B/a+p

Buffalo school of architecture + planning

Architecture & Planning shop user guide

Edition 8 | July 2014

University at Buffalo

The State University of New York

Buffalo School of Architecture and Planning

Materials & Methods Shop
2 Parker Hall
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Welcome

Welcome to the UB Architecture and Planning Shop. The shop is here as a resource for all the members of the UB school of architecture and planning community. We invite you to utilize the shop for school work, personal projects, and skill building.

This shop is a complete machine and assembly shop, and has an excellent reputation both in terms of work produced and student safety. Available in this shop are complete woodworking, metalworking, and masonry capabilities, as well as a growing set of ceramics, glass and plastic facilities.

In the shop, myself, and my staff are here to support students and staff in academic and research work from small models through to full size construction. We are happy to provide specific instruction on any tool at any time. As well, we are happy to take on small projects in service of the school community.

Sincerely

Pete Russell
Director

Pete Russell
Materials and Methods Shop Director
School of Architecture & Planning
University at Buffalo

e: prussell@buffalo.edu
p: 716.829.3510

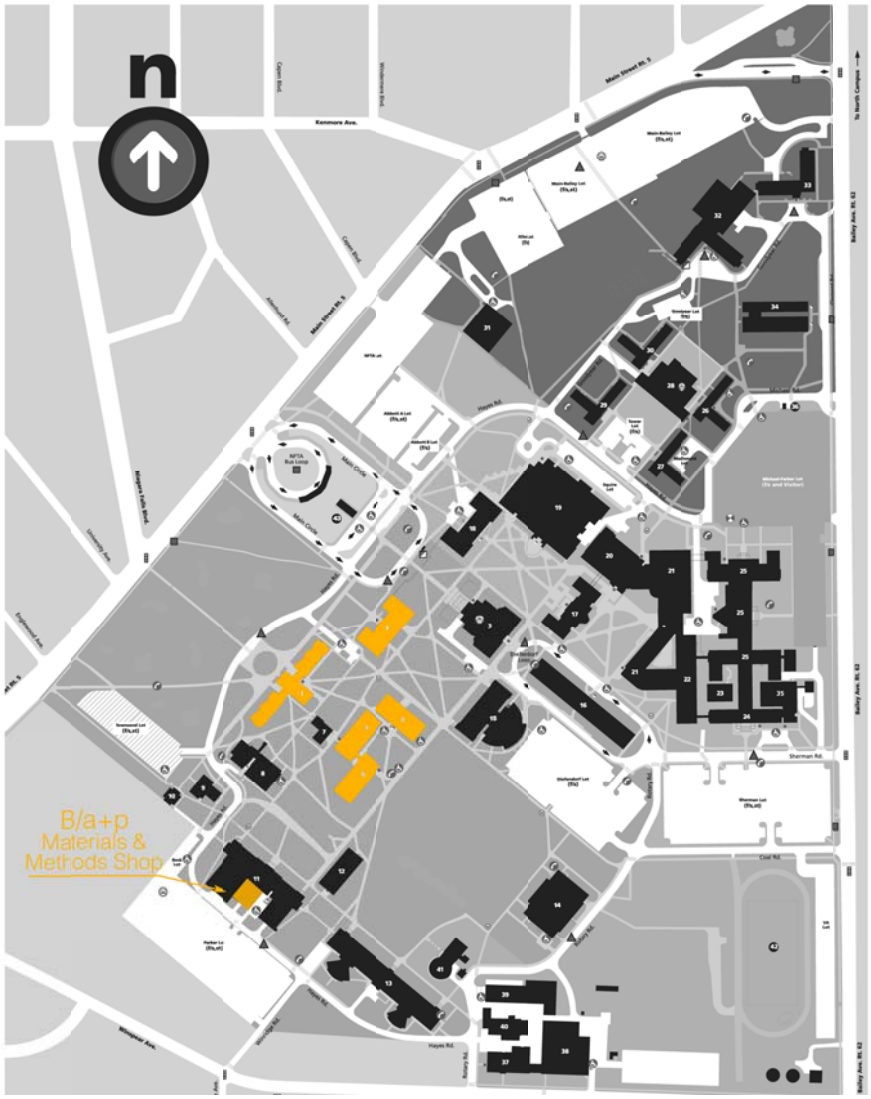
Location

The shop is located at:

Parker Hall Room 2

716-829-3510
prussell@buffalo.edu

Our mailing address is:
3435 Main Street
Parker Hall Room 2
Buffalo NY, 14214



Opening Times

The shop opening times are subject to change without notice and are posted on the shop doors.

