection is required at all times when using this tool. Dust masks and hearing protection are recommended but not required.
2. **Stay focused on the tool and the work being performed.**
3. Restrain loose clothing, tie back long hair, remove or restrain loose jewelry.
4. Keep fingers away from blade and line of cut.
5. Use appropriate blade for material to be cut. Ask for help from shop staff.
6. Disconnect the power from the Saw before changing the blade or performing any other type of adjustment. To change the blade:
 - a. Raise the arm shown above to its highest position
 - b. Remove the blade protection cover.
 - c. Remove the blade currently in the saw by pressing the blade release
 - d. Insert the selected blade by pressing and then releasing the blade release.
 - e. Reinstall the blade protection cover.
 - f. Plugin the saw
 - g. Run test cuts
7. Start saw using the red power button with blade away from the material to be cut.
8. Adjust the speed for the type of material being cut.
9. Make a test cut.
10. Apply moderate pressure while cutting.
11. Never use a bent blade.

4.1.11 3/8" Drill

Cordless drills have a variety of uses; drilling holes, driving screws and fasteners, sanding with abrasive accessories, etc. They are very versatile because of the large number of accessories available and also because they are not bound by the limits of electrical cords.



Figure 10–3/8" Drill

Safety and Use

1. Eye protection is required when using this tool.
2. **Stay focused on the tool and the work being performed.**
3. Loose clothing, hair and or jewelry should be removed, tucked back and or restrained.
4. Use appropriate drill bit or accessory for work to be performed.
5. Ask attendant for assistance if you are not sure which bit or accessory to use.
6. Set gear switch to high or low. Generally, use low speed to drive screws and high speed to drill holes.
7. Check forward/reverse switch before drilling or driving screws. Switch should be in forward position for drilling or driving screws, reverse for removing screws.
8. Adjust clutch to appropriate setting for work being performed. Ask for assistance if you are not sure which setting to use.
9. Always keep finger or exposed flesh away from drill bit or accessory.
10. Ask for assistance with discharged battery.
11. When drilling holes use a piece of scrap under material being drilled to protect workbenches and to minimize tear out on material.

4.1.12 1/4" Impact Driver and 3/8" Impact Socket Drivers

Impact drivers are like normal drills, but more powerful, and as long as you find the right bits for the job, impact drivers can be used for drilling, for tightening and loosening screws and tightening and loosening bolts.



Figure 11–1/4" Impact Driver

Safety and Use

1. Eye protection is required when using this tool.
2. **Stay focused on the tool and the work being performed.**
3. Loose clothing, hair and or jewelry should be removed, tucked back and or restrained.

4. Use appropriate drill bit or accessory for work to be performed.
5. Ask attendant for assistance if you are not sure which bit or accessory to use.
6. The speed of the ¼" impact driver is controlled by the amount of pressure you apply to the trigger.
7. Check forward/reverse switch before drilling or driving operations are performed. Switch should be in forward position for drilling or driving, and reverse for removing screws or bolts.
8. Always keep finger or exposed flesh away from drill bit or accessory.
9. Ask for assistance with discharged battery.
10. When drilling holes or inserting screws or bolts, use a piece of scrap under material being drilled or screwed into to protect workbenches and to minimize tear out on material.

4.1.13 Angle Grinder

One of the primary uses of an angle grinder is cutting through metals, concrete slabs, and hardwoods. The right cutting disc, an Angle Grinder can outperform the most efficient saws. A cutting grinder is a very high-speed and powerful tool and you must be highly careful of while using. It can be dangerous if not handled with care and caution.



Figure 12–Angle Grinder

Safety and Use

1. **Eye protection and hearing protection are required when using this tool. Dust masks are recommended but not required.**
2. **Stay focused on the tool and the work being performed.**
3. Loose clothing, hair and or jewelry should be removed, tucked back and or restrained.
4. Use appropriate grinding wheel for work to be performed.
5. Ask attendant for assistance if you are not sure which grinding wheel to use.

6. Always keep finger or exposed flesh away from the grinding wheel.
7. Avoid dropping or bumping the angle grinder on other equipment. Be mindful and keep angle grinder away from the edge of work benches or elevated surfaces.
8. Ask for assistance with discharged battery.
9. When grinding use a piece of scrap under material to protect workbenches and to minimize tear out on material.

4.1.14 Oscillating Tool (Multi Tool)

An Oscillating Tool is a tool that can be used for multiple tasks. These tools oscillate at a certain angle of almost 3°, and they work in a side-to-side fashion. The best part about an oscillating tool is that you can change its accessories according to your work.

For example, you can attach a blade for cutting or sand pads for sanding any material. Basically, you can customize the tool according to the material and function you want to perform.

This tool comes in handy when you are in a situation where you cannot use bigger tools as there is not enough space for them to fit it. If there is a pipe that you want to cut, in a small place, you can use this tool.



Figure 13—Oscillating Tool

Safety and USE

1. Eye protection and hearing protection are required when using this tool. Dust masks are recommended but not required.
2. **Stay focused on the tool and the work being performed.**
3. Loose clothing, hair and or jewelry should be removed, tucked back and or restrained.
4. Inspect the tool before use and look for any damage or broken components.
5. Attach the proper accessory to the Oscillating Tool for the work to be performed. Get help from the Wood Shop staff if you are not certain which accessory to use for your task. Some of types of accessories

available include: cutting blades for wood, drywall, and metal, a carbide blade, scraper blade, sanding pads, carbide grout removal rasp, and more tools to handle most tasks.

