SAFETY MANUAL

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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 skill is the real culprit of accidents.

Ask Questions!
Plan!
Think!
Accidents do happen!
THINK SAFETY!

The Building Construction Lab is available for school-wide projects and independent work throughout the academic year. This complete machine and assembly shop is open days, evenings, and weekends. The facility is supplied with full woodworking capabilities, welding and milling equipment, lathes, sheet-metal machines, a plastics area, and a variety of hand and hand held power tools.

Shop Goals:

- Safe place to explore talents and materials
- Safe place to learn new skills and proper safe habits
- Safe place to develop and construct projects

Shop Motto:

- Learn by doing

Shop facilities may be used by:

- School of Architecture students who have completed Shop Orientation and Faculty

SHOP GUESTS AND VISITORS

Any person who has completed the shop safety course may accompany shop guests and visitors. He or she is responsible for that guest/visitor.

POLICIES AND PROCEDURES

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.)

2. Safety Class Requirement

2.1 Every student wishing shop privileges must satisfactorily complete all required shop safety courses before they become a shop user.

2.2 All shop users must have a valid FAMU identity card and sign "in" and "out" of the shop facility.

3. Injury- Causing Accidents

In the event of an injury-causing accident, the following procedures must be followed:

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

In the event of accidents resulting in machine damage, material "kick-backs," jamming, or other unsafe events, the following procedure must be followed:

4.1 A meeting is required between the person involved in the accident and the shop manager before shop privileges resume.

6. Cleaning of Shop Facilities

The shop facility is under the control of the School of Architecture, and is, not cleaned by FAMU's janitorial staff. Therefore, shop users are responsible for clean-up in the shop.

6.1 Each student is personally responsible for clean up and tool return.

6.2 Each student is required to assist in a general clean up of the shop at the end of the day or when deemed necessary by shop supervisory personnel.

General Safety Rules:

These rules are meant to protect you from injury; please obey them.

1. By law, every person is required to wear eye protection in the shop.
2. All accidents, even if very small, must be reported to your instructor/shop manager or the staff person on duty.
3. A safe attitude will protect you and others.
4. Remove all rings, wristwatches and necklaces before operating machinery.
5. Never wear loose clothing - tuck in shirttails, etc.
6. Tie back/up long hair when operating machinery.
7. All safety guards must be kept in place while operating equipment. (Do not remove.)
8. Use equipment for its intended use. If in doubt, ask for help.
9. No one should use equipment until he or she has received proper and safe instruction and feels comfortable with its operation.
10. Do not use plaster on any power machines. (Hydrocal)
11. Always keep your eyes on your fingers, ears tuned to the sound of the machine and nose tuned to the smell of smoke.
12. Never talk to someone operating a machine.
13. Operator never talks to someone while operating a machine.
14. Make sure machines are in the **"off"** position and motion has stopped, before leaving them.
15. Make sure machine's work surface is clean, unobstructed and ready for use.
16. Clean up your mess! Wipe up all spilled liquids. Pick up your materials. Sweep up any loose debris.
17. If you have made an adjustment on a piece of equipment, return it to its normal position after you are done.
18. Adjustments are made with the red knobs.
19. Students are not to attempt repairs to any equipment that is broken. Please ask for help.
20. Do not use broken or damaged equipment; report this immediately to manager.
21. Follow all special and regular safety rules for operation of equipment.
22. Dispose of solvents, finishes, chemicals, and other hazardous materials of any kind in the proper containers.
23. Return all tools to their proper storage place after using.
24. If you are unsure of the operation of a piece of equipment, read the safety manual and ask for help from your shop manager or student assistants.
25. Think - practice and develop good, safe habits.
26. Respect the rights and property of other students.
27. Horseplay, running, yelling and/or fighting are absolutely forbidden in the shop.
28. Be thoughtful and helpful towards others in the shop and always find something to clean up before leaving.

