Drill Mill Training Part

This guide will help you create an aluminum die while also getting you more use to the drill mill.

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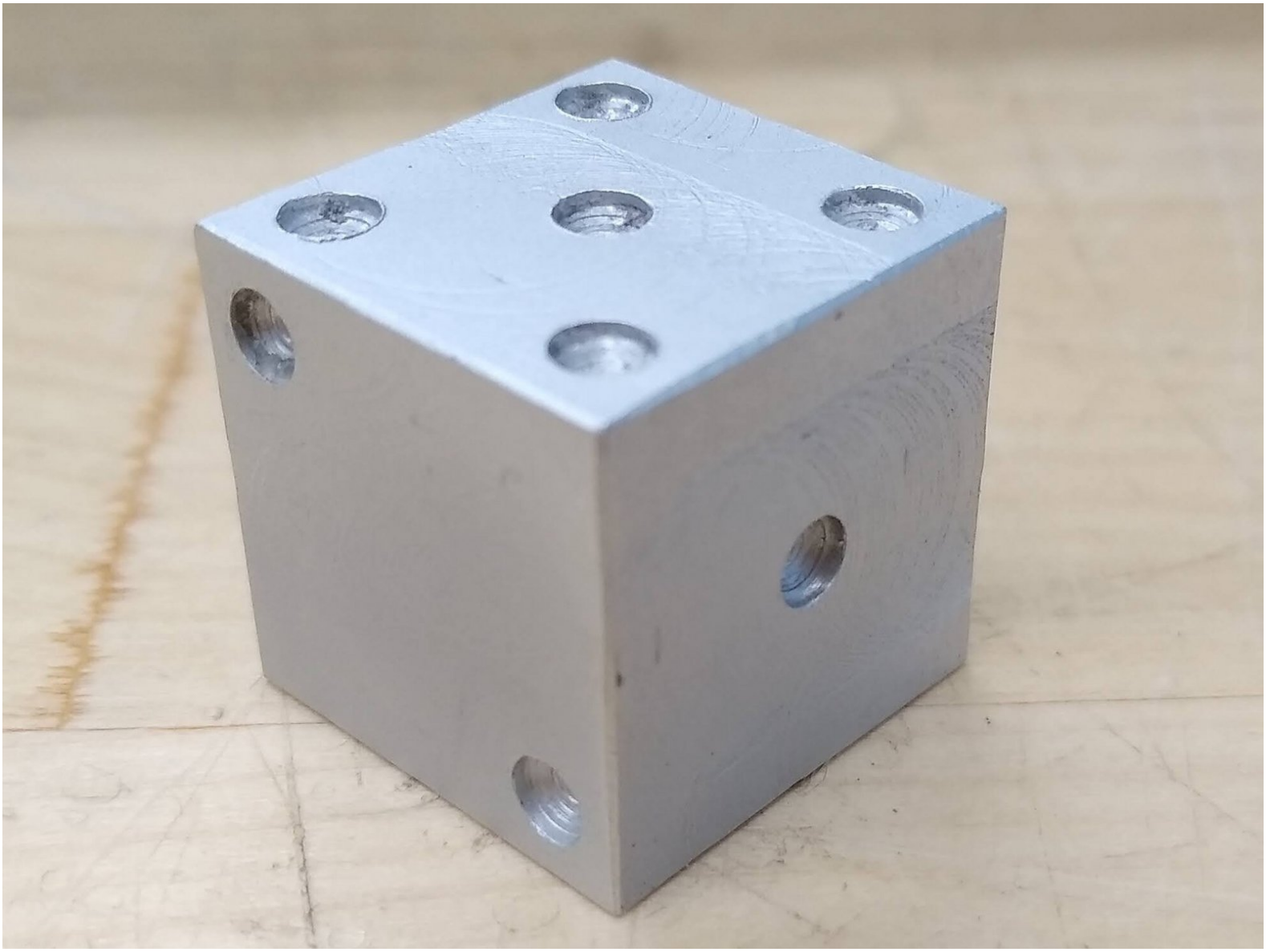
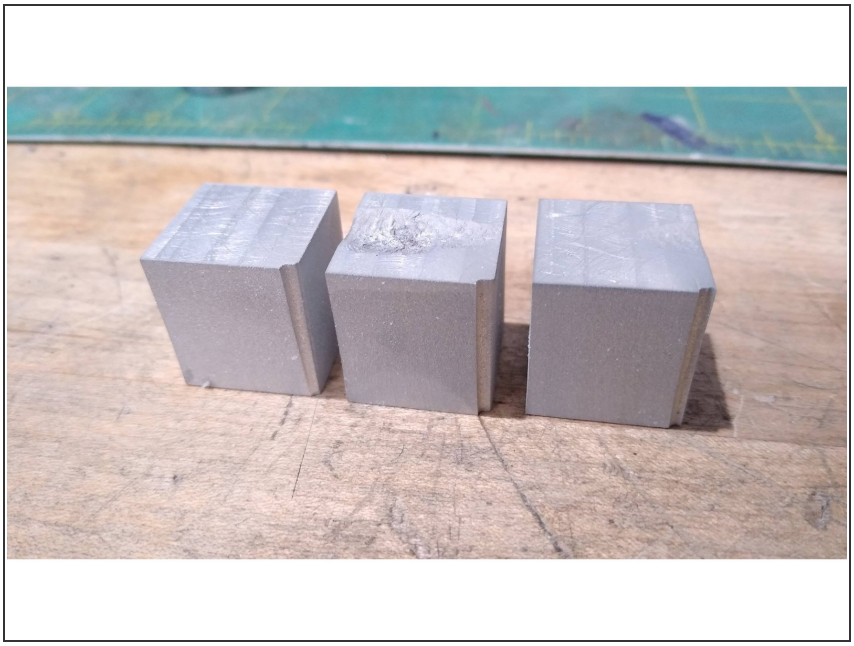