6. Use the speed control switch to set the speed on the oscillating tool for the task to be performed.
7. Use the power switch to turn the oscillating tool on or off
8. Apply moderate pressure while cutting.
9. Never use a bent blade.

4.1.15 Jig Saws

The Jig Saw is generally used for pattern cutting into materials with the maximum thickness of 2" wood and 1 & 1/4" plastic and fiberglass, refer to manual for metal thickness.



Figure 14—Corded Jig Saw

Safety and Use

1. Eye protection is required at all times when using this tool. Dust masks and hearing protection are recommended but not required.
2. **Stay focused on the tool and the work being performed.**
3. Make sure tool is turned off before plugging it in.
4. Restrain loose clothing, tie back long hair, remove or restrain loose jewelry.
5. Keep fingers away from line of cut
6. Always securely clamp or hold material in position.
7. Use appropriate blade for material to be cut. Ask for help from shop staff.
8. Do not attempt to change blade or blade settings without disconnecting the Jig Saw from its power source.

9. Find a clear area to work with this tool and secure the material. Line of cut should be supported within 1/2" of the cut being made.
10. When cutting on material on bench-tops be aware of where bench surface is underneath. Avoid cutting bench-top.
11. Area underneath line of cut should be free of any obstructions.
12. Line up front edge of blade with line of cut.
13. Back Jigsaw away from material slightly (about 1/2")
14. Never start Jigsaw with front edge of blade pressed up against material.
15. Keep jigsaw base flat on material when in use.
16. Never use a bent blade.

4.1.16 Power Hand Planer

Power Hand Planers are used to shape up slight imperfections, smooth rough sections, and even taper down the height or width of your woodworking project by shaving off thin layers of wood to reveal a smooth layer beneath.



Figure 15–Battery Powered Hand Planer

Like a Hand Plane, the Power Hand Planer rides on a shoe, or sole plate (Fig. A). Like a jointer, the planer has blades mounted on a cutter head or drum that spins at 20,000 rpm, removing wood equal to the difference in elevation between the front and rear shoes.

The front hand grip doubles as a depth-adjustment gauge. The gauge, with its built-in scale settings, turns back and forth to move the front planer shoe up or down, setting the depth of the cut. Depending on the depth you set, the planer removes lots of wood (1/8 in. per pass) or, like a belt sander, a little (1/64 in.).

Get the most out of the tool by mastering the right way to hold and push the planer. Properly balancing your body ensures safety and the best planning results.

Balance means standing with your feet apart in a position that you'll find comfortable throughout the full tool pass on the workpiece. Each pass of the planer involves a rhythm of balance and hand pressure

Safety and Use

1. **Safety glasses and hearing protection are required. Dust masks are recommended but not required.**
2. **Stay focused on the tool and the work being performed.**
3. After turning the tool off, protect yourself and the work—and the blades—by setting the front shoe of the hand planer up on a wood block while the spinning cutter head stops.
4. Begin by resting the front shoe of the planer flat on the wood without letting the blade touch the work.
5. Start the tool, let the motor reach full speed, then ease the plane into contact with the work and push it steadily forward.
6. Keep your initial pressure on the front grip as the planer enters the workpiece.
7. Balance hand pressure between the tool handle and front knob as both planer soles contact the work.
8. As you push the tool off the work, apply greater control to “catch” the rear handle. Avoid overreaching at the end of a pass; the front shoe will drop off the wood and let the blades take an uneven bite off the end of the wood (called “snipe”).
9. The speed at which you push the tool and the depth setting you choose will affect the final smoothness of your work. For power-shaving dimensional lumber, bites of 1/8 in. per pass are OK. To obtain the smoothest results when you're edge-planing hardwood boards, use a 1/64-in. or 1/32-in. depth setting, push the tool slowly and make more passes.

4.1.17 Handheld Routers

There are currently 3 Handheld routers available in the FLPC Wood Shop. They are:

- Makita Trim Router (Battery)
- 2 Craftsman Handheld Routers

The router is a simple, relatively safe, portable electric tool. It is extremely versatile; its use is limited only by the imagination of the operator. The router consists mainly of two parts; a motor with a collet mounted on one end of the motor shaft and a base that holds the motor.



Figure 16–Craftsman Hand Held Router

A bit or cutter is mounted in the collet and protrudes below the surface of the base to do the cutting. The depth of the cut can be adjusted by moving the motor up or down inside the base and locking it at the desired depth setting. Routers run at speeds up to about 22,000 rpm.

There are two basic types of Handheld Routers, Fixed-Base and Plunge-Base. With a Fixed Base Router, the motor is adjusted in the base for a given depth of cut and locked in place. With a Plunge-Base Router, the motor can be slid up and down within the base while the motor is running.

Currently the FLPC Wood Shop does not have a Plunge-Based Router.

Safety and Use

- 1. Safety glasses and hearing protection are required. Dust masks are recommended but not required.**
- 2. Stay focused on the tool and the work being performed.**
3. Use only bits that are specially designed for operation in highspeed routers.
4. Always unplug or remove the battery from the router before changing bits or making adjustments other than the depth of cut.
5. Do not bottom out the shank of the router bit in the collet. When possible, insert the bit to its maximum depth, and then withdraw it about 1/8" before tightening the collet.
6. Make sure the bit is firmly secured in the collet before starting work. A loose bit will work its way out of the collet, damaging your work and/or injuring you.
7. Make sure the router motor is tight in the router base before power is turned on.
8. When starting the router, make sure the bit is not in contact with anything and the base is down on the material to be cut.
9. Do not start routers while holding them up in the air.