Portable Electric Tools

Design Function

1. Hand-held portable tools have specific functions. Check to be sure you have the correct tool for the job.
2. Treat all portable tools with the same respect as any power tool.

Safety

- **Eye protection is required at all times.**
- **Do not talk with observers while operating machines.**
- Keep work area near hand tools clean and junk free.
- Use the right tool for the job.
- Do not abuse electric cords.
- Keep hands clear of machine path.
- Secure work to bench when using electric hand tools.
- Do not over reach with electric hand tools.
- Make all adjustments on the tool with the power cord unplugged.
- Remove wrenches and check keys after adjusting.
- Do not carry plugged in tools with finger on power switch.
- Use only grounded extension cords.
- Keep guards in place and working properly.
- Keep hands away from cutting portions of tools.
- Seek help if you are unsure of tool operating procedures.
- Unplug, clean and put away idle tools or when finished using tools.

Woodworking

Wood is classified as either hardwood or softwood. Hardwood comes from deciduous trees with broad leaves, trees that shed their leaves at the end of the growing season. Softwood comes from the evergreen or needle bearing trees within the range of hard and soft woods each grouping has a range of hard and soft woods. For example, bass wood is a very soft wood it has broad leaves that sheds thus making it a hardwood the same as ash. However ash is a much harder wood. Conversely, yellow pine has needle like leaves and does not shed them. Yet it is harder than basswood. You will learn that in each classification of woods there is a range from soft to hard.

Woods are challenging to work with, there is a distinct grain pattern, a range from hard and soft, open or closed grain and moisture factor that must be dealt with before you will be successful in building a project.

BAND SAW

Design Function

1. Cutting freehand curves.
2. Ripping stock into thin strips.
3. Cross cutting or ripping stock.
4. Cutting circles.
5. Cutting wood or plastic.

Safety

- **Eye protection is required at all times.**
- **Do not talk with observers while operating machines.**
- ALWAYS MAINTAIN A 3" MARGIN OF SAFETY.
- Make all adjustments with the power off.
- Adjust the upper guide to about 1/8" above stock.
- Allow saw to reach full speed before beginning cut.
- Hold stock flat on table top.
- Do not cut stock that does not have a flat surface.
- Feed stock only as fast as teeth will remove material.
- Avoid backing out of cuts when possible.
- Plan relief cuts in advance – cut first.
- Do not make turns too tight – listen for blade twisting.
- If "clicking" noise is heard, **SHUT OFF POWER – BLADE IS CRACKE**D.
- Stop machine and blade before removing scrap pieces.
- Before cleaning and leaving machine – shut off, stop blade.

THIS IS A FREE HAND MACHINE!

BELT AND DISK SANDER

Design Function

1. For wood 6 inches long and shorter.
2. For sanding surfaces or edges.
3. For rounding or shaping edges.

Safety

- **Eye protection is required at all times.**
- **Do not talk with observers while operating machines.**
- **Make sure belt is tracking correctly; this adjusts the belt while sander is running.**
- Make sure disc or belt is not loose or torn.
- Keep hands away from abrasive surfaces.
- Do not sand stock if it is ¼" or less in thickness.
- Sand with grain of the wood.
- Never wear gloves or hold the work with a rag when sanding.
- Always sand on downward side of the disc to keep the piece on the table.
- Shut off power. Wait for machine to stop before cleaning and leaving the machine.

DRILL PRESS

Design Function

1. Cutting holes in wood, metal or plastic (using the proper cutter).
2. Drilling to depth or through stock.
3. Accessories are available for specialized work: mortise joints, etc.

Safety

- **Eye protection is required at all times.**
- **Do not talk with observers while operating machines.**
- General Rule: ***The larger the bit, the slower the speed .Fast speed is for wood; slow speed for metal***
- Always remove chuck key before starting the drill.
- Change variable speed with motor running.
- Make all other adjustments with power off.
- Securely lock all bits into the chuck.
- Have wood plate on metal table top.
- Adjust table or depth stop to avoid drilling into table.
- Hold material to be drilled securely.
- Plastic and metal must be clamped.
- When making deep cuts, pull bit back to clean out hole.
- Shut off power; remove bit, and clean machine when done.

