

City University of New York  
Architectural Technology Department  
Materials, Methods and Model Woodshop  
Voorhees Hall, Room 405 & 305  
186 Jay Street, Brooklyn NY 11201

## Woodshop Safety Procedures and Training Guide

### INTRODUCTION:

The Materials, Methods & Model Woodshops are currently in both V405 & V305. In V405 we are guests of the CMCE Department. V305 is both an ArchTech classroom, and a satellite woodshop, with limited facilities and equipment. These spaces are available to Department of Architectural Technology students and faculty on a limited and supervised basis during week days, and on Sunday for V405.

You will be required to take, and pass, a multi-level training and safety program that builds up, level by level, from the basics to more complicated and advanced levels of woodworking skills. Once you go through the training you will be able to use the woodshop for class and individual projects to further your Architectural Technology education.

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## **I. PREFACE:**

- Goals:
  - A safe place to explore creative talents, and develop an understanding of, and innovative use of, various materials.
  - A safe place to learn new skills and the proper safe procedures for using those skills.
  - A safe place to develop and construct various projects.
  - Learning by direct hands on doing.

## **II. LEVEL ONE:**

### **LEVEL ONE-GENERAL SAFETY RULES & PROCEDURES**

#### **What is Safety?**

Safety, though difficult to define because it is an attitude, can be described as “the minimization or elimination of injury and loss resulting from non-deliberate acts such as accidents.” Failure to develop proper, safe attitudes, habits and skills, is the real culprit of accidents.

An important part of your experience in woodworking will be learning to follow practices and procedures that will prevent injuries to YOURSELF and OTHERS. Pay close attention to the instructions and demonstrations given to you. Study the directions given in this manual for using tools and machines. As you learn to use them the correct way, you also learn to use them the safe way.

Develop a good attitude toward safety. This means that you have a strong feeling toward the importance of safety and are willing to give time and attention to learning the safest way to perform your work. It means that you will be certain to work carefully and follow the rules – even when no one is watching you. A safe attitude will protect you and others, not only in the shop, but also in activities outside of school.

Carefully study the safety rules which follow. Your instructor may also recommend some additional rules. If you follow the rules and directions carefully, many of them will soon become safety habits that you will perform almost automatically.

#### **SHOP GUESTS AND VISITORS**

Guests and visitors to the shop are to be by prior approval of the shop manager. Any person who has completed the shop safety course may accompany shop guests and visitors. He or she is responsible for that guest/visitor. In addition, guests and visitors are not permitted into any machine areas, or to use any machines or tools during their visit. Visits will be as brief as possible.

All faculty and staff should arrange with the shop manager prior to bringing any students into the shop.