In general, if the University is closed, the shop will also be closed.

Standard hours are

	Open	Close*
M	9 am	10pm
T	9 am	10pm
W	9am	10pm
T	9am	10pm
F	9am	5pm
S	12pm	5pm
S	12pm	10pm

*All work in the shop is to stop 30 minutes prior to close for shop cleaning

Shop Staff

The shop is staffed by a knowledgeable and helpful mix of graduate and undergraduate students led by a shop Director. At all times there will be a director or senior staff person in the shop. They will be easily recognizable, often wearing a "staff" shirt.

Director

Pete Russell

Senior Staff

Matthew Kreidler
Matthew Meyers
Kenzie McNamara

Code of Conduct

1. Purpose

The School of Architecture and Planning Workshop aims to foster a community that is open, welcoming, and SAFE for everyone. We are committed to providing a friendly, safe and welcoming environment for all, regardless of gender, sexual orientation, disability, ethnicity, or, religion. Discriminatory or harassing behaviors will not be tolerated.

This code of conduct outlines our expectations for shop behavior as well as the consequences for unacceptable behavior.

We invite all shop staff and users to help us realize a safe and positive event experience for everyone.

2. Exemplary behavior

A supplemental goal of this code of conduct is to increase transparency and efficacy at the shop by encouraging participants to recognize and strengthen the relationships between what we do and the school at large.

If you see someone who is making an extra effort to ensure our shop is welcoming, friendly, and encouraging all participants to contribute to the fullest extent, we want to know.

3. Expected Behavior

- **Follow all shop protocol at all times**
- Be mindful of working in a safe and thoughtful manner
- Be considerate, respectful, and collaborative.
- Refrain from demeaning, discriminatory or harassing behavior and speech.
- Be mindful of your surroundings and of your fellow participants. Alert shop staff if you notice a dangerous situation or someone in distress.

4. Unacceptable Behavior

Unacceptable behaviors include: intimidating, harassing, abusive, discriminatory, derogatory or demeaning conduct by any shop user or staff member. The Architecture and Planning shop is a venue which we take great pride in, and as such is often a shown to prospective students and

their families or other members of the public; please be respectful to all patrons of these locations.

Harassment includes: offensive verbal comments related to gender, sexual orientation, race, religion, disability; inappropriate use of nudity and/or sexual images in public spaces (including presentation slides); deliberate intimidation, stalking or following; harassing photography or recording; sustained disruption of talks or other events; inappropriate physical contact, and unwelcome sexual attention.

5. Consequences of Unacceptable Behavior

Unacceptable behavior will not be tolerated from Shop staff or shop users or visitors.

Anyone asked to stop unacceptable behavior is expected to comply immediately.
If a participant engages in unacceptable behavior, the shop staff may take any action they deem appropriate, up to and including expulsion from the shop and removal of shop privileges.

6. What to do if you witness or are subject to unacceptable behavior

If you are subject to unacceptable behavior, notice that someone else is being subject to unacceptable behavior, or have any other concerns, please notify the nearest member of the shop staff.

Shop Protocols

Emergency Protocol (to be completed by senior staff member on duty)

1) Notify nearest shop staff member of any and all accidents immediately.