10. Hold the router firmly when turning on the power to withstand the starting torque of the router motor.
11. Keep hands, loose clothing, and jewelry away from revolving bits and cutters.
12. Operate the router in the proper direction. If only one side of the bit is being used, move the work against cutter rotation. If the bit is cutting on both sides, feed the router so that the bit pushes the work towards the fence (when applicable).
13. Use slower speeds for larger bits.
14. Do not overload or bog down the speed of the motor.
15. Several light cuts are better than one heavy cut.
16. Always make sure the bit is sharp; if unsure, check with the Wood Shop Steering Team.
17. Always secure or clamp the work so that it cannot move during routing.
18. When using multi-piece router bits, ensure all nuts and bearings are tightened properly.
19. Large panel-cutting bits should not be used in a hand-held router.
20. Due to the physics of routing, dados and rabbets in solid wood are best achieved using a table saw. Dados and rabbets in manufactured material such as plywood, particleboard, and MDF are better achieved using a router.

4.1.18 Pneumatic Nail Guns and Staplers

Pneumatic Nail Guns and Staplers are compressed-air-operated devices used to drive nails or staples quickly and efficiently. They also increase accuracy over using a hammer, since the gun does not require pounding on the workpiece. Pneumatic Nail Guns and Staplers are made in a variety of sizes. In the FLPC wood shop, Finish Nailers, Brad Nailers, and Staplers are available. Each shoots a specific diameter of nail or width of staple in a range of lengths.



Figure 17–Pneumatic Nail Guns and Staplers

Operating a Pneumatic Nail Gun or Stapler requires the user to press the gun against the workpiece, thereby depressing the nose guard. The gun is then actuated by pulling the trigger.

Safety and Use

1. Safety glasses are required.
2. Stay focused on the tool and the work being performed.
3. Always point the nail gun or stapler away from any person or body parts.
4. Except when ready to actuate the nail gun or stapler, keep your finger off the trigger.
5. Always disconnect the air supply when loading or unloading the magazine, or when making adjustments.
6. Ensure the nose guard is working properly, and if it is not, report the problem to the Wood Shop Steering Team.
7. When operating the nail gun or stapler, make sure your hand or other body parts are not in front of or to the side of the fastener's path. Nails have been known to hit hard objects, like knots or difficult grain, and shoot out the side of a workpiece.
8. Use extra caution when driving a fastener close to an edge to prevent the fastener from splitting the work, flying away, or hitting your hand.
9. Do not attempt to angle a nail or staple into the work surface more than about 10°; more than that may cause the fastener to ricochet off the work.
10. Pull the trigger lightly. A heavy pull may result in the gun driving two nails.
11. Before loading or unloading nails into the magazine, make sure the magazine is completely empty, then load the fasteners. Failure to do so may result in misfire, damage to the tool, or a fastener too long for the job.

4.1.19 Pocket Hole Jig

The Pocket Hole Jig is used to make precise pocket-hole joinery. Pocket-hole joinery involves drilling an angled hole into the face of one workpiece and then joining it to a second workpiece with a self-tapping screw. The Kreg Pocket hold Jig clamp allows you to clamp the work piece and drill holes at the correct angle and depth for pocket screws.



Figure 18–Kreg Pocket Hole Jig

Safety and Use

1. Safety glasses are required. Dust masks are recommended but not required.
2. Stay focused on the tool and the work being performed.
3. Determine the size of the workpiece
4. Set the drill bit on the Kreg Pocket Hole Jig for the size of the workpiece
5. Place the workpiece in the Kreg Pocket jig at the location that you want to drill the pocket holes and clamp it in the jig.
6. Drill the holes desired to secure the workpiece
7. Unclamp the workpiece
8. Join the two workpieces using the correct length pocket hole screws
9. Push the part firmly against the fence in order to depress the safety buttons. The safety buttons are two silver button-head screws on either side of the drill. The machine will not perform a pocket cycle unless these are depressed when the foot switch is pressed.

4.1.20 Craftsman Drill Presses

There are two Craftsman Drill Presses in operation in the FLPC Wood Shop:

- Large Standalone Drill Press
- Small Bench Top Drill Press

The Drill Press is an excellent machine for drilling accurate holes and is invaluable when drilling large holes. It consists of a motor/head assembly, chuck, and work table. Any uses other than drilling holes are special setups and must be approved by the Wood Shop Steering Team.



Figure 19–Craftsman Drill Presses

Safety and Use

1. Safety glasses are required. Dust masks and hearing protection are recommended but not required.
2. Stay focused on the tool and the work being performed.
3. The procedure of changing spindle speed varies from drill press to drill press. Check with your Wood Shop Steering Team prior to making speed adjustments.
4. Be certain that the table and head of the drill press are secure.
5. Select the proper drill bit for the job and avoid dull bits.
6. Insert the drill bit in the chuck properly and tighten it securely before starting the drill press.
7. Remove the chuck key before turning on the power and before leaving the area of the drill press. If the chuck key is not removed, it will be thrown out from the chuck at a tremendous speed when the power is turned on.
8. Use clamps or a drill vise whenever necessary to secure small or odd shaped work firmly.
9. Larger bits should be run at slower speeds and smaller bits at higher speeds. This keeps the cutting edge of the bit at a reasonable speed.
10. Use a backer board under the work or be sure the bit is over the center hole in the table when boring completely through your work.
11. Keep hands away from the rotating spindle.
12. Operate the feed lever so that drill cuts at a consistent feed rate into work.
13. Ease up on feed pressure when the bit begins to break through the work.