## GENERAL SAFETY RULES

1. **SECURE APPROVAL.** Secure your instructor's approval for all work you plan to do in the shop. He or she is the one to decide if the work can and should be done, and will be able to suggest the best, easiest, and safest way to do it.
2. **CLOTHING.** Dress properly for your work. Remove coats and jackets, and roll up loose sleeves. Never wear loose clothing-tuck in baggy shirts, etc. Open toe shoes/sandals, clogs, high heels or untied laces, are **not allowed**. It is advisable to wear a shop apron that is snugly tied.
3. **EYE PROTECTION.** You must wear safety glasses, goggles or a face shield when doing any operation that may endanger your eyes. Be sure you have enough good light to see what you are doing without straining your eyes.
4. **CLEAN HANDS.** Keep your hands clean and free of oil or grease. You will do better and safer work, and the tools and your project will stay in good condition.
5. **ALL ELECTRONIC DEVICES, CELL PHONES, ETC.,** must be turned off! Vibrate/silent is NOT OFF! Also, take any devices off of belts, or out of shirt pockets, and store safely out of possible damage.
6. **AUDIO HEADPHONES,** or ear pods, are **prohibited** in the shop. Earplugs for sound deadening can be used, and are encouraged.
7. **ABSOLUTELY** no smoking in the shop facilities. Voorhees Hall is a smoke free environment.
8. **EATING & DRINKING.** No eating or drinking at the workbenches. Do not leave any open containers on any workbench. Immediately wipe up any liquids spilled on the floor.
9. **TOOL SELECTION.** Select the proper size and type of tool for your work. No one should use a tool until he/she has received proper instruction, and feels comfortable using it. Never use a tool unless it is sharp and in good condition. Inform your instructor if tools are broken, have loose handles, or need adjustments.
10. **CARRYING TOOLS.** Keep sharp-edged and pointed tools turned down. Do not swing or raise your arms over your head while carrying tools. Carry only a few tools at one time, unless they are in a special holder. Do not carry sharp tools in the pocket of your clothes.
11. **CLAMPING STOCK.** Whenever possible, mount the work in a vise, clamp, or special holder. This is especially important when using chisels, gouges, or drills.
12. **USING TOOLS.** Hold a tool in the correct position while using it. Most edged tools should be held in both hands with the cutting motion away from yourself and other students. Be careful when using your hand or fingers as a guide to start a cut. Test the sharpness of a tool with a strip of paper or a scrap of wood. **DO NOT USE YOUR FINGERS.**
13. **BENCH ORGANIZATION.** Keep your project materials carefully organized on your bench with tools located near the center. Do not pile tools on top of each other. Never allow edged or pointed tools to extend out over the edge of the bench. Close your vise when it is not in use and see that the handle is turned down. Keep drawers and cabinet doors closed.
14. **RETURN ALL TOOLS** to their proper place after using.
15. **THERE IS NO** loaning of tools. All tools must always stay in the shop.
16. **PROJECTS** and materials need to be stored outside of V405 & V305. Name and date your projects.
17. **FLOOR SAFETY.** The floor should be clear of scrap blocks and excessive litter. Keep projects, sawhorses, & other equipment, and materials you are using out of traffic lanes.
18. **LIFTING.** Protect your back muscles when lifting heavy objects. Have someone help you. Lift with your arm and leg muscles. Secure help with long boards, even if they are not heavy.
19. **CONSIDERATION OF OTHERS.** Be thoughtful and helpful toward other students in the class. Be sure that the work you are doing does not endanger someone else. Caution other students if they are violating a safety rule.
20. **INJURIES.** Report all injuries even though slight, to your instructor.  
These rules are designed to make the shop a safe place to work. Your cooperation will also make this a safe workplace.

## LEVEL ONE -FIRE SAFETY RULES

### Fire Protection

Shop workers need to understand the hazards of fire. You need to know what causes a fire and what methods of control should be used. Practices of fire prevention should be followed throughout the shop.

When highly flammable surface finishes and glues are being used special precautions should also be taken.

Fires are divided into three "classes". Any of these classes of fires could occur in the shop.

- A. Class A - Fires that occur in ordinary combustible materials, such as wood, rags, and rubbish.
- B. Class B - Fires that occur with flammable liquids, such as gasoline, oil, grease, paints, and thinners.
- C. Class C - Fires that occur in or near electrical equipment such as motors, switchboards, and electrical wiring.

For any fire to start or remain burning, it must have the following three things:

- A. Fuel - Any combustible material.
- B. Heat - Enough to raise the fuel to its ignition temperature.
- C. Oxygen - Necessary to sustain combustion.

If any of the three is missing, a fire cannot be started. With the removal of any one, a fire will be extinguished.

You use different types of fire extinguishers for different classes of fires. What works for one class of fire will not always work for others. Sometimes, using the wrong extinguisher could result in injury or further property damage. Always use the correct type of fire extinguisher for the correct class of fire.

#### Type of Fire Extinguishers

- A. Pressurized Water - Operates usually by squeezing a handle or trigger; used on Class A fires.
- B. Soda Acid - Operates by turning extinguisher upside down; used on Class A fires.
- C. Carbon Dioxide (CO<sub>2</sub>) - Operates usually by squeezing handle or trigger; used on Class B and C fires
- D. Dry Chemical - Operates usually by squeezing a handle, trigger, or lever; used on Class A, B, and C fires.
- E. Foam - Operates by turning extinguisher upside down; used on Class A and B fires.

Model Shop Fire Extinguishers  
Dry Chemical Fire Extinguisher  
For Class A, B, and C fires.



## LEVEL ONE-BASIC SHOP PROCEDURES & BEHAVIOR

### 1. EYE PROTECTION

- 1.1 Eye protection must be worn at all times in the shop facilities. (Non tinted, plastic lens prescription glasses will suffice.) Lens cleaner is available in the shop office.
- 1.2 Failure to wear eye protection will result in loss of shop privileges:
  - First offense: Warning.*
  - Second offence: Loss of shop privileges for 48 hours.*
  - Third offence: Loss of shop privileges until meeting with department chair and shop manager.*

### 2. SAFETY: CLASS REQUIREMENTS

- 2.1 Every student wishing shop privileges must satisfactorily complete all required shop safety course before they become a shop user.
- 2.2 All shop users must have a valid Student ID and “sign in” and “sign out” of the shop facility (procedures are posted in the shop).