1) Staff member will initiate Shop emergency protocol

-Assess the emergency for severity.
-Ask the person(s) affected to sit on the floor, stay with them at all times
-Is medical attention required?
– is it immediate?
-If yes phone campus police: **(716) 645-2222 or 911**
-If no send them to Michael hall or a nearby hospital
--Ensure they are accompanied; if they are alone send a staff member
-If it is minor you are welcome to administer first aid (no staff member is *required* to)
-Phone Shop Director 716-400-9160
-Does the shop need to be closed?
-Does keeping it open pose a safety risk?
-Collect information required to complete a thorough incident report
-Clean up any mess, and properly dispose of medical waste
-Collect and take to the office any project work left behind by effected student(s)

Reporting Accidents

1) All accidents no matter how big or small must be reported.
   a. Accidents will be classified into one of 2 categories minor or major
   b. Minor accidents range from tripping, to small cuts and scrapes. These accidents do not require medical attention and time is not lost. A short discussion with a senior staff member is required before returning to work so that we can prevent the accident from happening to other students.
   c. Major accidents are any incident that could have or does result in serious injury. A full incident report must be filled out, and prior to returning to work in the shop a discussion with the shop director is required to address what happened, and how to prevent it from happening again.

Shop Safety Protocol

1) Staff is here to help. Ask them questions, do not guess
2) Eye protection is required at all times in the shop
3) Ear protection is recommended at all times in the shop
4) External or personal tools are not allowed in the shop
5) All accidents must be reported
6) Remove all jewelry before operating machinery
7) Avoid loose or baggy clothing
8) Tie back long hair
9) Do not remove Safety guards on equipment
10) Machine and tool maintenance is to be completed by senior staff only
11) Use equipment for its intended use
12) Concentrate on the tool you are using
13) Ensure the machine you are using is off and completely stopped before you clean and leave
14) Return all tools to their proper location after use
15) Dispose of chemicals and solvents in a proper fashion
16) Disruptive behavior is not welcome in the shop
17) Personal music players are not allowed in the shop
18) Mobile phones must be switched off and remain away while in the shop
19) Do not converse while operating machinery
20) Extension cords are not to be plugged into other extension cords
21) Keep all circulation paths clear of projects

Shop User Protocol

1) Respect one another
2) Respect your shop staff
3) Projects are not to be left on table tops
4) Small projects can be left under tables for 24 hours. Longer term storage requires prior approval
5) If there is a large project please stay out of the large project area
6) Be mindful of working safely & in accordance with the code of conduct
7) The back door is for emergency use only
8) Shop users must be signed in to work in the shop
9) Bags are to be under tables while you are working

Material Considerations

1) Materials purchased in the shop store are all previously approved
2) Plaster of any kind is not to be used with power tools
3) Mdf and homasote may be cut but not sanded
4) All used and reclaimed materials must be approved by Senior Staff

Year Specific Protocol

1) First year students are not allowed in the metal shop
2) Ceramics and Masonry projects require approval from senior staff

Teaching Guidelines

The shop is first and foremost a learning environment. We invite all faculty and staff that have an interest in utilizing the shop to do so.

Teaching space

We are prepared to close the shop to facilitate teaching, and a small sound controlled space is available for discussion. If you have interest in using the shop as a teaching space please get in touch prussell@buffalo.edu and I will work to accommodate.

Class projects

If you are assigning shop based work to your class and think that your students might require additional tutoring on specific equipment, please get in touch and we will be happy to add additional staff to ensure that your students get the most from the shop

Material requests

We carry a wide range of materials in the shop store, and have a large network of suppliers. If you have requests for large quantities of material, or requests for materials we do not stock, please get in touch prussell@buffalo.edu and I will ensure that we have in the store everything your students need to complete their project in a timely manner.

Large Project Policy

Large projects can be defined as anything that does not fit on a table top, and or is going to be in the shop for more than three days.

The shop is in full support of students and staff working on large, even full-scale projects in the shop, and we are happy to facilitate this process. These projects can pose a different set of safety risks than our typical projects and we must work together to avoid incidents and ensure a positive outcome. All large projects must have a sponsoring member of faculty or staff to support them.

If you are interested in sponsoring a large project we will require three documents to be on file before work can begin.

