

Wood Shop Orientation and Safety Training



Wood Shop Rules

- 1. Safety glasses must be worn at all times.**
- 2. Proper attire must be worn at all times.** (Loose or dangling clothing, hair, or jewelry and open-toed shoes are not allowed.)
- 3. Students must complete orientation and safety training before they will be allowed in the Wood Shop.**
- 4. Students may not work alone in the Wood Shop.**
- 5. Students may only use machines and power tools for which they have received training.**
- 6. Absolutely, positively no horseplay is allowed in the Wood Shop.**
- 7. Students have access to the Wood Shop Monday through Friday from 8:30am to 4:30pm.**
- 8. Students may only use the Wood Shop to work on projects related to courses they are taking at Trinity College.**
- 9. Students may not take tools out of the Wood Shop without the permission of the department Technician.**
- 10. Students must clean up any mess they make and put away any tools they use before they leave the Wood Shop.**
- 11. Wood Shop doors must remain closed at all times.**
- 12. Food and beverages are not allowed in the Wood Shop.**
- 13. Pressure-treated wood is not allowed in the Wood Shop.**
- 14. Students failing to comply with these rules will lose the *PRIVILEGE* of using the Wood Shop.**

Training Overview

Wood Shop Orientation and Safety Training is intended to:

- Familiarize students with the Wood Shop and its resources
- Introduce students to the machines and power tools they are most likely to use, the:
 1. sliding compound miter saw
 2. table saw
 3. band saw
 4. drill press
 5. corded drill
 6. cordless drill
 7. impact driver
 8. jig saw
 9. circular saw
 10. belt and disc sander
- Demonstrate how to use those machines and power tools safely
- Give students hands-on experience in operating those machines and power tools safely

Students may only use machines and power tools for which they have received training!

- Students wishing to use other machines and power tools present in the Wood Shop must first schedule additional training with the department Technician.

Safety First!!!

The most important to remember when working with machines and tools of any kind is ***Safety first!***

Accidents happen quickly, and they can result in serious injury and even death.

That is why it is absolutely essential that anyone using machines and power tools respect all that they can do: both the good and the bad.

So remember, whenever you are in the Wood Shop, your primary focus should always be:

Safety first!

Best Practices for Safety

- **Do not rush** – Always work in a slow, thoughtful, and careful manner.
- **Always maintain your balance** – Physically, that means maintain an athletic, well balanced stance that allows you to react quickly. Mentally, that means never work in the Wood Shop when you are angry, upset, or distracted.
- **Keep the shop clean** – It reduces the chances of accidents occurring.
- **Beware of saw dust on the floor** – Sweep up saw dust before it becomes a slip hazard...whether you generated it or not.
- **Never leave a running machine**
- **If anything unusual happens – e.g. weird sounds, weird smells, weird events – turn off the machine immediately and find the department Technician or your instructor**
- **If you do not remember or do not know how to do something, ask the department Technician** – Never hesitate to ask a question. I want you to be safe, and I want you to be successful. **SO, IF YOU HAVE QUESTIONS, PLEASE ASK.**

If an Accident Occurs in the Wood Shop

If an accident occurs in the Wood Shop, a First Aid Kit, fire extinguisher, and campus telephone are located to the right of the doors as you leave the room.

In the event of an emergency, call Campus Safety at x2222.

Students are required to report all accidents and near-misses to the department Technician and their instructor.

A Quick Tour of the Wood Shop

Machines and Work Tables

To be discussed during the hands-on portion of this training.

Red Tool Chest

The red tool chest contains measuring instruments, hand tools, power tools, and other miscellaneous items.

Recycled Wood Area

The Recycled Wood Area contains pieces of wood left over or reclaimed from previous projects. Students are free to take wood from this area for use in their projects. **However, students must always inspect this wood carefully for defects.** Defects can be either naturally occurring (e.g. knots, splits, or cups) or man-made (e.g. screws, nails or other pieces of metal in the wood). **If a man-made defect cannot be removed completely, highlight the defect with pen or Sharpie marker, and put that piece of wood in the gray scrap wood bin.** (Please see below.)