### 3. INJURY-CAUSING ACCIDENTS

- 3.1 Notify the shop supervisor immediately!
- 3.2 All personal injury accidents require a meeting between the injured person and the shop manager before shop privileges will resume. The purpose is to determine the cause of the accident for the prevention of future accidents.

### 4. NON INJURY ACCIDENTS

- 4.1 In the event of accidents resulting in machine damage, material “kick backs,” jamming, or other unsafe events, the following procedure must be followed:
- 4.2 A meeting is required between the person involved in the accident and the shop manager before shop privileges resume.

### 5. SHOP OCCUPANCY REQUIREMENTS

In order to maintain a safe shop environment strict user limits are enforced. Therefore, faculty should always schedule their shop related projects with the shop manager, at the semester start.

## 6. CLEANING OF SHOP FACILITIES

The shop facilities are cleaned by janitorial staff only at night. Therefore, shop users are responsible for cleaning up these facilities after each use.

- 6.1 Each student is personally responsible for cleaning up and tool return.
- 6.2 Each student is required to assist in a general cleaning up of the shop at the end of the day or when deemed necessary by shop supervisory personnel.
- 6.3 Students failing in their clean -up responsibilities:
  - *First Offence: Warning.*
  - *Second Offence: Loss of shop privileges for 48 hrs.*
  - *Third Offence: Loss of shop privileges until meeting with department chair and shop manager.*

## 7. STORAGE OF MATERIAL AND PROJECTS

- 7.1 We do not have any storage lockers available to us at this time in V405 or V305.

*Special arrangements will have to be made for large materials storage with Arch. Tech. Department.*
- 7.2 Projects and materials need to be stored outside of V405 and V305. Be sure to name and date your projects for identification purposes.

## 8. GENERAL SHOP HOURS

- 8.1 Shop Hours of Operation vary by semester. Check in with the shop supervisory personnel for information.
- 8.2 When the university is closed and classes are cancelled, the shop is closed.

## 9. MATERIAL USE RESTRICTION

- 9.1 Homosote and MDF (medium density fiber board) may be sawn, but not routed or sanded.
- 9.2 The following materials are **NOT ALLOWED** in the shop facilities:
  - Music or piano wire
  - Fiberglass and resin
  - Rubber casting
  - Spray paint

## LEVEL ONE-BASIC HAND TOOL USAGE & SKILLS

At this **Level One** section of the training, we will concentrate on the basic hand tools that every woodworking student should be familiar with, and feel comfortable working with. They include the following categories and items that would be in a Basic Toolkit:

### **•Measuring & Marking:**

- Retractable tape
- Try square
- Levels
- Awl
- Steel rule
- Combination Square
- Adjustable bevel gauge

### **•Cutting:**

- Hard point saws (rip and crosscut)
- Tenon saw (back saw)
- Dovetail saw
- Coping saw
- Hacksaw
- Miter saw
- Mat knives

### **•Shaping:**

- Beveled chisels
- Bench plane
- Block plane

### **•Assembling:**

- Hammers (claw, pinhead, ball peen, tacking, mallets)
- Screwdrivers
- Hand drills & drill bits
- Clamps (C-clamps, spring, bar)
- Glue & adhesives
- Sandpaper & abrasives

After the introduction and demonstration of these basic tools, students will fabricate a project by themselves or in teams. This small, hands on project might be some small box or jig that could later be used in the shop for future projects.

On the following pages are some examples of basic hand tools, their descriptions and safety issues.

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## Hammers

A hammer is a very basic tool for any carpenter. Professionals with years of trade experience will select and use only a good quality hammer with which they feel comfortable.



Curved Claw Hammer

Hammers are made in various qualities. The finest are made with a tough alloy drop forged steel head. They are stronger than ordinary steel when tempered and heat-treated.

There are two shapes of claws on hammers. The straight claw hammer is better for prying or pulling wood apart. The claw wedges, like a chisel, in between two boards to loosen them. This straight claw hammer is preferred by framing carpenters and is usually a heavier weight (16oz. – 32oz.). The curved claw hammer is better for pulling nails. This curved claw hammer is preferred by finish carpenters and is usually lighter weight (13oz – 16oz.).

### Hammer Safety

1. Use the proper size and type of hammer for the job.
2. Never throw a tool.
3. Check the head to see that it is securely fastened to the handle.