JOINTER

Design Function

1. For shaving edges smooth.
2. For squaring edges of stock.
3. Edge grain only (not for flat surface).

Safety

- **Eye protection is required at all times.**
- **Do not talk with observers while operating machines.**
- Do not run stock through unless it is at least 12 inches long.
- Depth of cut is preset to 1/16".
- If the stock is below top of fence, you must use a push stick and push paddle.
- Do not run used or painted stock through jointer.
- Push stock through slowly to prevent ripples or tearing.
- Do not adjust rear table.
- Guards should be in place and used at all times.
- Feed work through so knives cut "with" the grain.
- Maintain a 4" margin of safety between you and the knives.
- Make sure cutters have stopped before cleaning and leaving the machine.

COMPOUND SLIDING MITRE SAW

Design Function

1. Making cross cuts.
2. Making simple miters.
3. Making compound miters.
4. Making dado cuts.

Safety

- **Eye protection is required at all times.**
- **Do not talk with observers while operating machines.**
- Do not remove or hold guards up while operating machine.
- Make all adjustments with the power off.
- Start saw, pull out, push down, and push in.
- Never use the machine with the arms crossed, the machine can be used with the left or the right hand.
- Tuck thumb in tight to index finger.
- Stop operating immediately if you smell smoke.
- Wait until blade has stopped before removing material from machine.

OSCILLATING SANDER

Design Function

1. For sanding edges and inside corners.
2. For rounding and smoothing.

Safety

- **Eye protection is required at all times.**
- **Do not talk with observers while operating machines.**
- Keep hands away from abrasive surfaces.
- Never wear gloves or hold work with a rag when sanding.
- Select appropriate drum size for the job. The hold down nut is left handed.
- Change table insert to accommodate drum.
- Hold stock firmly to table for best results.
- Shut off power, wait for machine to stop before cleaning and leaving.

PANEL SAW

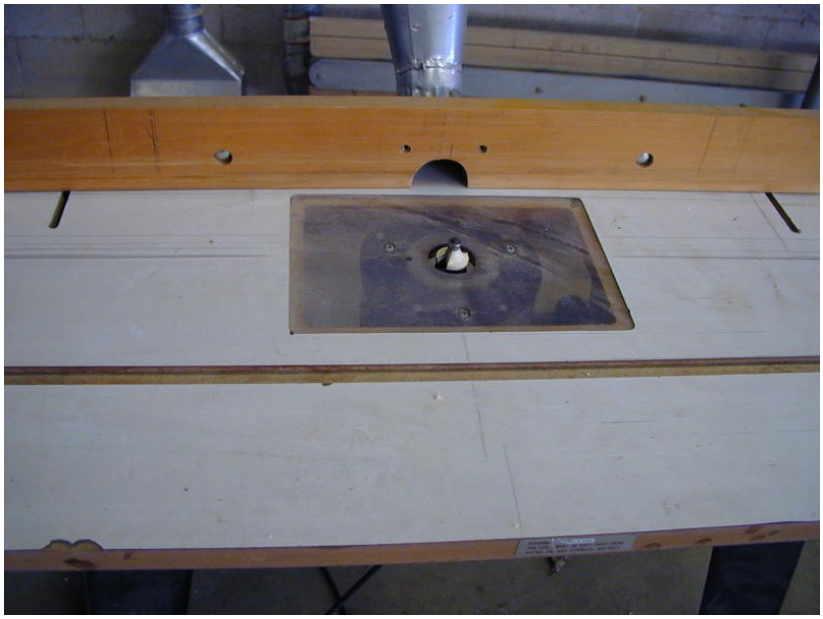
Design Function

1. For straight cuts on panel board material.
2. For ripping or cross cutting large sheets.

Safety

- **Eye protection is required at all times.**
- **Do not talk with observers while operating machines.**
- Keep hands out from under saw carriage.
- Do not wear gloves when operating the machine.
- Feed stock through saw slowly and smoothly.
- Do not drop material on roller carriage.
- Place stock on carriage backside facing out for best results.
- Feed stock against rotation of blade – follow arrow on saw.
- Lock carriage rip lock when saw is not in use.
- Tighten all adjustments to a snug fit only.
- Shut off power, wait for blade to stop before cleaning and leaving.

