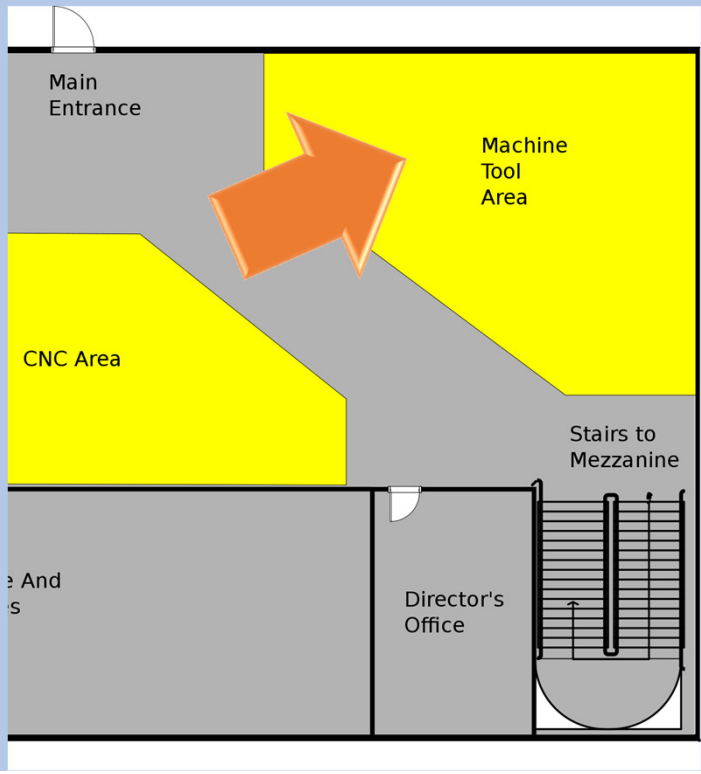
Tulane MakerSpace

Metal-2 Training Presentation

Metal-2 Training

- **MakerSpace Layout:**
  - **This presentation will focus on tools in the "Machine Tool Area", which are used for working metal and plastic materials.**
  - **Training for Machine Tool access involves two parts:**
    - **Part One requires completing this presentation and the quiz that follows.**
    - **Part Two requires an in-person demonstration where you will use each of the tools to make a small part.**

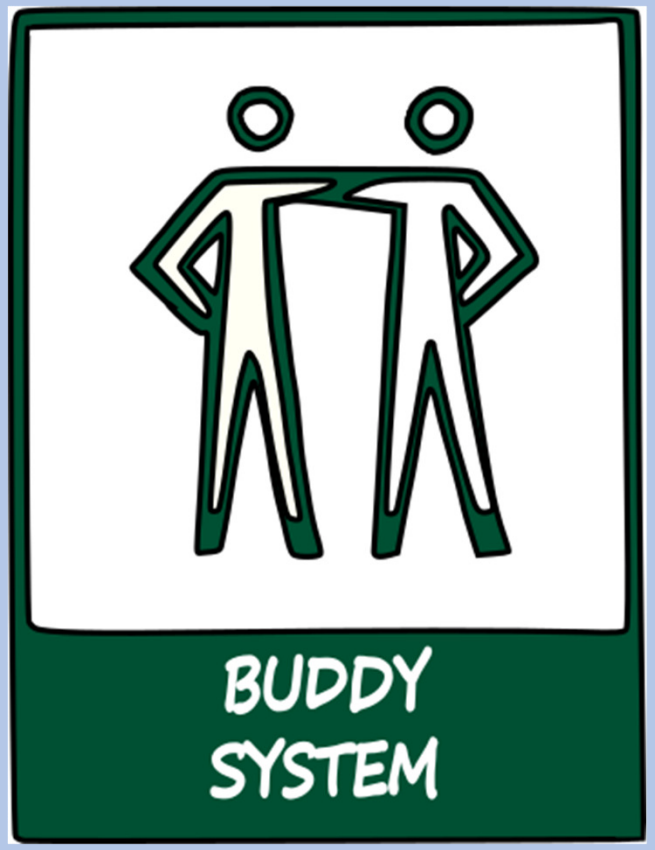


Metal-2 Training

- **MakerSpace Safety:**
  - **Anyone standing in a yellow zone must be wearing:**
    - ***safety glasses***
    - ***long pants***
    - ***closed-toe shoes***
  - **Long hair must be tied back, and no dangling clothes or jewelry are allowed.**