14. Back the bit out often to clear chips from the hole.
15. When boring to a given depth, use the depth adjustment nut or feature.
16. Stop the drill press before removing your work.
17. If work comes loose and is seized by the drill press, shut off the power immediately if you can do so without endangering yourself. If it is impossible to shut off the power, move away from the machine and move others away. Notify the Wood Shop Steering Team immediately.

4.2 Major Equipment Requiring Endorsement Before Use

This section describes the major equipment in the FLPC Wood Shop. Before any FLPC Wood Shop Member can use any of the equipment in this section they must pass an equipment test and demonstrate to the Wood Shop Steering Team or that they are capable of setting up and operating this equipment safely.

4.2.1 General Safety for Standard Power Tools and Equipment

The general safety requirements for all handheld power tools are as follows:

1. **Eye protection is required when using any of the tools or pieces of equipment described in this section. Hearing protection and dusk masks are required for specific pieces of equipment. These requirements are defined for each tool or piece of equipment in this section.**
2. **Stay focused on the tool and the work being performed.**
3. Keep work area clear of other tools and materials.
4. Use the right tool for the job.
5. Seek help if you are unsure of tool operating procedures.
6. Keep hands and fingers clear of the tools blade or bit and cutting path.
7. Secure work to bench when using electric hand tools.
8. Do not over-reach with electric hand tools.
9. Make all adjustments on the tool with the power cord unplugged.
10. Do not carry plugged in tools with finger on power switch.
11. Use only grounded extension cords.
12. Always keep tool guards in place.
13. Let the tools bits and the blades do the work. Do not force tools into the material.

14. Unplug or remove the battery and clean and put away tools when finished working.

4.2.2 Jet Left Tilting 10" Arbor Table Saw

Although the Table Saw is one of the most useful machines in the wood shop, it is also one of the most dangerous. 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 resawing. With the use of special jigs, joinery like tenons and box joints can be made. In addition, the blade can be tilted for cutting bevels and miters.



Figure 20–Jet Left Tilting 10" Arbor Saw

The table saw in the FLPC Wood Shop uses a 10" diameter blades and tilt left (that is, away from the fence). There are three different types of blades available depending on what type of cuts you are making. Have the FLPC Wood Shop Steering Team help you select the right saw blade for your work and to change the saw blade. The Jet Arbor saw must be turned off and then unplugged from its 220 V power source before the blade can be changed.

The Jet Arbor Saw has a built-in MAIN POWER SWITCH. To start the blade, make sure that the saw blade is at the right height and that there is nothing obstructing the blade or on the Jet Arbor Saw table. Then push the green START switch, and wait until the saw is up to speed to start your cut. To stop the Jet Arbor saw push the Red Stop button. Then wait until the saw is completely stopped before removing pieces of wood that you have cut.

Safety and Use

1. Safety glasses and hearing protection are required. Dust masks are recommended but not required.
2. Stay focused on the tool and the work being performed.

3. The number one cause of injuries on the table saw is kickback. Kickback occurs when the operator loses control of the material being cut and it is thrown from the machine with great force.
4. When cutting, the saw blade should project $\frac{1}{4}$ - $\frac{3}{8}$ " above the stock or enough to clear the common gullets.
5. The fence is used to guide ripping operations. The miter gauge or sled is used to guide crosscut operations. Always hold the work firmly against the fence, sled, or miter gauge.
6. During a rip cut, once the material has moved away from your left hand, move your left off the table. Do not drag your hand across the table and never reach over the blade.
7. You must use a push stick when ripping pieces that are 6" or less in width.
8. Cutting workpieces shorter than 10" in length is a special setup; get permission from the Wood Shop Steering Team or aide prior to cutting.
9. Performing on-edge resawing is a special setup. You must get specific instruction and special permission from your Wood Shop Steering Team. The resaw fence should be used when resawing material wider than the height of the rip fence.
10. When ripping stock, the piece between the fence and blade must be controlled and pushed past the blade and splitter all the way off the throat plate. Failure to do so may result in a kickback.
11. When you are ripping stock, the scrap must fall to the outside (non-bound side) of the blade (not between the blade and fence).
12. Lowering stock directly down over the saw blade is dangerous and is never allowed.
13. Procedures involving raising the blade into the work are special setups. Permission and instructions must be obtained from your Wood Shop Steering Team prior to performing this type of work.
14. The splitter must always be in place behind the blade except when the Wood Shop Steering Team has authorized its removal for special setups.
15. Make adjustments or measurements at the blade only when the power switch is off, the saw is unplugged and the blade is at a complete stop.
16. The main power switch should be placed in the off position when you leave the saw.