ROUTER TABLE



Design Function

1. Wood only.
2. Rolling edge.
3. Creating decorative cuts.
4. Cutting dado grooves.

Safety

- **Eye protection is required at all times.**
- **Do not talk with observers while operating machines.**
- Feed stock from appropriate direction for work – check machine instructions.
- Use extreme caution when routing through knots.
- Keep fingers well away from bit.
- Keep stock moving.
- Hold stock firmly down to the table.
- Hold stock tightly against fence.

SCROLL SAW

Design Function

1. Making fine / small scroll designs.
2. For cutting wood ½ inch or smaller.
3. For cutting plastic 1/8 inch or smaller with slow speed.

Safety

- **Eye protection is required at all times.**
- **Do not talk with observers while operating machines.**
- This is a "free hand" machine.
- Adjusting the blade:

a. Loosen tension by pulling front knob forward
b. Loosen blade by pulling release.
c. Lift head & place material over blade.
d. Lower head and place blade into the upper arm and tighten.
e. Create tension.
f. Saw is ready to use.

- Make sure blade teeth are pointing down.
- Keep "hold down" foot tight to work.
- Note, "hold down" foot is also a blade guard.
- Keep finger out of line of cut.
- Feed stock slowly and hold firmly to table.
- Turn off machine and clean area.
- Use ½" stock wood or smaller only.

THIS IS A FREE HAND MACHINE!

TABLE SAW

Design Function

1. For straight cuts only.
2. For ripping or cross cutting stock.

Safety

- **Eye protection is required at all times.**
- **Do not talk with observers while operating machines.**
- **NOT** a free hand machine.
- Make all adjustments with the power off.
- Use fence when ripping – **NEVER cut freehan**d.
- Use miter gauge when cross cutting - **NEVER cut freehan**d.
- Hold work firmly against fence or miter gauge.
- Right and left hand pushes to front of the guard.
- Remove left hand continue to push with right hand to back of guard.
- Set blade so that it extends only ¼" above stock.
- Stand to one side of operating blade.
- Do not reach across operating blade.
- Keep hands at least 4" away from blade when cutting. Use push sticks!
- Always use a push stick to clear scraps from cutting table.
- Move rip fence out of the way when crosscutting.
- When ripping, push stock between blade and fence – until material clears the blade.
- Push stock **beyond** the saw blade when cutting.
- Always use a push stick when ripping narrow stock.
- Shut off power. Wait for blade to stop. Then remove the scraps.

THIS NOT A FREE HAND MACHINE!

WOOD LATHE

Design Function

1. Turning symmetrical pieces.
2. Creating original profiles on turned stock.
3. Creating bowls, platters and goblets.

Safety

 Eye protection is required at all times.
 Do not talk with observers while operating machines.
 Change variable speed with motor running.
 Make all other adjustments with the power off.
 Guards should be in place and used at all times.
 Adjust tool rest height appropriately to center of the work.
 Keep tool rest as close to the work as possible.
 Remove tool rest before sanding or polishing.
 Double check setup before turning power on.
 Rotate work by hand to check clearance before starting.
 Examine piece for flaws, test glue joints before starting.
 When roughing off:
a. Do not jam tool into work piece.
b. Do not make cut too big a cut.
 Disengage index pin before starting lathe.
 Turning between centers:
a. Make sure all tail stock is snug to work and locked.
b. Lubricate tail stock center if it is not ball bearing type.
c. Check that screw fasteners do not interfere with tool at the finish dimension of the work piece.
 Shut off power and clean.
 Always operate lathe at the prescribed speeds.

