2890 The Hawk Collective

Mechanical Level 2 - Tools

Hand Tool Identification and Purpose

Hammer

Original Intended to drive and remove nails. Our team most often uses it as a heavy “persuader” to move objects into place.

Most of the time the surface of the persuaded object is damaged in the process.

Safety: Striking hard surfaces can cause bits of the hammer or bits of the object to break off that can damage humans around you.

Mallot

Soft faced hammer used to tamp objects together.

The better choice to use when “persuading”

Types

Deadblow -has sand in it to reduce bouncing
Non-marring - rubber will not leave a skid mark on the object
Double Sided - has two types of materials on them with different attributes such as hardness or marrablitiy.

Safety: Mallots can bounce in unpredictable directions when striking surfaces

Scribe

Generic name for a marking device normally consisting of a pointed or sharp hard metal object used like a pencil to make marks in softer materials like wood aluminum or plastic.

Also called a “Scratch Awl”

Safety: **Pointy OUCH!**

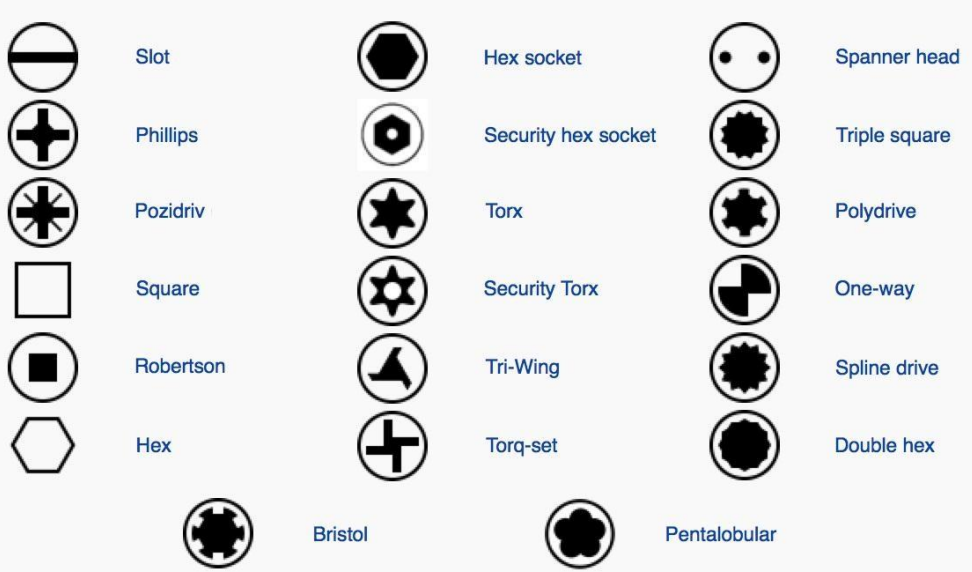
Deburring Tool

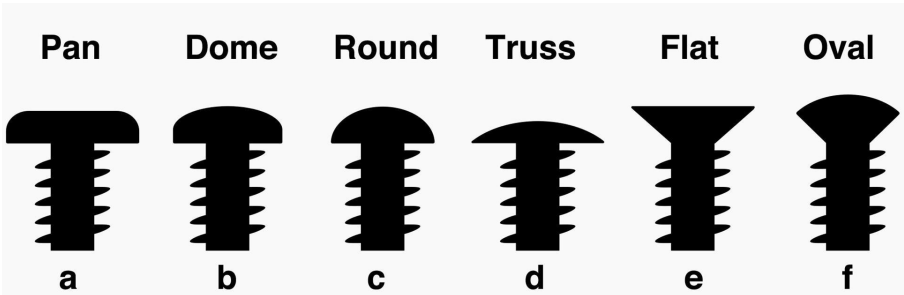
Used to remove edges after metal is cut or drilled.

Safety: **Working with sharp edges.**

Screwdriver

A device used for rotating screws with matching head shapes.
Philips, Slot(flathead), Square, and Torx are the most common. We work almost exclusively in Hex Socket Cap.