### Most Common Hazards

1. Smashing thumbs and fingers.
  2. Fumbling and dropping.
  3. Being hit on the head during the back swing.
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## Handsaws

### How to use the handsaw

1. Select the correct handsaw for the job to be done.
2. Be certain your material is well supported.
3. Mark the board where it will be cut.
4. Hold the saw in line with your shoulder and go the waste side of the mark on the board. With a hand on the board, help guide the starting cut with your thumb.
5. Cut with more pressure on the down stroke, the cutting stroke. As the cut deepens, take longer strokes with even pressure.
6. As you near the end of a cut, shorten the stroke and support the waste piece so as not to splinter the good piece.

The space left where a saw has cut is called a KERF. The saw kerf must be wider than the saw blade to enable the blade to move freely through the wood. Therefore, saw teeth are bent out slightly (this is called SET) to cut wider than the actual blade thickness.

The saw will remove approximately 1/8" of material when it cuts. This cut should be made on the waste side of a line so the piece you want comes out the correct length. Cutting out the line or on the wrong side of the line will make your piece too short. This rule applies when using any kind of hand or power saw.

### Handsaw Safety

1. Keep your hands and legs away from the cutting path or action of the saw.
2. Never attempt to cut a board in between two supports. Always cut where the biggest piece will still have an evenness of support.
3. Do not crowd the saw or force the cut. The saw may buckle or cause the wood to split.

## Chisel

A wood chisel is used to cut mortises into wood for hardware and other items. It is made of a steel blade heat treated throughout so it can be sharpened its entire length. Most carpenters' chisels are beveled along the edges as well as sharpened on the end.

Chisel sizes are determined by the width of the blade. Blades are available in 1/8" to 1", and in 1/4" increments from 1" to 2".

A chisel is made to either cut by hand or cut by holding the chisel and striking it with a hammer or mallet. Either way, the beveled side should be turned down. This enables you to prevent the chisel from cutting too deep by rocking it back on the bevel. This raises the cutting edge.

### Chisel Safety

1. Keep chisels sharp. A sharp tool is less dangerous than a dull one because less pressure needs to be used.
2. Drive wood chisels outward, away from your body.
3. Never put your hand in front of the cutting edge.
4. Remove nails or screws from the wood before you use a chisel on it.
5. Never use a wood chisel as a pry or wedge. The steel is hard and brittle and may break.
6. Always carry a chisel with the sharp end down.
7. Never carry sharp tools with points sticking up.

## Screwdrivers

When selecting a screwdriver, remember the tip should fit snugly in the slot and be almost the full width of the screw head.

Most hardware is supplied with phillips screws. To drive these screws it takes more downward pressure to keep the tip in the slots. The phillips screwdriver is very much like the standard screwdriver. The difference is that the tip is shaped like an "x" so it will fit into slots in phillips screws.

There are two ways to size a screwdriver. The length of the blade is one size. Tip sizes are another way to size and are numbered #1 - #4. The most common size is #2 tip. Each tip fits a certain range of screw sizes, see the diagram below.

**Table 1**

<b>Phillips Bit No.</b>	<b>Screw Gage Size</b>
Bit No. 1	Number 4 and smaller
Bit No. 2	Number 5 and 9 inclusive
Bit No. 3.	Number 10 to 16 inclusive
Bit No 4.	Number 18 and larger

## Screwdriver Safety

1. Use a screwdriver only for its intended use, not as a punch, wedge, or pry bar.
2. Do not use a screwdriver with a broken handle, bent blade, or a dull twisted tip.
3. Keep your hands away from the work after the screw is started.
4. Never hold an object in the hand and press a screwdriver into it.

## Block Plane

When using the block plane check to see that the blade is adjusted to the proper depth. Also, secure your work to keep it from moving around. Keep a firm grip on the plane and apply pressure downward and forward.

This plane is mostly used to plane small pieces of wood and end grain such as fitting the ends of molding. Its small size make it easy to control accurately.



### How To Use A Block Plane

First rest the palm of the hand to be used on the upper-most part of the plane; then grasp the sides of the plane between the thumb and second finger with the index finger resting in the hollow of the finger rest at the front of the plane.

Pressure should be applied down and forward at the beginning of the stroke. Maintain uniform pressure throughout the stroke.

**NOTE:** Always plane with the grain. If the grain is irregular, it may be necessary to change the direction of planing to suit the run of the grain. If cross or curly grain is to be cut, be sure that the plane edge is very sharp and set for a fine cut.

When any plane is not temporarily in use, set it on its side to protect the blade.