1) A brief project description
2) A brief project timeline with a **highlighted end date**

3) A detailed risk assessment of potential hazards and how to avoid them

If you sponsor a large project we will ensure that the large project space is available for your use and that other students are aware of the project and do not interfere with its completion.

The large project area will be available on a first come first serve basis. If you would like to know when large projects are scheduled or are interested in reserving the space, please get in touch prussell@buffalo.edu .

Shop Store Protocol

The store is a student service, rather than a traditional store. As such we are able to offer reasonable prices. That said prices must go up on occasion to compensate for freight charges and general inflation.

All purchases must be made using campus cash or Cash using exact change.

Refunds and exchanges are possible on a limited basis and must be approved by senior staff.

Appendices

Portable electric tools

Impact Driver	Drill	Jigsaw	Circular saw	Router	Trim router
Palm sander	Belt sander	Band file	Fein sander	Electric shear	Angle grinder
Electric carver	Kreg jig	Hammer drill	Roto zip		

DESIGN FUNCTION:

• Hand-held portable tools have specific functions. Check to be sure that you have the correct tool for the job.

• 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 portable tools.

• Keep work area near hand tools clean and clutter 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.

• 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 tool.

• Seek help if you are unsure of proper tool operating procedures.

• Unplug, clean, and put away idle tools, or when finished using tools.

Wood shop

BELT AND DISC SANDER

DESIGN FUNCTION:

- For stock 6” long and shorter
- For sanding surfaces or edges
- For rounding or shaping edges
- Wood Only

SAFETY:

- Eye protection is required at all times.
- Do not talk with observers while operating machines.
- Keep hands away from abrasive surfaces
- Make sure the belt is tracking correctly before use
- Make sure disc or belt is not loose or torn
- Do not sand stock if it is 1/4” or less in thickness
- Sand with the 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 and wait for the machine to stop before cleaning and leaving

DRUM SANDER

DESIGN FUNCTION:

• For sanding carved pieces
• For sanding sharp edges
• Wood Only

SAFETY:

• Eye protection is required at all times.
• Do not talk with observers while operating machines.
• Keeps hands away from abrasive surfaces
• Sand on the bottom of the drum
• Do not wear gloves or hold work with rag

EDGE SANDER

DESIGN FUNCTION:

• For sanding edges
• For material 6” or longer
• Wood Only

SAFETY:

• Eye protection is required at all times.
• Do not talk with observers while operating machines.
• Keeps hands away from abrasive surfaces
• Do not wear gloves or hold work with rag
• Hold material with hands. Do not use clamps, pliers, etc.
• Start material at rest on the right
• Push material against the belt towards the left
• At the end of the belt, pull material away and repeat process if necessary
• Two people may operate the machine at the same time, one on each side
• Turn off machine and wait until it stops before cleaning and leaving

OSCILLATING SANDER

DESIGN FUNCTION:

- For sanding edges and inside corners
- For rounding and smoothing
- Wood Only

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 while sanding
- Select appropriate drum size for the job
- Change table insert to accommodate drum
- Hold stock firmly to table for best results
- Shut off power and wait for machine to stop before cleaning and leaving

SANDING TABLE

DESIGN FUNCTION:

- For sanding irregular shapes
- For use with handheld sanders
- Keeps dust to a minimum
- Wood Only

SAFETY:

- Eye protection is required at all times.
- Do not talk with observers while operating sanders.
- Do not wear gloves or hold work with rag
- Lay material to be sanded on table
- Make sure dust collector is on
- Make sure dust collector gate is open
- Clean area when finished and return sander

SUPERMAX SANDER

DESIGN FUNCTION:

- For sanding stock to thickness
- For smoothing surfaces
- For making material uniform in thickness
- For material that is 12” or longer
- Wood Only

SAFETY:

- Eye protection is required at all times.
- Do not talk with observers while operating machines.
- Do not sand stock less than 12” in length
- Cut only a 1/16” off with each pass or less
- Sand no stock that is less than 1/8” thick
- Do not sand used or painted material
- Shut off power and wait for machine to stop before cleaning and leaving

