

UW Physics Student Machine Shop

Standard Operating Procedures

Sheet Metal Equipment

Turret Punch

Working with thinner sheet metal requires very different tooling and methods than working with thicker metal stock. Most standard metal cutting tools, like saw blades, drills, need enough material to stabilize and guide themselves while cutting. Without the benefit of enough material to cut easily, methods like punching often prove valuable.

Punching operations are the same principle as shearing, except applied to remove a shape rather than to separate along a long straight line. These shapes can be as simple round holes, square holes, slots, or more complex custom cut-outs. Unlike the long straight blade dropping down along a shear line, the punch press utilizes the Punch and Die combination to shear and form the inside and outside lines of the cut-out feature. These Punch and Die pairings are precisely uniform in all their outer working dimensions. This way they loaded into any one the rotating turret' stations, as long as the **pairing is loaded into the correct positions for both turrets.**

Limitations

- Sheet metal tooling is limited by the type and thickness of the workpiece stock. Specific limits are specific to the tool itself. In the case of the UW Student Shop Turret Punch, the maximum thickness of a variety of metals is listed on a plastic-coated card attached to the machine itself.
- Also, in the case of the UW Student Shop, the selection of Punch and Die pairings is limited to what is on hand and set up.

- This is a manually-operated Turret Punch, making it highly limited compared to its Computer Numeric-Controlled and hydraulically powered counterparts. There are no alarm lights when the Punch and Die are misloaded.

As always, whenever you have any doubt regarding the safe operation of Student Shop equipment, find the Shop Instructor or another Instrument Maker and ask before you act.

Hazards

There are a number of particular hazards associated with the operation and use of tool, including but not limited to:

- Pinch Points and crushed fingers: This machine requires the operator to power the punching action using the leverage of a long handle. The operator's one hand will be extended out while the other hand floats the workpiece, locating the center of the punch. This can be a little awkward for the beginner. Priority attention should always focus on keeping fingers and hands free of pinch and crush points.
- Tool Failure: Punches and Dies are hardened tool steel and tend to break before they bend. If Punch and Die are incorrectly matched or misaligned in turret stations, the force of the punch can do serious damage, including tool shatter.
- Eye Hazard: Always wear safety glasses, goggles and/or OSHA-tested face shield.
- Be safe from burrs and sharp edges. Sheet metal is notoriously dangerous when it is just being moved or is even laying on a table with a corner sticking out. Wear proper clothing and footwear.

Required Personal Protective Equipment (PPE)

- Safety Glasses and/or Face Shield. Eye protection should be worn at all times.
- Closed-toe, sturdy footwear. Sturdy sneakers and other such footwear is the minimum level of allowable foot protection. Proper safety shoes or boots, with steel toes, electrical protections, etc. are preferred. Extremely lightweight sneakers and all sandals and flip-flops are not safe for machine shops in general.
- Hearing protection is recommended in areas which exceed 85 decibels. Higher decibel levels can cause permanent hearing loss very quickly so hearing protection is always recommended in machine shop.
- If sufficient dust is created, a particle mask or respirator is advised.
- Hair ties, hats, etc. to safely contain long hair if needed

- Sturdy, well-covering and comfortable clothing WITH NO LOOSE SLEEVES, SCARVES, etc. that could get pinched and pulled through the band saw.
- ABSOLUTELY NO GLOVES ARE TO BE WORN WHILE THE MACHINE TOOL IS RUNNING.