Metal-2 Training

- **MakerSpace Safety:**
  - **The "buddy system" requires that - at all times - there has to be someone in the same room who can both hear and readily see you, and can come to your aid.**
  - **For example, someone in the Mezzanine is not a "buddy" for someone working on the Main Floor. Buddies must be able to immediately see and hear if a problem arises.**



Metal-2 Training

- **MakerSpace Safety:**
  - **Be aware of other people in the vicinity, and what they are doing. This rule applies to tool operators, helpers, and bystanders.**
  - **Maintaining control of the workpiece is the most important way to operate tools safely and effectively.**
    - **Clamp any parts that can remain stationary during a cutting or drilling operation.**
    - **Keep parts/workpieces pressed against the table and/or fence.**
    - **Consider the motion of cutting surfaces and the forces they apply to your workpiece.**

Metal-2 Training

- **Tools: Band Saws**
  - **There are two vertical band saws in the Machine Tool area.**

The larger, gray band saw is geared for cutting softer materials like aluminum and plastic.

The smaller, black band saw is geared for cutting harder materials like steel.

Metal-2 Training

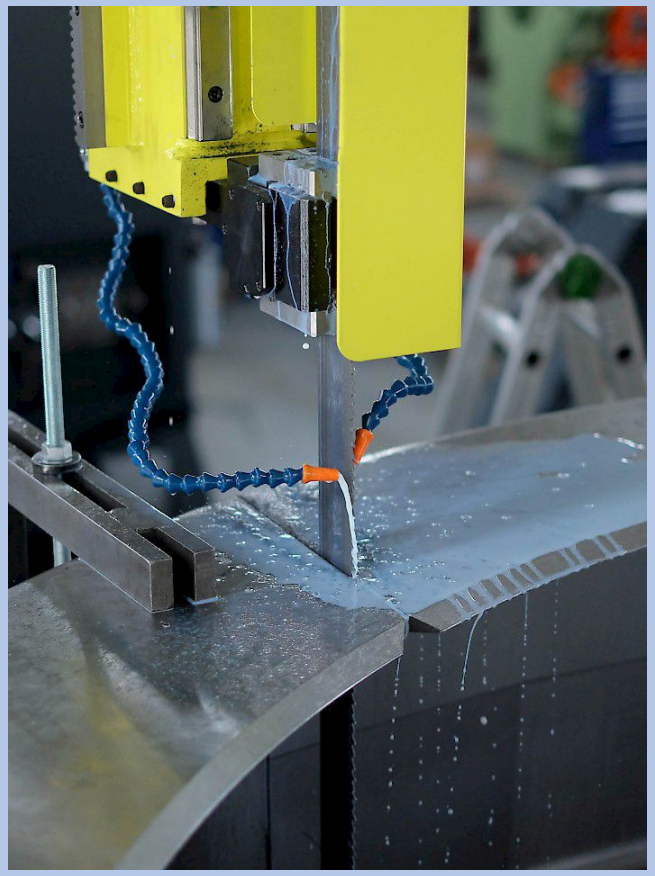
- **Tools: Band Saws**
  - **When using a band saw, first adjust the height of the guard so that it covers as much of the blade as possible without interfering with your cut.**
  - **Turn the saw on, then slowly but firmly slide your workpiece through the moving blade while keeping it flat on the work surface.**
  - **Do Not attempt to hold your workpiece above the work surface, the saw will rip it from your hands and likely injure you.**

Release the guard lock on the right side, then turn the knob to adjust height and re-lock the guard.