JOINTER

DESIGN FUNCTION:

- For shaving edges smooth
- For squaring edges of stock
- Edge grain only - not for fl at surface
- For material 12” or longer
- Wood and Plastic Only

SAFETY:

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

PLANER

DESIGN FUNCTION:

- For planing stock to thickness
- For smoothing surfaces
- For making material uniform in thickness
- For material that is 12” or longer
- Wood Only

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
- Do not plane stock less than 1/4” in thickness
- Do not plane used or painted material, MDF, ParticleBoard, Plywood or Foam
- Cut only a 1/16” or less off with each pass
- Shut off power and wait for machine to stop before cleaning and leaving

DRILL PRESS

DESIGN FUNCTION:

- For cutting holes in wood, metal or plastic
- For drilling to depth or through stock
- Accessories are available for specialized work: mortise joints, etc.
- For wood, metal, or plastic

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
- 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 to avoid drilling into the table
- Hold material to be drilled securely
- Plastic and metal must be clamped
- When making deep cuts, pull bit back to clear debris from hole
- When drilling metal, use WD-40 to keep the bit sharp and cool
- Shut off power, remove bit, and clean machine when done

MORTISER

DESIGN FUNCTION:

• For drilling square holes up to 1/2”
• Wood Only

SAFETY:

• Eye protection is required at all times.
• Do not talk with observers while operating machines.
• Do not mortise material that does not have a fl at surface
• Adjust drill bit and chisel so that they are not touching
• Remove chuck key before starting the machine
• Always hold work pieces against fence to prevent rotation
• Adjust depth stop to avoid drilling through the table
• Hole in chisel should be positioned to the right side facing the machine
• After the first cut, move work to the right so that chips may discharge freely
• Stop operating if you smell smoke
• Turn off power when down and clean machine and surface
• Do not wear gloves when operating this machine

ROUTER TABLE

DESIGN FUNCTION:

- For creating a rolling edge
- For creating decorative cuts
- For cutting dado grooves
- Wood Only

SAFETY:

- Eye protection is required at all times.
- Do not talk with observers while operating machines.
- Feed stock from appropriate direction of 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 and tightly against the fence
- Make sure bit has stopped rotating before cleaning and leaving
- Different bits are available different cuts and edges

LATHE

DESIGN FUNCTION:

• For turning symmetrical pieces
• For creating original profi les on turned stock
• For 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 must be in place and used at all times
• Adjust tool rest height appropriately to center of work
• Keep tool rest as close to the work as possible
• Remove tool rest before sanding or polishing
• Double check setup before turning on
• Rotate work by hand to check for clearance
• Examine pieces for fl aws, examine glue joints before starting
• When roughing off:
    Do not jam tool into work piece
    Do not make cut too big
• Disengage index pin before starting lathe
• Turning between centers
    Make sure all tail stock is snug to work and locked
    Lubricate tail stock center if it is not a ball bearing type
    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

BAND SAW

DESIGN FUNCTION:

- For cutting free-hand curves
- For ripping stock into thin strips
- For cross cutting or ripping stock
- For cutting circles
- Wood or plastic only

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 fl at on table top
- Do not cut stock that does not have a fl at surface
- Feed stock only as fast as teeth will remove material
- Avoid backing out of cuts when possible
- Plan relief cuts in advance and cut fi rst
- Do not make turns too tight - listen for blade twisting
- For cutting smaller pieces use the provided push sticks
- If “clicking” noise is heard, SHUT OFF POWER, the blade is damaged
- Stop machine and blade before removing scrap pieces
- Shut off and stop blade before cleaning and leaving

COMPOUND SLIDING MITRE SAW

DESIGN FUNCTION:

• For cross cuts only
• For simple mitres
• For compound mitres
• For 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
• Pull saw out, start saw, push down, and push in
• Never use the machine with 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, cleaning, and leaving

FESTOOL

DESIGN FUNCTION:

- For making cuts or dadoes in wood
- For cuts that cannot normally be done on the table saw
- For cutting angles 0 to 90 degrees