Recycled Materials Area

The Recycled Materials Area contains metal, PVC pipe, Plexiglas, angle iron, and other miscellaneous items left over or reclaimed from previous projects. Students are free to take items from this area for use in their projects.

Waste Disposal

Two waste disposal bins are located in the Wood Shop:

- Gray, square waste bin – for **solid pieces** of scrap wood **only**
- Yellow, circular trash can – for everything else, including saw dust

Watch Out for Overhead Lights

When handling long pieces of wood, be very careful not to break one of the overhead lights.

Ear Plugs and Hand Soap

Disposable ear plugs are available for student use and may be found with the safety glasses. If you decide to wear ear plugs, it is suggested that you put them in when you first enter the shop, before your fingers get dirty.

Gojo Natural Orange Pumice Hand Cleaner is available for student use and may be found on the sink in the ME Lab.

Clean-up

Before leaving the Wood Shop, students are **required** to put away all of the tools they have used and to clean up any mess they have made. Vacuums, brooms, and dust pans have been provided for this purpose.

Students who do not clean-up after themselves will lose Wood Shop privileges.

General Information about Wood

Wood: A Bundle of Straws

When working with wood, it is helpful to think of it as a bundle of straws, with the straws representing the wood fibers. Cutting across the fibers (perpendicular to the straws) is easier and safer than cutting in line with the fibers (parallel to the straws).

Dimensional Lumber vs. Plywood

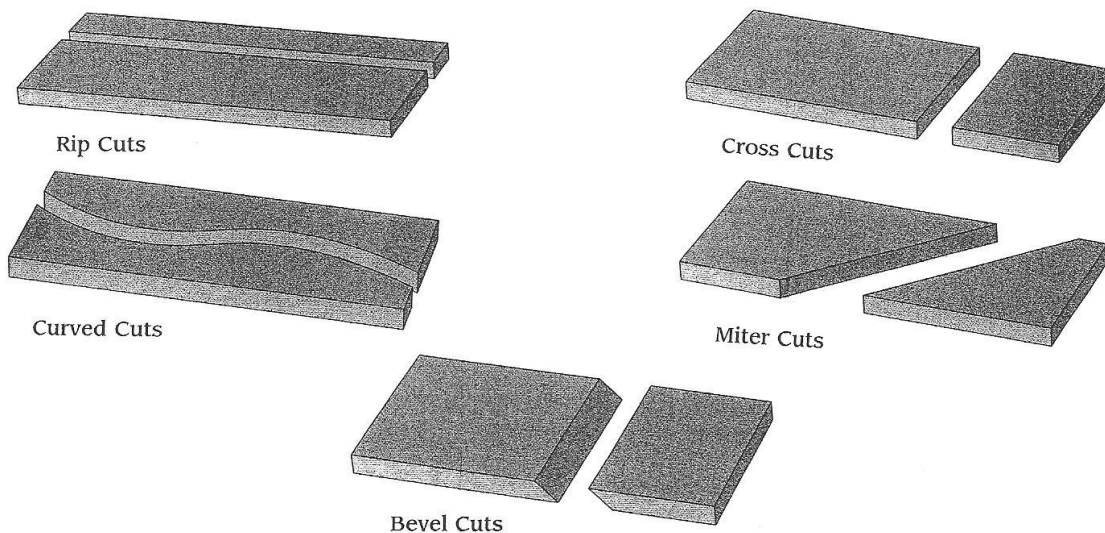
A piece of dimensional lumber, e.g. a “2x4”, is a single piece of wood. All its wood fibers run in the same direction.

Plywood is composed of a multiple thin pieces of wood glued together. The fibers of one thin piece are perpendicularly oriented to the fibers of the next thin piece.

Types of Cuts

There are many different ways to cut wood. The two main types of cuts you are most likely to make are cross cuts and rip cuts. You may also make curved, miter and bevel cuts. As you will see, different power tools excel at different cuts.