Safety: **Not to be used as a Wago or Pry bar.**

Allen Key/Hex Key

One of the most common used tools on our team. The main two sizes we use are **3/16 and 5/32.**

Can be ballended or square. Ball-end allows you to get at a screw at angle other than perpendicular but has less surface contact and is more likely to strip.
Come in metric and standard sizes. If it seems loose you might be in the wrong group.

Safety:

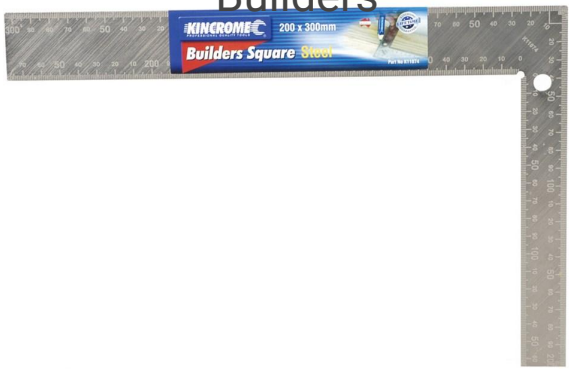
Square

Can have special functions, but all are used to check for perpendicular or to make mark perpendicular to a plane.

Speed

TriSquare

Builders



Combination

Safety:

Center Punch

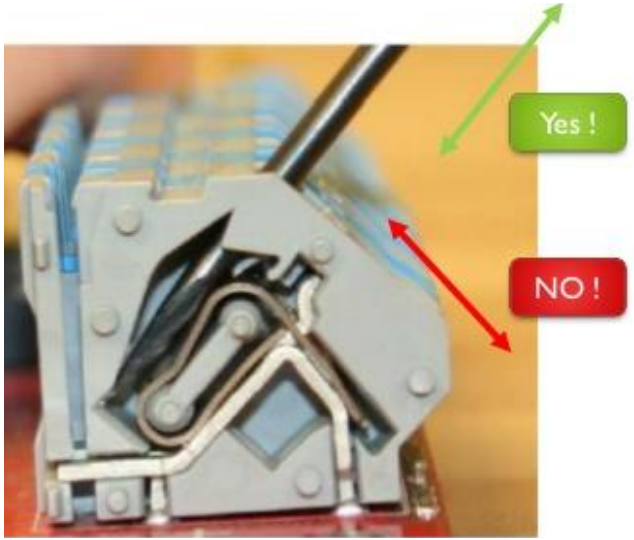
Used to put a small indentation into a material to limit the amount of drill bit “skating” on a smoothe or rounded surface.

Can be spring loaded/mechanical or manual

Safety: **Can put “large indentions” in flesh.**

Wago Tool

Used with special connectors to connect wire to devices without any soldering or external connectors.

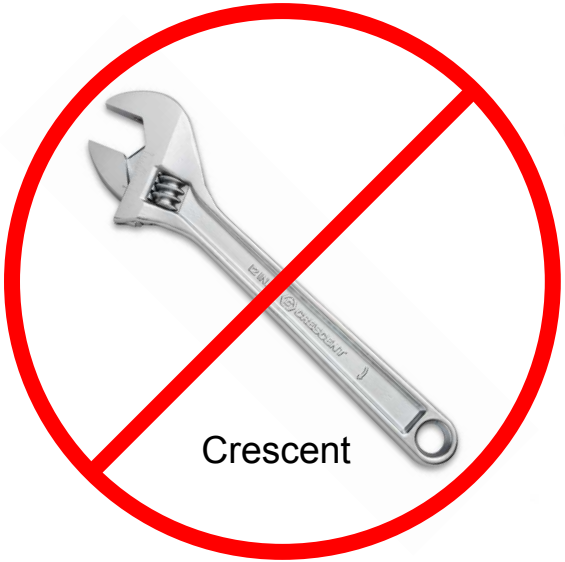


Safety: **Can slip and implail if not used properly**

Wrench

Used to hold or turn a nut or bolt. Our team primarily uses one size ⅜ with our ¼ -20 nylock nuts

Only us a crescent wrench as a last resort (after your fingers and teeth* have failed).