17. Freehand cutting, ripping, or crosscutting without using the fence, sled, or miter gauge is ABSOLUTELY FORBIDDEN in all circumstances.
18. Do not reach or pass wood over the saw blade any time the blade is spinning.
19. When helping someone to tail-off (supporting the work hanging off the back of the saw table), your only purpose is to support the stock from below. Only the operator pushes the stock through the saw.
20. Make sure the blade is stopped and completely lowered when clearing scraps from the table.
21. The Wood Shop Steering Team must approve all special setups and dado blade installations before the power is turned on.
22. Use a special setup with V-block or sled when cutting cylindrical stock to help keep it from spinning.
23. If you need to stop the saw in the middle of a cut, stop what you are doing without moving your hands and turn off the saw.
24. Backing the stock away from the blade while the saw is running is forbidden. If it is necessary to remove a workpiece, always stop the saw first.
25. The piece between the blade and the fence or a stop must always be under the operator's control. If uncontrolled, it can bind and cause a serious kickback.
26. If the fence is used at the same time as the miter gauge, the miter gauge must be between the fence and the blade. This is a special setup.
27. When you are crosscutting a number of pieces to the same length using the miter gauge, clamp a clearance block to the rip fence well ahead of the saw blade to prevent the cut piece from being pinched between the blade and fence.
28. Stock edges or faces that contact the table, miter gauge or fence, must be straight and flat.
29. Seek assistance and direction from your Wood Shop Steering Team before milling materials with defects such as splits, warps and knots.
30. Changing the saw blade for non-standard operation. If you are unsure of how to perform this task, ask an FLPC Wood Shop Steering Team member or Full Access Member for help.
31. Using the dado set is a special setup. If you are unsure of how to perform this task, ask an FLPC Wood Shop Steering Team member or Full Access Member for help.

4.2.3 Jet and Freud Router Tables

There are currently two router tables available in the FLPC Wood Shop:

- Jet Router Table with a Bosch 1.5 HP router
- Freud Router Table with 3 HP Makita Router

One way to increase a router's usefulness is to mount the base to the underside of a table. The bit then protrudes up through the table and the piece being routed is moved past the bit. This configuration makes for a very stable and controlled routing process and is the desired configuration whenever possible. Using the router table is not possible, however, for large workpieces or for those that cannot be moved to the router table. The procedures for using a router at the router table are similar to those for a hand-held router, with the following additional information.



Figure 21–Jet Router Table & Lift with Fence

Safety and Operations

1. Safety glasses and hearing protection are required. A Dust Mask is recommended but not required.
2. Stay focused on the tool and the work being performed.
3. Move the workpiece in the proper direction. If only one side of the bit is being used, move the work against cutter rotation. If the bit is cutting on both sides, feed the work so that the bit pushes the work towards the fence (when applicable).
4. Use slower router speeds for longer bits. This is especially important at the router table, since large bits are more likely to be used here.
5. On the Bench Dog router lifts: Do not change router bits without first removing the throat plate.

6. Use the throat plate that leaves the smallest opening around the router bit.
7. When routing small or narrow pieces, use a backer board and/or a push stick to ensure proper support, along with a fence with a small or no opening.

4.2.4 Craftsman Jointer

The Jointer is primarily used for flattening the face of a board and straightening and squaring the edges of a board. In special circumstances, it may also be used for rabbeting, bevelling and tapering. The stock is placed on the infeed table and pushed, with the aid of a push stick or push block, over the cutterhead and onto the outfeed table. The fence is used to help guide the stock. The length of the cutterhead, which defines the size of a jointer, indicates the widest board that can be surfaced.



Figure 22–Craftsman 6" Jointer

Safety and Use

1. Safety glasses and hearing protection are required. A Dust masks is recommended but not required.
2. Stay focused on the tool and the work being performed.
3. Ensure that the guard is over the knives at all times while the jointer is being operated.
4. The most stable side of the stock should be toward the table, often it is the most concave face.
5. Adjust the depth of cut before turning on the power. For most cuts, the jointer should be set for 1/32".
6. The maximum depth of cut is 1/16".
7. The minimum length of stock for jointing is 14".

8. Keep all body parts at least 6" from the cutterhead. Never place your hand directly on the piece being jointed within 6" of the cutterhead.
9. Use a push stick or push block when face-jointing flat pieces of stock or for edge-jointing any piece lower than the height of the fence.
10. Never joint the face of stock less than 1/4" thick.
11. Push the stock clear of the cutterhead and make sure the guard has returned over the throat and knives before picking up stock.
12. To avoid rocking of the stock during cutting, always place the concave or most stable side of the stock on the table.
13. The outfeed table must be at the same level as the knives and is **NEVER to be adjusted anyone but an FLPC Staff member.**
14. Never joint "end grain". It is a dangerous practice, especially on narrow pieces, and the jointer tends to splinter the work at the end of the cut.
15. Examine stock for loose knots and splits and avoid cutting these if possible.
16. Operations involving "stop cuts" or "drop cuts" require that the stock be held in place by a stop or clamp. The Wood Shop Steering Team must approve these special setups.
17. Never attempt to run a piece of wood across the jointer until the machine is running at full speed.
18. Your Wood Shop Steering Team must check special setups on the jointer for special operations such as rabbeting, beveling, chamfering, or tapering.
19. Use only clean, dry lumber on the jointer.
20. On stock that is severely warped, rough rip using the Band Saw or Track Saw to make the material narrower and/or rough crosscut using the Compound Miter Saw to make the material shorter. This eliminates much of the warp. Then joint the faces as usual.
21. Material must be pushed through the jointer and never pulled.

4.2.5 Delta Planer

The Planer is used to smooth lumber to an even thickness. 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, which supports the board and acts as a reference surface. The cutterhead, located above the workpiece, then planes the opposite face and makes it parallel to the jointed face. The width of the cutterhead, which defines the size of a planer, indicates the widest board that can be surfaced.