SAFETY:

- Eye protection is required at all times.
- Do not talk with observers while operating machines.
- Ask for staff assistance for first time use
- Adjust track to hold material snuggly
- Adjust blade to proper depth
- Wait for saw to come to full speed before making cut
- Wait for blade to stop before removing material, cleaning, and leaving

PANEL SAW

DESIGN FUNCTION:

• For straight cuts on panel board material
• For ripping or cross cutting large sheets
• Wood Only

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
• Place stock on carriage, backside facing out for best results
• Do not drop material on roller carriage
• Feed stock through saw slowly and smoothly (for rip cuts)
• 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 fi t only
• Leave saw at bottom and wait for blade to stop before removing material, then return saw to top position
• Shut off and wait for saw to stop before cleaning and leaving

Scroll Saw

DESIGN FUNCTION:

• For making fi ne, small scroll designs
• For cutting wood a 1/2” thick or less
• For cutting plastic a 1/8” or smaller with slow speed
• Wood or plastic only

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-ask Staff for assistance if different blade is needed
    Loosen tension to “0”
    Loosen top thumb nut on blade
    Lift head and place material over blade
    Lower head, place blade under thumb nut, and tighten
    Tighten tension to “5”
• 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 wait for blade to stop before cleaning and leaving

TABLE SAW

DESIGN FUNCTION:

- For straight cuts only
- For ripping stock only
- For materials that are longer than they are wide
- For material up to 24” wide

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 FREEHAND
- Hold work firmly or against mitre gauge
- Right and left hand pushes material to front of the guard
- Remove left hand and continue to push past guard with right hand
- Set blade so that it extends only a 1/4” 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
- Always use a push stick to clear scraps from cutting table
- Move rip fence out of the way when cross cutting
- When ripping, push stock between blade and fence – until material clears blade
- Push stock beyond the blade when cutting
- Always use a push stick when ripping narrow stock
- Shut off power, wait for blade to stop, then remove any scraps and clean the machine

Metal Shop

BENCH GRINDER

DESIGN FUNCTION:

- For grinding ferrous metals (mild steel and hard steel)
- Metal only

SAFETY:

- Eye protection is required at all times.
- Do not talk with observers while operating machines.
- Wear gloves to protect from sharp edges and hot metal
- Always wear a face shield when operating grinders
- Have cooling pail or water nearby
- Do not grind non-ferrous metals (brass, bronze, aluminum, copper)
- Clean area when finished

METAL SANDER

DESIGN FUNCTION:

- For metal 12” long and shorter
- For sanding surfaces or edges
- For rounding or shaping edges
- Metal only

SAFETY:

- Eye protection is required at all times.
- Do not talk with observers while operating machines.
- Keeps hands away from abrasive surfaces
- Make sure the belt is tracking correctly
- Make sure belt is not loose or torn
- Do not sand stock if it is 1/4” or less in thickness
- Wear gloves and protective face shield
- Shut off power and wait for the machine to stop before cleaning and leaving

ENGLISH WHEEL

DESIGN FUNCTION:

- For making custom curves in sheet metal
- Sheet metal only

SAFETY:

- Eye protection is required at all times.
- Do not talk with observers while operating machines.
- This is a free hand machine
- It is recommended that you wear gloves
- Do not place hands near wheels

METAL BENDER

DESIGN FUNCTION:

- For bending solid metal (cold)
- For bending tubing metal (cold)
- For bending angle iron (cold)
- For bending pipe (cold)
- Metal only

SAFETY:

- Eye protection is required at all times.
- Do not talk with observers while operating machines.
- Do not bend tool steel
- Mild steel only
- Setup instruction book is located on rack with dies

RING MACHINE

DESIGN FUNCTION:

- For forming circles from metal strips or rods
- Metal Only

SAFETY:

- Eye protection is required at all times.
- Do not talk with observers while operating machines.
- Make multiple passes while gradually increasing pressure

SHEET METAL SHEAR

DESIGN FUNCTION:

- For cutting sheet metal up to 16 gauge thickness
- For cutting sheet metal at angles
- Sheet metal only