Crescent

Socket/Ratchet

Box/Open Ended

*Sarcasm

Safety:

Pliers

Pliers are used for grasping, twisting, clamping, and bending parts.
Often used to aid in assembling oversized parts.

As a last resort can be used on nuts and bolts.

Safety:

Power Tool Identification and Purpose

Band Saw

We have a few bands saws that we use for the robot.
Metal- we have a green cordless and a larger black one. These have blades with small teeth. While we call these metal saws they do not cut all metals. If you are unsure ask. But as
Wood/plastic- lager grey bandsaw.

Safety: Safety lesson required before use.
https://www.youtube.com/watch?v=_fJv2f6-014

Chop Saw

We have modified a cordless chop saw to cut metal. We added a non-ferrous metal cutting blade (soft metals only), and an enlarged fence.
This saw does shoot shavigns out the back so pay attention to what is directly behind it such as another teams pit !
-Securely clamp the item
-Let the blade come to full speed
-Let the blade do the cutting
-Allow the blade to stop before lifting the blade out of the workpiece.

Safety: Safety lesson required before use.
Need to film a how to video.

Drill Press

Drill presses are used to drill holes thought items. They can be outfitted with sanders, counter boars and other items.

A special “key” (chuck key) is used to tighten the “bit-heder”(chuck).

When drilling through materials with smooth or round surfaces a center punch is used to “start” the hole by giving the drill bit a place to sit in.

Safety: **Safety lesson required before use.**

Drill Press

Safety

Hand Drill

We use hand drills to make holes, grind and smooth edges,/holes, and install nuts and bolts.

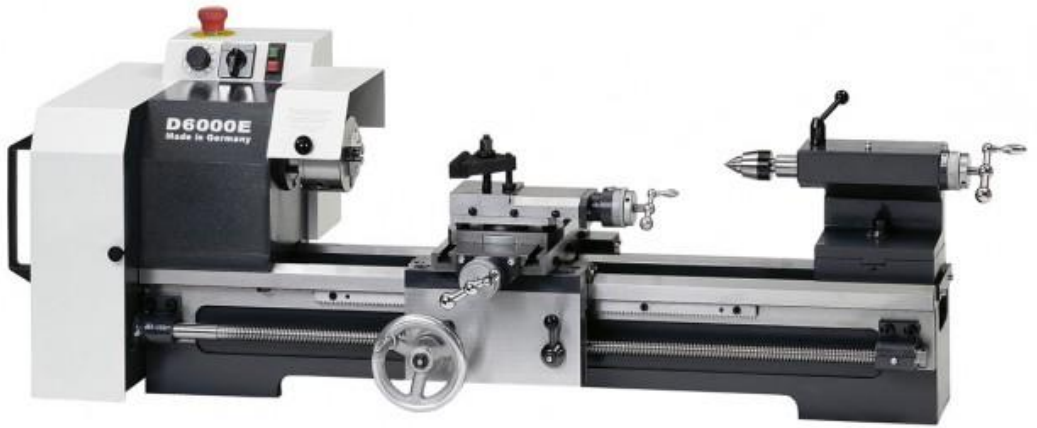
Speed is controlled by the gearbox switch on top and the trigger. Direction is controlled by the switch above the trigger.

The chuck is tightened around the bit by hand or by hand assisted with the drill motor.

Safety:

Metal Lathe

The small metal lathe is used for many things. Most often the material is locked into a large multi-jawed chuck. The tools are then mechanically pushed up against the the surface of the material and shaved to change its shape.