Figure 23–Delta 12" Planer

Safety and Use

1. **Safety glasses and hearing protection are required. A Dust mask is recommended but not required.**
2. **Stay focused on the tool and the work being performed.**
3. **Ensure that the guard is over the knives at all times while the jointer is being operated.**
4. Do not remove more than 1/16" of wood in one pass (1/2 turn of the table height adjustment wheel).
5. Adjust the initial depth of cut to the thickest part of the board.
6. The stock must be longer than the distance between the infeed and outfeed rollers. The minimum length of stock for planing is clearly marked on each planer.
7. Do not plane stock to less than 1/4" thick. To plane thinner stock, run it through the planer with a backer board. For this special setup, obtain the Wood Shop Steering Team's permission.
8. Never put your hands into the planer.
9. If a board needs to be realigned on the table after being gripped by the cutterhead, use care to keep your fingers clear of the table and feed rollers.
10. Never change depth of cut after stock has been started through the planer.
11. Do not plane stock with large cracks or loose knots.
12. Always plane wood with the grain, never across or perpendicular to the grain; the planer will shred the wood.
13. Always ensure that the machine has reached full speed before inserting the wood in the machine.

14. Plane pieces of varying thickness in progressive order, starting with the thickest first.
15. Because of the possibility of flying particles, do not look into the planer while the machine is running. Stand in an upright position and to one side while you are operating this machine.
16. Only the location of walls and other equipment surrounding the planer limit the maximum length of stock that can be surfaced or planed.
17. A Planer will produce two flat, parallel faces only when the surface that was put on the table was flat and smooth to begin with. Planing a warped board will only produce a warped board of even thickness.
18. Kickbacks are infrequent but possible on a planer.
19. Only the Wood Shop Steering Team may adjust the speed of the planer's feed rollers. If the stock gets stuck in the Planer, do the following, in this order:
 - Gently push the stock into the planer; do not overly force the ?
 - If that does not work, shift the stock at a slight angle while keeping your fingers clear of the table.
 - If that does not work, lower the table 1/8 turn of the adjustment wheel and repeat steps a and b until the stock starts feeding again. If the stock still will not proceed through the planer repeat steps a, b, and c until the stock starts feeding again. Do not turn the wheel more than 1/8 turn at a time; the feed rollers could lose contact with the stock and a kickback could occur.
 - **Note:** Do not turn the power off while stock is in the planer; you could damage the cutterhead.

4.2.6 Compound Miter Saws (Chop Saw)

There are two 10" Compound Miter Saws currently in use in the FLPC Wood Shop. They are the Milwaukee and Red Eye saws. The Compound Miter Saws are the best tool in the shop for accurately crosscutting surfaced lumber to length. It is extremely useful for making all cuts from 90° to ±45°. The Compound Miter Saw is one of the most dangerous machines in the shop. Use care in its operation.



Figure 24–Pictures of Compound Miter Saws

Safety and Use

1. Safety glasses and hearing protection are required. A Dust mask is recommended but not required.
2. Stay focused on the tool and the work being performed.
3. Keep protective guards in place at all times.
4. Remove scraps and other foreign items from the machine before operating the saw.
5. Make sure the piece to be cut is firmly against the table and fence before cutting.
6. Allow the blade to reach full speed before cutting.
7. Do not force the tool into the work.
8. Never hold the piece to be cut in a manner that causes your arms to cross. The majority of all cuts are made on the miter saw with the material held with the left hand on the left side of the saw while the right hand operates the machine.
9. Do not leave the area of the machine until the blade has come to a full and complete stop.
10. Always maintain a 6" margin of safety between all body parts and the blade.
11. Remove chips, scraps and cutoffs only after the blade is at a complete stop.
12. After placing the stock securely on the saw table and aligning the cut, pull the trigger. After the blade comes to full speed, lower the blade into the work at a moderate speed. When the cut is complete release the trigger and allow the blade to come to a complete stop before returning it to the upright position.
13. Use a stick or other hold down device when needed to secure short material without putting your hand in danger.

14. The operator should hold the workpiece in place, rather than the off-fall, for all cuts.
15. NEVER use the chop saw to cut rough material.

4.2.7 Bandsaws

There are two bandsaws in the FLPC Wood Shop. They are:

- Jet 14" Bandsaw
- Craftsman 12" Bandsaw

The Bandsaw is almost indispensable for making curved cuts and resawing (cutting wood to make it thinner). The blade is a thin loop of steel, typically $\frac{1}{4}$ to $\frac{1}{2}$ inch wide. The blade runs over wheels above and below a table, allowing wood to be cut where blade is traveling downward through the table. The size of a Bandsaw is determined by the diameter of the wheels, which roughly indicates the largest piece that can fit between the blade and the body of the saw. The Bandsaw is the fastest cutting saw in the woodworking shop. It is a rough cutting and shaping tool not intended for finish cuts.



Figure 25–Jet and Craftsman Band Saws

Safety and Use

1. Safety glasses and hearing protection are required. A Dust masks is recommended but not required.
2. Stay focused on the tool and the work being performed.
3. Adjust the upper guide and guard to about $\frac{1}{4}$ " above the stock with the machine at a full stop.
4. Allow the saw to reach full speed before starting to feed your work.
5. Plan cuts carefully; lay out and make relief cuts before cutting long curves and curves of small radii. Turning holes should be made where