Metal-2 Training

- **Tools: Band Saws**
  - **KEEP YOUR HANDS AS FAR FROM THE MOVING BLADE AS POSSIBLE. If you need to use a cutting guide, push stick, clamp, or whatever helps, USE IT.**
  - **Depending on the material being cut, you may want to wear ear protection.**

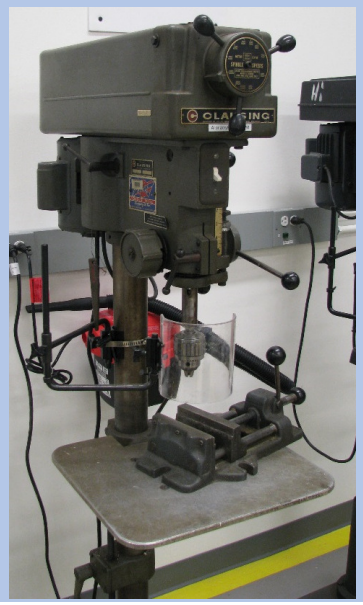
  - **Use lubrication as necessary to reduce heat on the blade and on the part.**



Metal-2 Training

- **Tools: Drill Press**
  - **There are three drill presses in the Machine Tools area.**

This press is set for cutting soft materials, like aluminum or plastic.



This press is set for cutting hard materials, like steel.

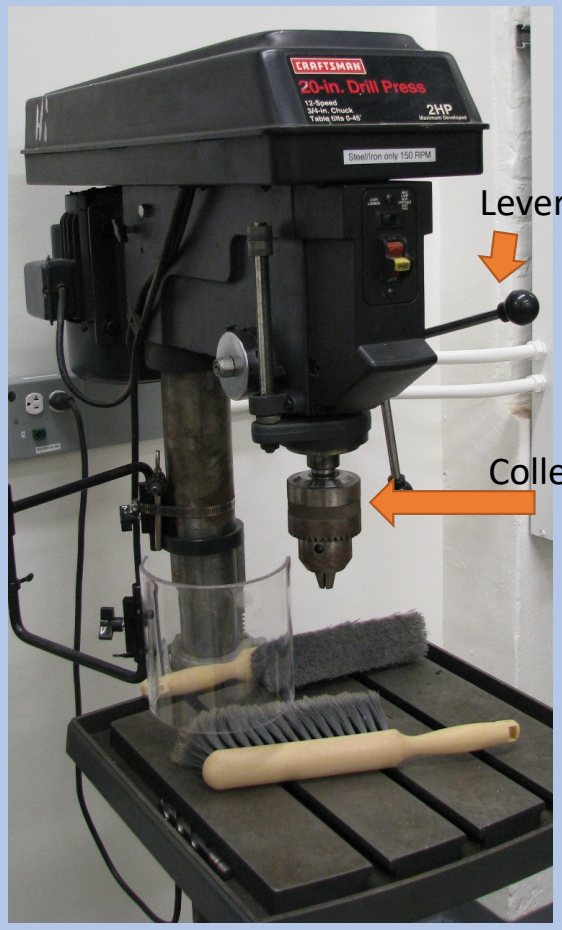
The precision press is used for cutting precisely measured holes using the movable bed.

Metal-2 Training

- **Tools: Drill Press**
  - **When using a drill press, insert the drill bit into the collet and tighten it by hand.**
  - **Once you're sure the bit is straight, use the chuck key to securely tighten the bit in place.**