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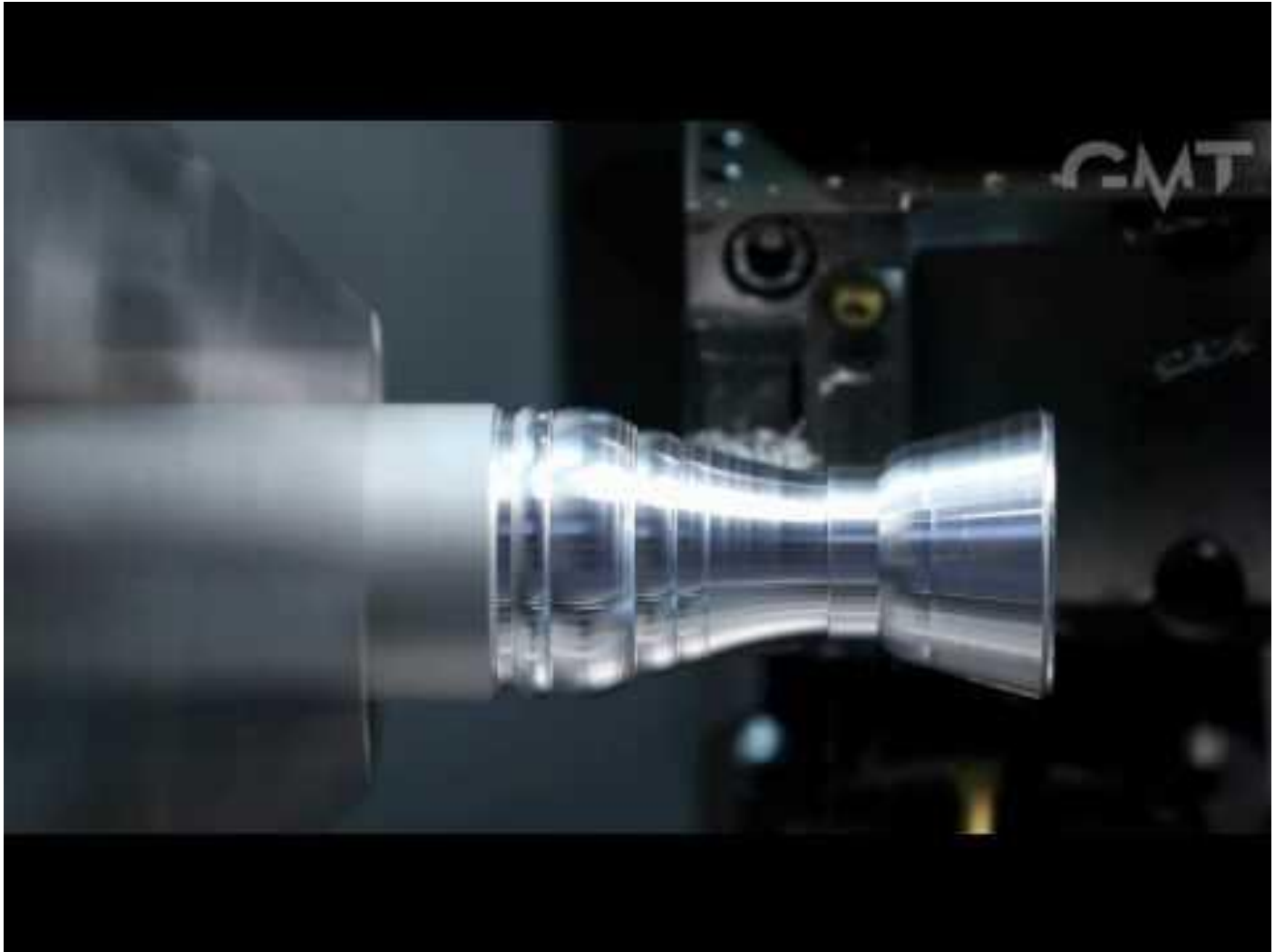
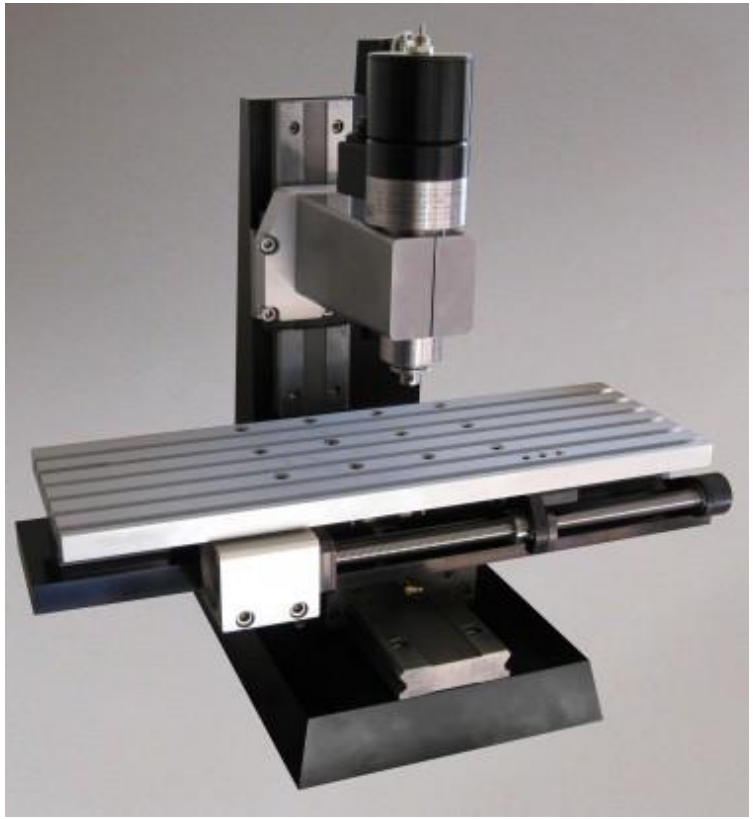