- required. Plan work so that all cuts will be made in the forward direction.
6. If the stock binds or pinches the blade, do not attempt to back the stock out. Shut the power off and remove the stock after the machine stops. Backing the material out while the machine is running could pull the blade off the wheels.
 7. 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.
 8. Keep the floor areas surrounding the saw clear of scraps.
 9. If the blade breaks, stand clear and shut off the power if possible. Keep others clear until the machine stops completely and notify the Wood Shop Steering Team.
 10. Never adjust the saw while it is running.
 11. Do not place your fingers close to the saw blade when cutting stock. Always maintain a 4" margin of safety.
 12. If it is necessary to back the material out of a long cut, turn the power off and wait for the blade to stop. Seek assistance from the Wood Shop Steering Team if the material does not freely come out.
 13. To stop the band saw make sure the power is off then apply gentle pressure on the brake pedal until the blade stops. Leave the machine only after the blade has stopped moving completely.
 14. Your Wood Shop Steering Team should approve all resawing and other special setups.
 15. Use a pushstick when resawing.
 16. When resawing, the edge of the stock on the table must be straight and the face of the stock against the resaw fence must be flat.
 17. Keep upper and lower doors closed and all guards in place.
 18. Use a pushstick or guide for cuts that would place your hands near the saw blade.
 19. Cutting cylindrical or irregular stock on the band saw may be done only with a special jig, such as a V-block. This is a special setup. Get help from an FLPC Wood Shop Steering Team Member to perform this operation.
 20. Never stand or allow others to stand to the right of the band saw when it is running.

21. If you hear a clicking noise, turn off the saw at once. This indicates a crack or kink in the blade as it passes through the guide.

4.2.8 Jet Lathe

The Lathe is used to make round or cylindrical shapes. Its primary components are the bed, headstock, tailstock, and tool rest. The work is rotated using a motor in the headstock; various tools are used at the tool rest to shape the work. The tailstock is used to support longer work at the opposite end of the bed. The Lathe can be used to make a variety of turned objects, including table or chair legs, spindles, goblets, and bowls.



Figure 26—Jet 16" Lathe

Safety and Use

1. Always wear a face shield when operating the lathe. Dust masks and hearing protection are recommended but not required.
2. Stay focused on the tool and the work being performed.
3. Remove or fasten any jewelry, loose clothing and roll sleeves above your elbows. Tie long hair up and back.
4. Be sure belt covers are in place and closed.
5. Keep the floor where you are standing clear of chips to provide good footing.
6. Make sure the stock is free from checks, loose knots, or other defects.
7. Make sure the stock is correctly mounted on the lathe.
8. For faceplate turning, carefully select the screws used to secure the work. The screws must be properly sized for the design; they must not contact the cutting tools while you are working. Use a screw in every hole provided in the faceplate.
9. Make sure all screws are tight and check them occasionally.
10. Clamp the tool rest holder and tool rest firmly.
11. Adjust the tool rest only when the lathe is at a complete stop.

12. Keep the tool rest as close as reasonably possible to the stock by frequently stopping the lathe and adjusting the tool rest.
13. Adjust the tool rest height so the cutting edge of the tool is at or just below the center of the workpiece.
14. Before turning on the lathe, rotate the stock at least one full revolution by hand to make sure it clears the tool rest and all parts of the lathe.
15. Always hold the turning tool firmly against the tool rest.
16. Remove the tool rest when sanding, polishing, or finishing the workpiece.
17. Use a tailstock with a bearing center (live center) whenever possible.
18. Adjust the tailstock center so that the point is firmly embedded in the stock without impeding free rotation.
19. Run the lathe at slow speed when beginning any turning operation. When the stock is balanced and does not vibrate the speed may be increased.
20. If the lathe vibrates, it is running too fast or the stock is not properly secured. Stop the lathe and correct the problem.
21. The speed selector on a variable speed lathe must be operated only while the lathe is turning. A variable speed lathe does not have a belt that is moved between different sized pulleys to change the speed; it typically has a knob or handle on the front that can be rotated.
22. Stand to the side when starting the lathe.
23. Keep your hands away from the stock while it is rotating.
24. Keep your tools sharp since dull tools are harder to control and leave a rough surface on the work.
25. Stop the lathe to make measurements with callipers.
26. When polishing use a small rag folded in a pad, not wrapped around your finger.
27. Sand and polish only on the underside of the work.
28. Cut faceplate stock round on the band saw before mounting on the faceplate.
29. Allow glued stock or mounting blocks to cure at least 24 hours before using.
30. On faceplate turnings keep an accurate check on cutting depth to avoid striking the mounting screws.

5. Future Equipment for the FLPC Wood Shop

The equipment listed in this section is equipment that the FLPC Wood Shop Team needs to add to the shop, to make it fully functional, as funding becomes available. It is included here for planning purposes.

5.1 New Jointer

The existing Craftsman Jointer is old, too small, and the safety shield does not work properly. Therefore, the FLPC Wood Shop needs to purchase a new larger Jointer as soon as possible.

5.2 Sanders

This section describes the various types of Sanders that would be extremely useful in the FLPC Wood Shop.

1. **Drum Sander**—Drum sanders excel at smoothing lumber. A planer can be used for the same purpose, but planers can cause tearout on difficult grain. A wide belt sander will never cause tearout.
2. **Edge Sanders**—The Edge Sander is basically a large belt sander laid on its side. It is extremely useful for sanding long edges like face frames and frame-and-panel doors. Care must be taken to use it correctly, as abuse can ruin the belt, destroy your work, and injure you. Like the disc sander, it is a relatively safe machine, but can result in painfully skinned fingers if the operator is not careful.

5.3 Horizontal Boring Machine

The horizontal boring machine is used to drill holes for dowel joints. It is easier to use than the drill press since the work is typically held flat on its largest side and clamped with an integral cam or pneumatic ram.

5.4 CNC Machine

The CNC machines can perform a variety of different tasks for cabinetmakers and furniture makers alike. The shop has several small 3-axis “benchtop” machines, several large 3-axis machines, and one large 5-axis machine. Students interested in using these machines must take the courses on how to operate them.