- **Cross cut** – cutting perpendicular to the wood fibers and / or cutting a piece of plywood to length
- **Rip cut** – cutting parallel to the wood fibers and / or cutting a piece of plywood to width
- **Curved cut**
- **Miter cut** – an angled cut across the face of a piece of wood
- **Bevel cut** – an angled cut across the depth of a piece of wood



Kickback

“Kickback” occurs when the moving blade of a power tool catches on the piece of wood being cut resulting in either the piece of wood or the tool being thrown. Kickback is potentially very dangerous and can result in serious injury. We will discuss kickback – and how to avoid it – as we examine the individual machines and power tools.

Do Not Cut Wet Wood

First, cutting wet wood on the table saw would activate its safety system unnecessarily. This would result in the table saw being unavailable for student use until the safety system is reset. Resetting the safety system takes a significant amount of time and costs a significant amount of money.

Second, cutting wet wood with other tools creates safety issues due to increased frictional forces and increased risk of kickback.

Wood Shop Tell-Show-Do

Since time limitations do not allow us to fully examine all their possible uses and applications, we will examine each machine and power tool in the context of how students are most likely to use them in their Engineering course work at Trinity College.

Sliding Compound Miter Saw

Most Likely Student Uses

- Making cross, miter, and bevel cuts in dimensional lumber and plywood
- Cutting PVC pipe

Sliding Compound Miter Saw Safety

1. Hold the wood being cut firmly against the fence

Technician Demonstration & Student Questions

Student Hands-On Experience

Drill Press

Most Likely Student Uses

- Drilling holes

Drill Press Safety

1. Never leave the chuck wrench in the chuck
2. If you are not sure you can hold the piece of wood securely in place, clamp it or put it in a vice
3. Hold small work pieces in a vice

Technician Demonstration & Student Questions

Student Hands-On Experience

Hole Saw Kit, Spade Bits, and Forstner Bits

The hole saw kit enables you to drill large diameter holes. Spade bits allow you to locate the center of your hole very precisely. Forstner bits allow you to make flat bottom holes in a piece of wood. When using the hole saw kit, spade bits, or forstner bits:

- Use a sacrificial piece underneath the board you are drilling to prevent damage to the underlying surface
- Clamp the piece of wood you are drilling

Corded Drill

Most Likely Student Uses

- Drilling holes and driving screws

Corded Drill Safety

1. Make sure the piece(s) of wood you are working on is (are) properly secured
2. Hold small pieces of wood in a vice or clamp them

Technician Demonstration & Student Questions

Student Hands-On Experience

Cordless Drill

Most Likely Student Uses

- Drilling holes and driving screws

Cordless Drill Safety

1. Make sure the piece(s) of wood you are working on is (are) properly secured
2. Hold small pieces of wood in a vice or clamp them
3. Do not store loose pieces of metal (e.g. spare bits, screws, etc.) in the case. They could short the spare battery's terminals, potentially leading to overheating and battery damage.
4. If leaked battery electrolyte gets in your eyes, rinse with clear water and seek immediate medical attention
(May result in loss of eyesight.)

Technician Demonstration & Student Questions

Student Hands-On Experience

Impact Driver

Most Likely Student Uses

- Driving screws

Impact Driver Safety

1. Make sure the piece(s) of wood you are working on is (are) properly secured
2. Do not store loose pieces of metal (e.g. spare bits, screws, etc.) in the case. They could short the spare battery's terminals, potentially leading to overheating and battery damage.
3. If leaked battery electrolyte gets in your eyes, rinse with clear water and seek immediate medical attention.
(May result in loss of eyesight.)

Technician Demonstration & Student Questions

Student Hands-On Experience

Table Saw

Most Likely Student Uses

- Making rip and cross cuts in plywood

Table Saw Safety

1. Watch out for kickback

Table saw kickback occurs when the piece of wood being cut binds between the blade and the fence causing the piece of wood to be thrown back toward the operator. To avoid table saw kickback:

- All wood cut on the table saw must be flat and have a known straight edge
 - That straight edge must stay completely against the fence or miter gauge through the entire cut
 - Never cut freehand on the table saw
 - Always use the rip fence for rip cutting
 - Always use the miter gauge for cross cutting
 - *Never use the miter gauge and rip fence at the same time*
 - Never force a piece of wood through the table saw
 - All pieces should pass through easily and encounter consistent resistance
 - If you have to force it, the piece is probably wedging or binding
 - Do not use the rip fence for what are really cross cuts
2. Push each piece of wood cut completely past the anti-kickback pawls
 3. Use a push stick for narrow cuts
 4. The table saw blade should project no more than a 1/2" above the piece of wood you are cutting
 5. If using out feed rollers, set them just below the height of the table (Watch out: The rollers are heavy)
 6. Do not cut sheets of plywood that are too large for you to control by yourself. Ask the department Technician for assistance.