GMT

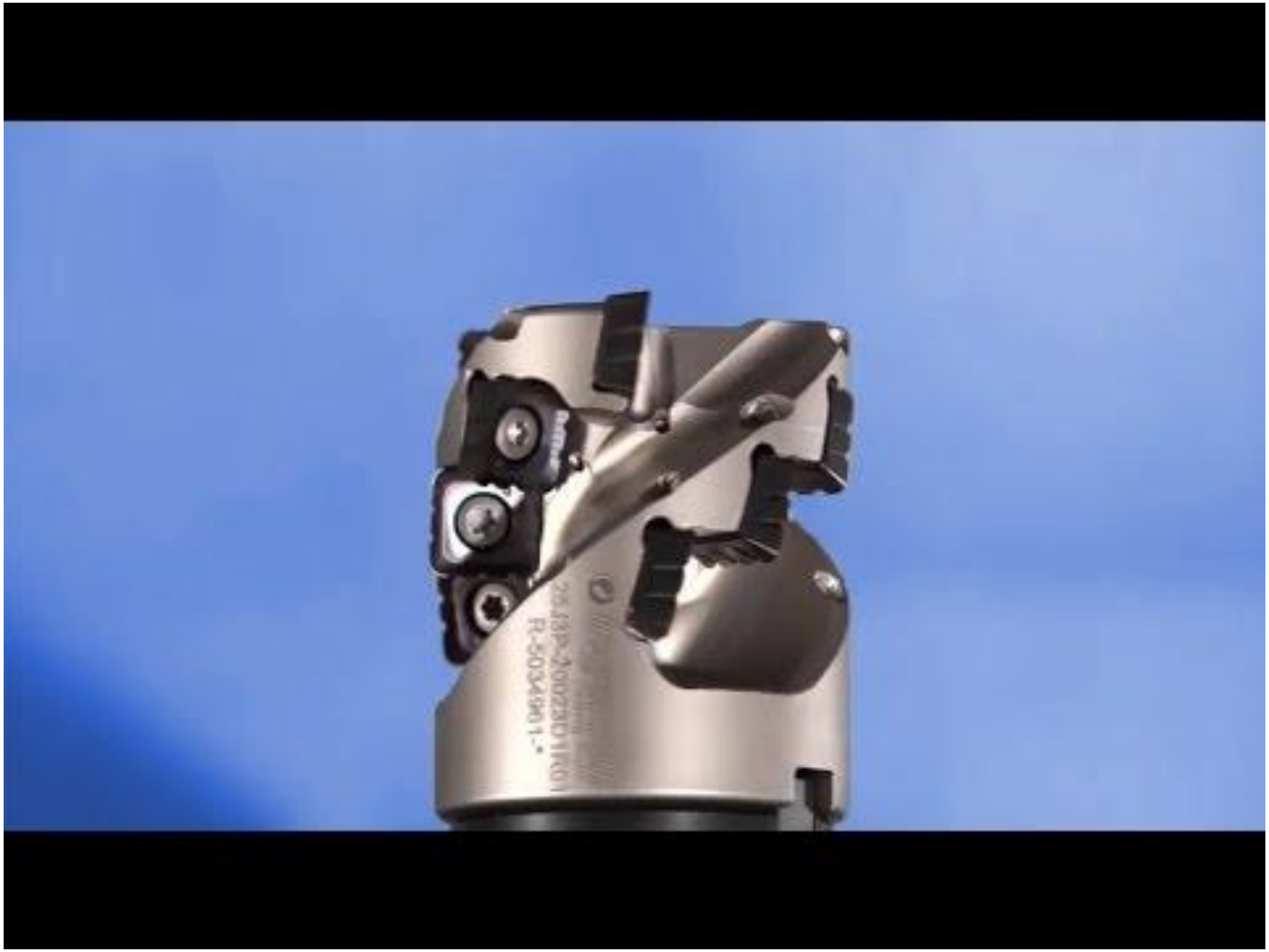
Table Saw

Mill

Manual Mill- Our team has access to a manual mill that can be used to shape metals (and woods and plastics) to a shape including slots and holes.
CNC Mill - we have retrofitted older mill that can be “driven” via a computer to make a repeatable shape or series of shapes in a material. These “cuts” can be coded using a numerical system called G-Code or you can use a software package that creates the G-Code from a graphical toolpath.

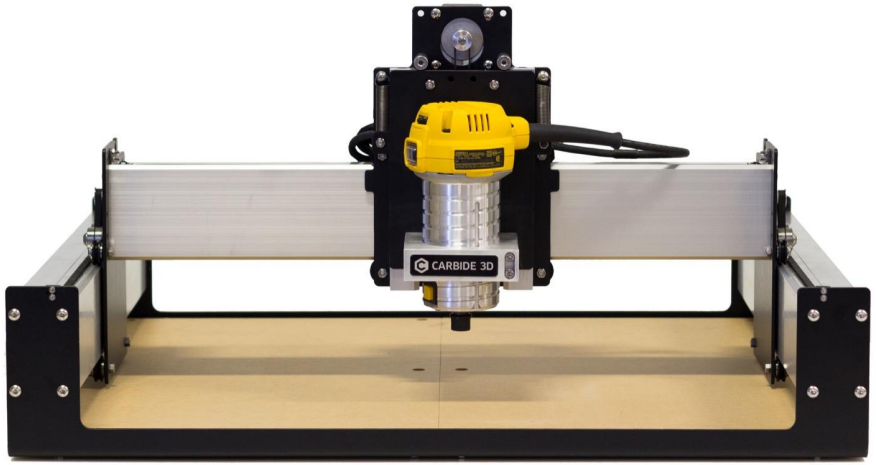


Safety: Safety lesson required before use.



CNC Router

CNC Router - used to cut shapes out of metal plastic and wood. Also used to a limited degree to drill holes.