DIAMETER OF WORK ROUGHING OFF GENERAL CUTTING FINISHING

Under 2" diameter 900-1300 rpm 2400-2800 rpm 3000-4000 rpm
2" – 4" diameter 600-1000 rpm 1800-2400 rpm 2400-3000 rpm
4" – 6" diameter 600-800 rpm 1200-1800 rpm 1800-2400 rpm
6" – 8" diameter 400-600 rpm 800-1200 rpm 1200-1800 rpm
8" – 10" diameter 300-400 rpm 600-800 rpm 900-1200 rpm
Over 10" diameter 300 rpm 300-600 rpm 600-900 rpm

SURFACE PLANER

Design Function

1. For planing stock to thickness.
2. For smoothing surfaces.
3. For making material uniform in thickness.

Safety

- **Eye protection is required at all times.**
- **Do not talk with observers while operating machines.**
- Do not plane stock less than 12" in length.
- Cut only 1/16" off with each pass or less.
- Plane no stock that is less than ¼" thick.
- Do not plane used or painted material. Make sure there are no nails or screws
- **Do not plane plywood, chipboard…**
- Shut off power, allow machine to stop before cleaning.
- Turn off dust collector.
- Turn off machine.

BISKET JOINT MACHINE

Design Function

1. Cut slots in wood for bisket joint.

Safety

- **Eye protection is required at all times.**
- **Do not talk with observers while operating machines.**

NOT A FREE HAND MACHINE!

METAL WORKING

Metals are common, easily available materials at your disposal for architectural projects. Metals provide opportunities for bending, forming, welding, and brazing that wood may not allow. Being aware of metal working capabilities in the shop can open up a whole new world of possibilities in designing and building projects.

In addition to welding and bending, the shop has machines for cutting and shaping metals. These tools are the milling machine, metal band saw, metal-lathe and sheet metal cutter. In addition, every semester or upon request there are welding classes. The staff is also available for questions and help.

ELECTRIC ARC WELDER

Design Function

1. For joining metals together.
2. For adding metal from an electrode to build up a joint.

Safety

- **Eye protection is required at all times.**
- **Do not talk with observers while operating machines.**
- Wear special protective helmet with visor for welding.
- Use the proper electrode for the job.
- Wear heavy-duty protective gloves when welding**.**
- Avoid contact between ground attachments and electrode.
- Use pliers to handle hot metals.
- Never change polarity while Arc Welder is under load.
- Do not weld near flammable materials.
- Turn welder off after use.
- Always keep electrode in your line of sight.
- Do not weld while standing on a wet floor.

Must complete special safety class before operating this machine. (See Deborah)

METAL BANDSAW

Design Function

1. For cutting solid or hollow non-ferris metals (brass, aluminum, copper, etc.).
2. For straight cuts.
3. Can be used for freehand work on thin metals.
4. Can be used in upright position.

Safety

- **Eye protection is required at all times.**
- **Do not talk with observers while operating machines.**
- Make all saw adjustments with power off.
- Adjust blade guides prior to use.
- Stop saw before putting in or removing stock from vise.
- Always have stock firmly clamped.
- Make sure blade is not touching stock when turning power on.
- Keep hands and fingers away from blade when saw is running.
- Never let saw blade drop on the work piece.
- Stop machine before removing waste.

OXYGEN-ACETYLENE WELDER

Design Function

1. For bonding metals together.
2. For cutting metals.
3. For melting iron, steel, cast iron, copper and many alloys.

Safety

- **Eye protection is required at all times.**
- **Do not talk with observers while operating machines.**
- Always wear subdued safety visor and gloves.
- Select proper tip and pressure for the job.
- Never allow line pressure to go above 15 PSI on acetylene tank.
- Make sure you turn off both needle valves on handle when finished.
- Make sure you turn off cylinder valves when finished.
- Clamp stock to bench while overhanging the cut line.
- Never remove cylinders from cart. Always ask for assistance.
- Do not apply flame to pressurized cylinders.
- When opening cylinder valves, stand away from regulators.
- Open cylinder valves slowly on oxygen.
- Keep hoses from coming into contact with open flame.
- Always keep torch in your line of vision.
- Never hand a lighted torch to another person.