SAFETY:

- Eye protection is required at all times.
- Do not talk with observers while operating machines.
- Do not remove or readjust any guards
- Wear gloves to protect hands from sharp edges
- DO NOT cut wire or rod on machine
- Clean area when done

SHEET METAL BREAK

DESIGN FUNCTION:

- For bending sheet metal up to 16 gauge thickness
- Sheet Metal Only

SAFETY:

- Eye protection is required at all times.
- Do not talk with observers while operating machines.
- Wear gloves to protect hands from sharp edges
- 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 ROLLER

DESIGN FUNCTION:

- For rolling sheet metal
- For making cones
- For making cylinders
- Sheet Metal only

SAFETY:

- Eye protection is required at all times.
- Do not talk with observers while operating machines.
- Wear gloves to protect hands from sharp edges
- DO NOT use wire or rod on machine
- Clean area when done

HORIZONTAL BAND SAW

DESIGN FUNCTION:

- For cutting solid or hollow metal stock to length
- For straight cuts and mitres
- For material over 1/4” thick
- Metal only

SAFETY:

- Eye protection is required at all times.
- Do not talk with observers while operating machines.
- Make all saw blade adjustments with power off
- Adjust blade guides prior to use
- Make sure both green lights are on before starting saw
- Stop saw before putting in or removing stock from vise
- Always have stock firmly clamped
- Make sure blade is not touching stock when turning on
- Keep hands and fingers away from blade when saw is running
- If “clicking” noise is heard, SHUT OFF POWER, the blade is damaged
- Never let saw blade drop on the work piece
- Stop machine before removing waste

METAL LATHE

DESIGN FUNCTION:

• For turning metal, plastic or wood
• For turning stock symmetrically around a point
• For creating original profi les on turned stock

SAFETY:

• Eye protection is required at all times.
• Do not talk with observers while operating machines.
• It is recommended that you wear a face shield
• Make all adjustments with the power off
• Use recommended speeds for materials being turned
• Guards should be in place and used at all times
• Adjust tool rest height appropriately so it is roughly centered on stock
• Keep tool rest as close to the work as possible
• Double check setup before turning power on
• Rotate work by hand to check clearance before starting
• Be sure to use correct cutter for the job
• General Rule: The harder the material the slower the speed
• Shut off power and clean lathe before leaving

MILLING MACHINE

DESIGN FUNCTION:

- For making accurate inside or outside cuts
- For cutting gouges, dadoes and grooves
- For surfacing
- For drilling
- Metal, plastic, or wood

SAFETY:

- Eye protection is required at all times.
- Do not talk with observers while operating machines.
- Stop machine before removing waste
- Never reach by a rotating cutter
- Make sure cutter is properly installed
- Tighten all adjustments snugly
- Shut off power and clean before leaving

MIG WELDER

DESIGN FUNCTION:

- For fusing metal together
- For joining 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 care is required while welding
- Anyone assisting must also have special eye protection
- When working on large projects, use red curtains to protect bystanders
- Gloves are required at all times
- Protective clothing that should be worn while operating machine
    - Long sleeves
    - Long pants
    - Leather shoes or use spats
    - 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
- No galvanized metal
- Aluminum requires special wire and gas-Ask staff for assistance if you need to weld aluminum

SPOT WELDER

DESIGN FUNCTION:

- For fusing sheets of metal together
- For use with sheet metal

SAFETY:

- Eye protection is required at all times.
- Do not talk with observers while operating machines.
- Wear leather gloves to protect hands from sparks and sharp edges
- Wear protective face shield

HYDRAULIC PRESS

DESIGN FUNCTION:

- For testing the strength of beams and columns
- For pressing parts together or apart

CUTTING PAPER PRODUCTS:

- Eye protection is required at all times
- Do not talk with observers while operating machines
- Place object to be tested on table of machine
- Set pressure needle gauge to zero
- Place guard in front of machine
- Stand in front of guard only
- Set hydraulic pump to down
- Pump handle until pressure gauge stops and crack appears
- Release pressure on hydraulic pump by turning handle to up
- Pump ram up
- Clean up mess on and around machine
- Beams and columns made of concrete must be removed from shop