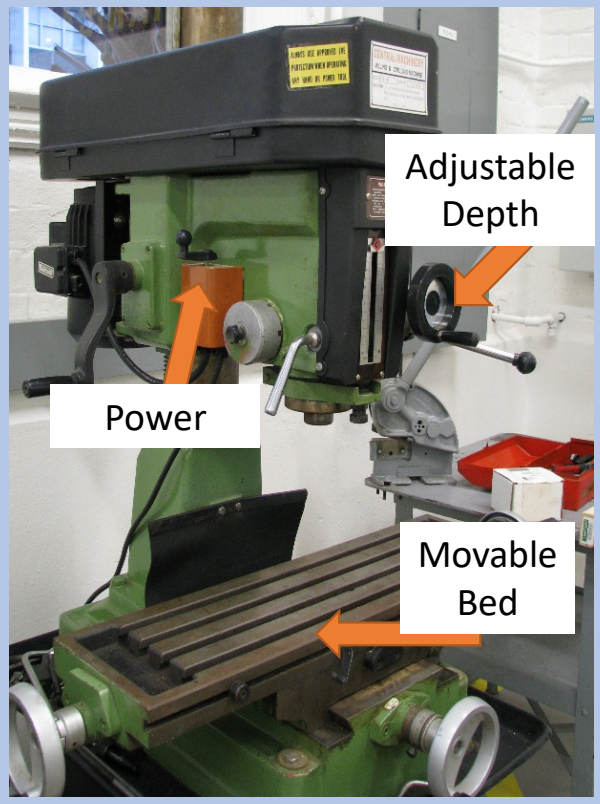

Chuck Key

  - **Secure your workpiece in place, and move the guard in front of the drill bit.**
  - **Turn the machine on and rotate the lever to lower the drill bit into place.**
  - **Slowly apply pressure, allowing the bit to cut the hole through the workpiece.**



Metal-2 Training

- **Tools: Precision Drill Press**
  - **The precision drill press has an extremely precise adjustable bed so that you can drill at highly accurate positions.**
  - **After clamping your object to the bed, use the wheels to move it into position. The measurements on the wheels can provide an accurate position.**
  - **You can also measure the depth of cut as the lever is rotated.**
  - **The direction of rotation is set by the power lever, push it <u>forward</u> to go <u>forward</u>.**



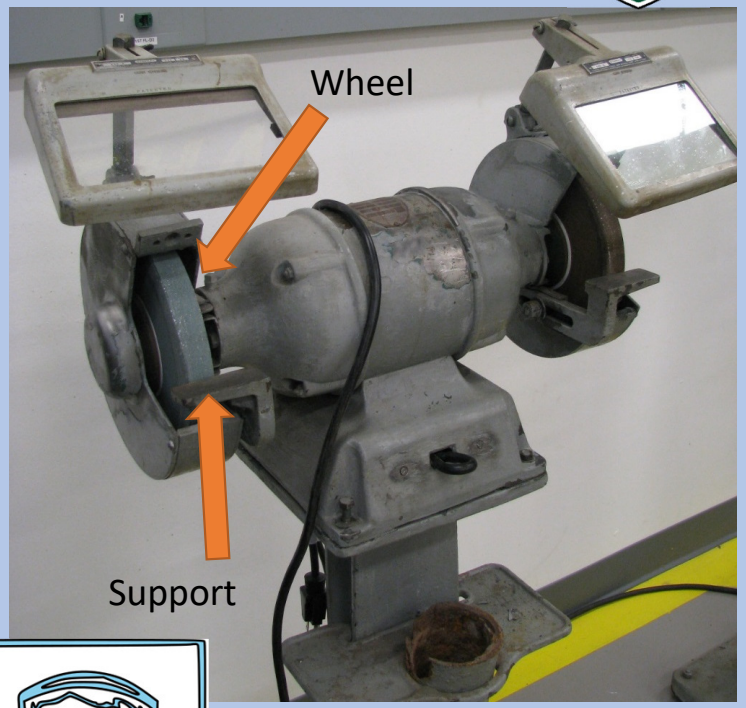
Metal-2 Training

- **Tools: Abrasive Cut-off Saw**
  - **The Cut-off saw uses a narrow grinding wheel for angled cuts from metal stock.**
  - **To use the saw, clamp your workpiece into place securely and keep hands clear of the cutting blade.**
  - **When ready to make the cut, squeeze the trigger and slowly lower the blade through the workpiece.**
  - **Do not cut aluminum or soft metals using abrasive tools, only steel.**

Ear protection is recommended.

Metal-2 Training

- **Tools: Abrasive Bench Grinders**
  - **Bench grinders use abrasive wheels to smooth and shape cut pieces of steel.**
  - **In addition to safety glasses, you must also wear a face shield to use the bench grinders.**
  - **Make sure your piece is held against the support, and slowly press it into the spinning wheel to smooth sharp edges or shape the piece as needed.**
  - **Ear protection is also recommended.**



Metal-2 Training

- **Tools: Abrasive Angle Grinder**
  - **An angle grinder works much like a hand-held version of the abrasive cut-off saw and bench grinder.**
  - **Wider wheels are for grinding, narrow wheels are for cutting steel.**
  - **To use the angle grinder, securely attach the wheel using the provided wrench, then hold the handle securely and squeeze the trigger.**
  - **Avoid flying sparks and keep away from any flammable materials.**