Step 1 — Drill Mill Details

- Here are some images for the different parts of the drill mill. If you need a more detailed explanation, you can go to the drill mill's dozuki page (IFL Training Shift 05-1: Drill/Mill)

  ⓘ You will need to know how to change the collet since we will be using a variety of tools to create this part.

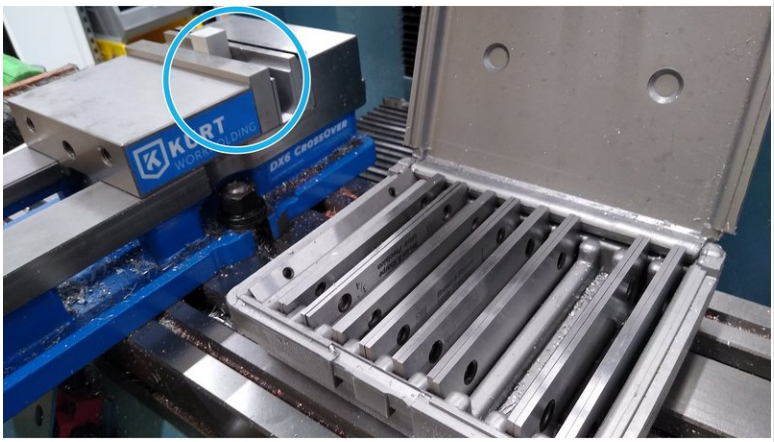
Step 2 — Measuring the Stock



- Measure the aluminum stock and note down how much you need to mill off each face in order to get all sides to be ¾ inches long.

  ⓘ You will need to face all the sides, so keep that in mind when you plan out your process.