Other tools

FLETCHER CUTTER

DESIGN FUNCTION:

• For cutting glass
• For cutting Plexiglas up to a 1/4” thickness
• For cutting corrugate, chipboard, and foam core

SAFETY:

• Eye protection is required at all times.
• Do not talk with observers while operating machines.
• Always wear gloves when cutting glass
• Load material from the left side
• Adjust turret to proper cutter (Ask for staff assistance if needed)
• Load material from the left side

CUTTING GLASS:

• Wear gloves
• Do not use clamp
• Raise head by pushing trigger and place cutting wheel above the upper edge of the glass and release trigger
• Bring head down slowly with a fi rm and continuous motion
• Only score glass once
• Hold glass with left hand, take right hand and apply pressure to the lower right hand corner of the glass
• Do not apply any pressure to the center of the glass

CUTTING PLASTIC:

• Set clamp
• Depress short trigger, hold it down and raise head
• Release trigger as close as possible to the top edge while still on the surface of the plastic
• Bring head down slowly with a firm and continuous motion
• For 1/8” plastic, one pass is required
• For 3/16” - 1/4”, two to three passes may be required
• To break plastic:

Depress short trigger and set pin
Raise head to top of plastic
Depress large trigger and hold
Pull head down and listen for snapping sound
Release clamp and remove material

CUTTING PAPER PRODUCTS:

• Set clamp
• Depress short trigger and raise head above material, release trigger
• Bring head down slowly with a firm and continuous motion
• Remove material

SAND BLASTER

DESIGN FUNCTION:

- For removing surface coat from metal or plastic
- For frosting the surface of glass or plastic
- For polishing surfaces or etching

SAFETY:

- Eye protection is required at all times.
- Do not talk with observers while operating machines.
- Treat blasting gun like a loaded weapon
- Work in a well-ventilated area
- Never point the blasting gun at another or yourself
- Do not blast wood or foam
- Do not blast near flammable liquids because of spark dangers
- Make sure air supply is off and lines are bled when done
- Rules of thumb:

The higher the pressure, the faster the job
The closer the material, the faster the job
User larger grit to remove surface material
User smaller grit to polish surfaces
As nozzle wears, adjust pressure and distance

VACUUM FORMER

DESIGN FUNCTION:

• For molding different types of plastic
• Plastic only

SAFETY:

• Eye protection is required at all times.
• Do not talk with observers while operating machines.
• Do not use when combustible vapors are present
• Keep approved fi re extinguisher within reach of operator
• Do not leave unattended during operation
• Do not install or remove plastic from the unit while the heaters are on or hot
• Do not use painted, oily or dusty plastic sheets
• Use plastic sheet intended for thermoforming processes only
• If unit shuts down due to an overheat condition, promptly shut off power at the remote disconnect
• Do not operate unit until the cause of the overheating has be corrected
• Wear heat resistant gloves while operating machine

OPERATION SEQUENCE:

• Read all safety precautions before operating machine
• Install the unit properly
• Remove any accumulated dust from machine and top of heat enclosure
• Install mold in center or table. Use duct tape to secure mold to mold frame
• Provide edge-seal to create vacuum cavity between plastic sheet and mold frame or table edge
• Adjust spreaders to sheet size and clamp
• Install plastic sheet, clamp firmly, move carriage to lowest possible position
• Preheat elements for 2-3 minutes at 100% heat
• Set cycle time and percentage heat control
• Raise carriage to upper position and press start
• Monitor heating, do no leave unattended
• When heating cycle finishes, vacuum motor will start
• Lower carriage over mold engaging edge seal
• Hold in position until sheet is formed; turn on fan to assist cooling.
• When part is cool, turn the heat switch off
• To interrupt heating cycle, press heat switch to reset. Cycle timer will reset, readjust the time if necessary. Pressing the heat switch to start will begin the cycle again