Must complete special Oxygen – Acetylene safety class before operating this machine. (See Deborah)

SHEET METAL MACHINE - BREAK

Design Function

1. To bend sheet metal up to 16 gauge thick.

Safety

- **Eye protection is required at all times.**
- **Do not talk with observers while operating machines.**
- Wear gloves because edges are sharp.
- DO NOT bend wire or rod on this machine.
- When finished replace all parts if you have readjusted the machine.
- Clean area when done.

SHEET METAL MACHINE - ROLLER

Design Function

1. To roll sheet metal.
2. To make cones.
3. To make cylinders.

Safety

- **Eye protection is required at all times.**
- **Do not talk with observers while operating machines.**
- Wear gloves because edges are sharp.
- DO NOT roll wire or rod on this machine.
- Clean area when done.

BENCH GRINDER

Design Function

1. Grind ferrous metals (mild steel and hard steel).

Safety

- **Eye protection is required at all times.**
- **Do not talk with observers while operating machines.**
- Wear gloves, the metal is sharp and can get hot.
- Have cooling pail of water close by.
- Do not grind non-ferrous metals (copper, aluminum, brass, etc.).
- Clean area when finished.

PLASMA CUTTER

Design Function

1. Cut metal up to 3/8" thick.

Safety

- **Eye protection is required at all times.**
- **Do not talk with observers while operating machines.**
- Always wear colored face shield/welding helmet.
- Wear gloves.
- Protect feet from hot sparks.
- Produces ultra-violet rays; protect bare skin from plasma burn.

Setup Machine

- Check compressor, must be on (switch with red handle above right of compressor).
- Check yellow valve on left side of compressor, should point in line with pipe.
- Start machine:

a. Turn on power switch (right side).
b. Adjust "set/run" switch to "set".
c. When AC green light stops blinking, turn to "run" and ready light will come on, airflow will stop.
d. Ground clip must be clamped to work.
e. Lower face shield.
f. Put torch in position, press button to start cutting.

Shut Down Machine

- When finished cutting, wait for airflow to stop.
- Flip switch from "run" to "set" (air starts).
- Turn off machine.
- Put face shield and torch in proper place.
- Clean up area.

Must complete Special Metal safety class before operating. (See Deborah)

MIG WELDER

Design Function

1. To fuse metal together.
2. To join metals by applying heat and using a filler metal.

Safety

Eye protection is required at all times.
Do not talk with observers while operating machines.
Special eye protection is required while welding (provided).
Gloves are required at all times.
Protective clothing (what should be worn while operating this machine):
Long sleeves
Long pants
Leather shoes / or use spats (provided)
Leather apron
Set up material to be fused on table.
Connect ground to table.
Set up and proceed as per instructions in Welding Safety Class.

Must complete Special Welding safety class before operating. (See Deborah)

SHOP USER SAFETY AGREEMENT

I, _____ (printed name) the undersigned, a student in the School of Architecture at Florida A & M University, agree to follow all safety rules and procedures and agree to the statements below. I have:

□ Successfully completed the 3 hour Safety Orientation Course.

□ Had shop policies and procedures explained to me.

□ Received demonstrations on all the major machines.

□ Been instructed to ask for help on any machine with which I am not familiar. I will not operate any machine without such instruction.

□ Received a pair of safety glasses. I will be responsible for wearing eye protection at all times in the shop facilities.

I understand that there are certain risks associated with the use of this equipment and if I have any questions or think that a piece of equipment is not functioning properly, I will as the person in charge.

Date: _____

Signed: _____

Shop Safety Instructor:
_____