About the SawStop table saw

This SawStop Contractor Saw is equipped with a unique safety system:

- A 3V charge is applied to blade which is constantly monitored by a digital signal processor
- If the blade contacts anything conductive (e.g. human skin, water, metal, etc.), the voltage drops
- If the digital signal processor detects a drop in voltage, an aluminum brake is jammed into the spinning blade, stopping the blade in less than 5 milliseconds

Consequently, students must never cut wet wood or allow anything conductive to touch the spinning blade. Once the safety system has been activated, the saw will not work again until the safety system has been reset.

Resetting the safety system takes a long time and costs a lot of money.

Using the SawStop table saw:

1. Ensure the Start / Stop paddle switch that powers the blade motor is in the "Off" position (is pushed in)
2. Turn the main power switch that powers the safety system to "On"
3. Allow the safety system time to initialize (the green and red LEDs will flash during initialization)
4. When the system is ready, the green LED will be solid and the red LED will be off
 - If you see anything different, do not use the saw and get the department Technician immediately
5. To start the blade, pull the paddle switch out
6. To stop the blade, push the paddle switch in
7. When you have completed all your cuts, after pushing in the paddle switch to stop the blade, turn the main power switch to "Off"

Technician Demonstration & Student Questions

Student Hands-On Experience

Circular Saw

Most Likely Student Uses

- Cutting plywood

Circular Saw Safety

1. Always keep the power cord well away from the blade
2. Watch out for kickback

Circular saw kickback occurs when the blade is pinched causing the tool to be thrown up and out of the piece of wood toward the operator. To avoid circular saw kickback:

- Always hold the saw firmly with both hands
- Release the switch immediately if the blade binds or the saw stalls
- Never remove the saw from a cut while the blade is rotating
- Support large panels so they will not pinch the blade as they are cut

Technician Demonstration & Student Questions

Student Hands-On Experience

Band Saw

Most Likely Student Uses

- Making curved or irregular cuts in wood
- Cutting Plexiglas

Band Saw Safety

1. Adjust the upper guide so it is about 1/8" to 1/4" above the stock
2. Given the saw's 1/2" blade, the minimum cutting radius is 2 1/2"

Safety First!

Technician Demonstration & Student Questions

Student Hands-On Experience

Jig Saw

Most Likely Student Uses

- Making curved or irregular cuts in wood
- Cutting out shapes in the interior of a piece of wood without cutting in from the edge

Jig Saw Safety

1. Always keep the power cord well away from the blade

Technician Demonstration & Student Questions

Student Hands-On Experience

Belt and Disc Sander

Most Likely Student Uses

- Sanding pieces of wood
- Making minor changes to the shape of a piece of wood

Belt and Disc Sander Safety

1. Never operate a sander with a torn belt or loose disc
2. Do not use on Plexiglas, fiberglass, or printed circuit boards (PCBs)
3. When using the disc sander, note the direction of rotation and place the work piece accordingly

Technician Demonstration & Student Questions

Student Hands-On Experience

Clean Up Procedure

Closing Statement

Whenever you have a question on how to do something, ask the Technician, and always remember:

Safety First!

Engineering Department Wood Shop Student User Agreement

I understand that use of the Trinity College Engineering Department Wood Shop is a privilege, not a right. _____

I understand that the Engineering Department grants student access to its Wood Shop solely at its discretion. _____

If allowed access to the Wood Shop, I promise to obey the *Wood Shop Rules* at all times. _____

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14. Students failing to comply with these rules will lose the privilege of using the Wood Shop.

I understand that if I violate *Wood Shop Rules* or behave in an unacceptable manner, the Engineering Department may revoke my access to the Wood Shop. _____

Student Name (please print legibly)

Student Signature

Date