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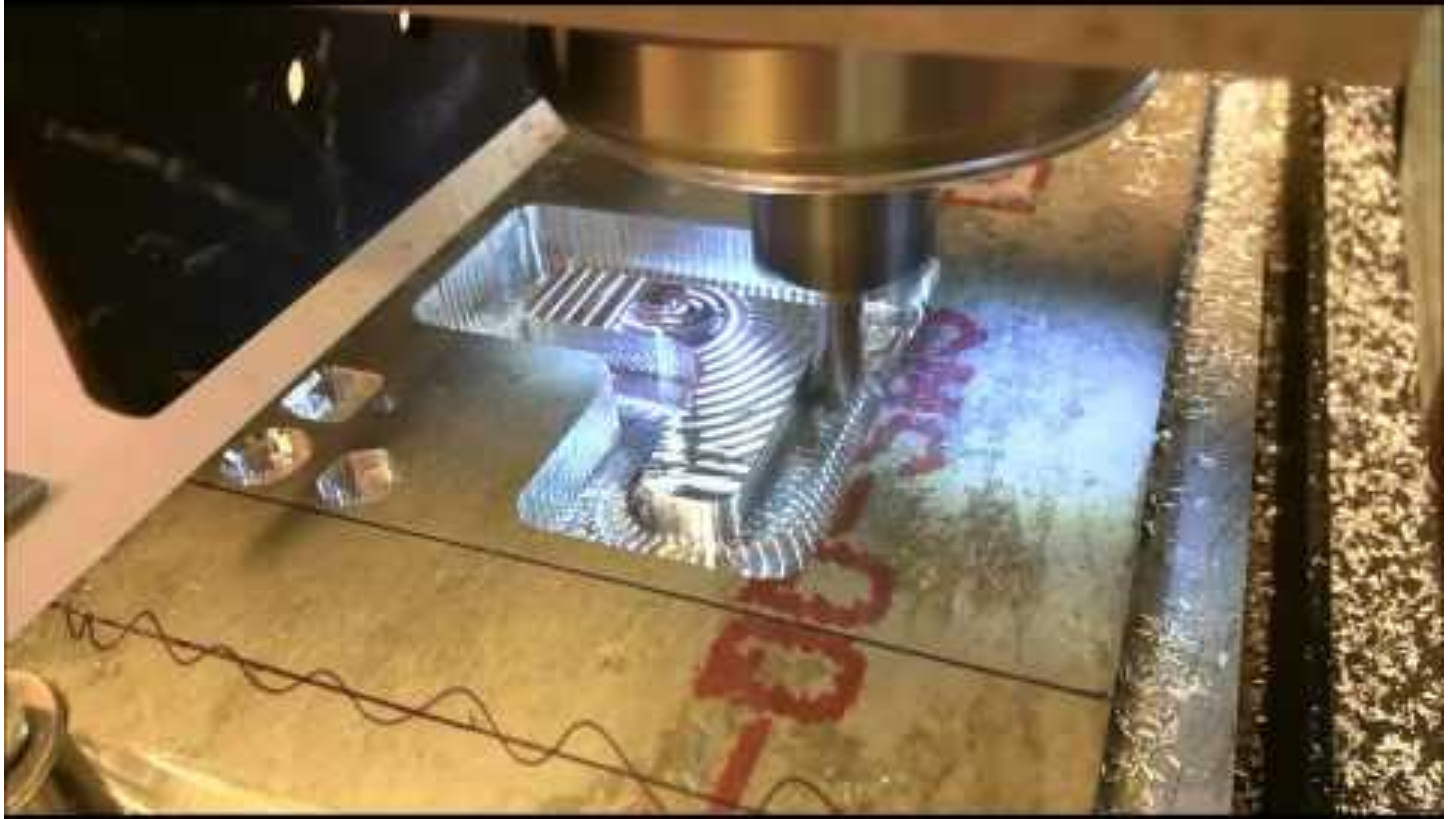

To Achieve Mechanical Technician Level 2

1. Review safety guidelines for each tool.
2. Get supervised “hands on time” with each tool.
3. Schendle an in person test with a Mechanical Trainer
    a. Cut and dress a piece of square tube to size. Be no more than 1/16 out of spec
    b. Drill two ¼” holes a specific distance apart.

Next-Mech Tech Level 3

1. Wheels
2. Gearboxes
3. Chassis design