5.5 Mortisers

This section describes the two types of Mortisers that the FLPC Wood Shop plans on purchasing in the future. They are not currently available in the Wood Shop.

1. **Horizontal Slot Mortiser**–The slot mortiser is used for making slots or mortises. It is made up of a horizontally mounted motor/chuck assembly and an adjustable table. The table can be moved vertically and horizontally and the motor can be moved in and out relative to the base, making the mortiser very versatile for machining mortises.
2. **Hollow Chisel Mortiser**–The Hollow Chisel Mortiser is uniquely capable of making a square hole. It does so by forcing a hollow, four-sided chisel into the wood, and removing the encircled waste with a special drill bit. Due to the forces involved, a lot of heat is generated. Setup of this machine is critical; improper positioning of the chisel and bit can ruin the tool or the workpiece.

6. Glossary

Note that the following terms are defined in the context of the woodworking shop and may be different from definitions found elsewhere.

- **Backer board**—a piece of wood or plywood placed on the back side of a workpiece in order to provide support or minimize tearout
- **Bevel**—an angled edge or end, where the entire surface of the edge or end is angled (different from a chamfer)
- **Chamfer**—an angled surface on the edge or end of a board that spans from the edge or end to the face (different from a bevel)
- **Chuck**—a device (usually on a drill or drill press) used to clamp a bit in place, capable of gripping a large range of bit or shank sizes and often utilizing a key to operate
- **Collet**—a device (usually on a router) that clamps a bit in place, sized for a specific bit or shank diameter, e.g. ¼" or ½", and utilizing one or two wrenches to operate
- **Crosscut**—to cut across the grain
- **Cutterhead**—a cylindrical block with knives or cutters positioned around its perimeter
- **Dado**—a groove running across the grain
- **Dado head**—a set of blades stacked side-by-side for use on the table saw, used for making dados or grooves
- **Edge**—the smaller pair of surfaces (relative to the face) on a board that exhibit long grain
- **End**—the pair of surfaces of a board that exhibits end grain
- **End grain**—wood fibers that are oriented perpendicular to the surface of a piece of lumber (as seen on the ends of a board)
- **Face**—the largest pair of long-grain surfaces of a board
- **Fence**—a beam or board used to guide a workpiece past a blade or bit
- **Green**—a term used to describe lumber that has not been dried
- **Grain**—the cylindrical fibers (like soda straws) which make up lumber, oriented along the vertical axis of a tree
- **Joint**—to flatten and smooth the face or edge of a board using the jointer (see the Jointer section in this manual)
- **Kerf**—the slot created by a blade or bit

- **Kickback**—a dangerous situation in which a workpiece is forcibly ejected from a machine, often at tremendous speed
- **Long grain**—wood fibers that are oriented parallel to the surface of a piece of lumber (as seen on the faces and edges of a board)
- **Lumber**—a solid wood board
- **Margin of Safety**—the minimum distance the operator’s hands, fingers, or other body parts should be from a cutter, blade, or bit
- **MDF Medium Density Fiber Board (MDF)**—a man-made sheet material made of fine particles glued together to make a smooth-faced, stable product
- **Melamine**—a man-made sheet material made from particle board with a thin layer of plastic on one or both faces, often used for cabinet construction
- **Mortise**—a hole or slot with at least two flat sides into which another part is inserted (typically a tenon)
- **Offcut**—the part of a piece being cut that is on the far side of a blade and is therefore not typically held or controlled by the operator
- **Particle board**—a man-made sheet material made from medium-sized particles glued together to make a moderately smooth-faced, stable product (coarser than MDF)
- **Plane (v.)** —to flatten and smooth the face or edge of a board using a plane or planer (see the following entries)
- **Plane (n.)**—a hand tool used to smooth and flatten a surface (also referred to as a hand plane)
- **Planer**—the stationary machine described in this document used to make the face of a board smooth and parallel to the opposite face
- **Platen**—a flat reference surface, typically the surface on which a belt-sander belt runs
- **Pushblock**—a safety device with a broad base and handle used to guide a workpiece past a cutter, blade, or bit, thereby keeping the operator’s hands at a safe distance
- **Pushpad**—a safety device with a broad soft base and handle used to guide a workpiece past a cutter, blade, or bit, thereby keeping the operator’s hands at a safe distance.
- **Pushstick**—a safety device used to guide a workpiece past a cutter, blade, or bit, thereby keeping the operator’s hands at a safe distance
- **Rabbet**—a stepped surface on the edge or end of a board

- **Resaw**—to cut a piece of wood in order to make it thinner
- **Rough**—a term used to describe lumber that has not been surfaced (smoothed) on its faces or edges
- **Rip**—to cut with the grain
- **Sheet good**—man-made sheet material, like plywood, melamine, or MDF
- **Sled**—a carrier consisting of a base and fence for controlling a workpiece during a cutting operation, typically guided in some way (by runners or an external, stationary fence)
- **Special setup**—a machine operation that exposes the operator to greater than average risk; a special setup requires Wood Shop Steering Team approval prior to operating the machine
- **Stock**—the piece being worked (same as Workpiece)
- **Tearout**—torn or damaged fibers, typically caused by a blade or bit exiting the workpiece
- **Track**—on a belt sander, to adjust the belt to run true on the machine and not off to one side
- **Trigger lock**—the button on some hand-held power tools that locks the trigger in the ON position
- **V-block**—a block with a V-shaped channel along its length
- **Warp**—a lumber defect describing stock that is not flat; the four types of warps are cup, bow, crook, and twist
- **Workpiece**—the piece being worked (same as Stock)