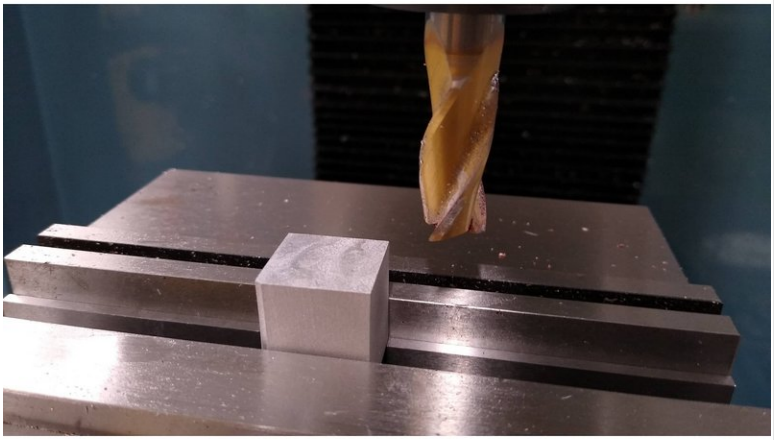
Step 3 — Clamping the Stock

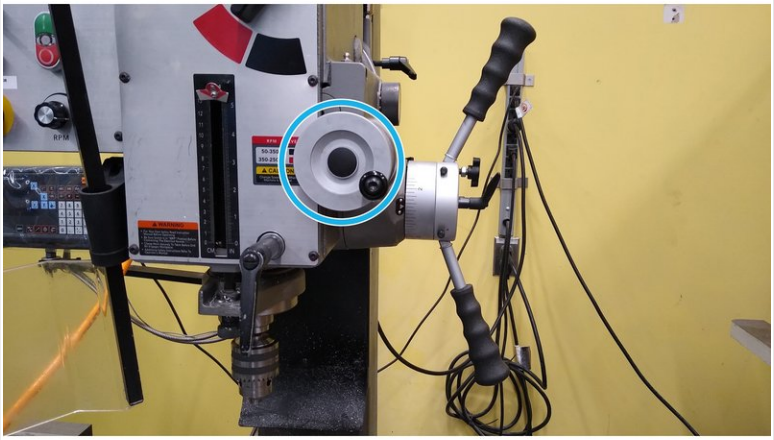


- Clean out the clamp area as well as you can.
- Place the cube into the clamp. Use the spacers to raise up the cube so that the top is well away from the drill mill's clamps.
- To get a flatter surface, use a hammer on the aluminum cube while slowly tightening the clamp.

  ⓘ If the spacers on the bottom of the cube do not move, then the cube is as flat as it can be and you will get a flatter surface after facing it.

Step 4 — Facing the Stock



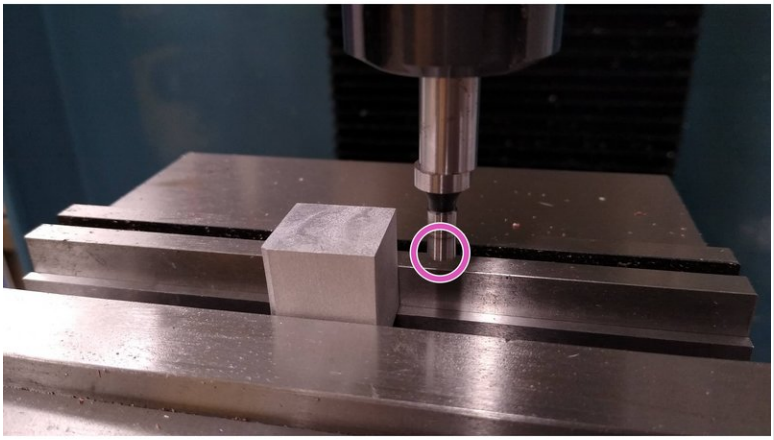


- Attach the ½ in. end mill to the machine.
- Make adjustments before facing.
  - Lower the end mill so that it touches the top of the cube and lock it in that position. Move the bed so that the end mill bit is completely off the cube. Use the precision knob to lower the knob by a max of .02 inches.
  - Position the end mill so that when facing the cube, it will only use half the end mill's diameter.
- Turn on the machine and set the rpm of the mill to 1600. You can start making passes.

  ⚠ NEVER shift the gears when the machine is running. However, the machine has to be on for you to set the rpm. Also, do not make z adjustments over .02 inches while facing.

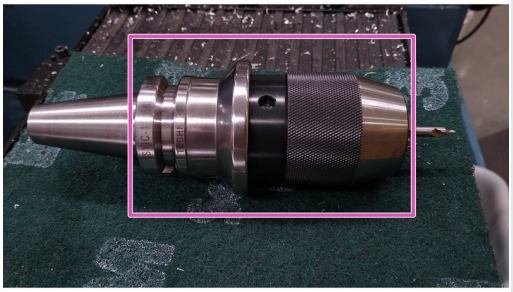
  ⓘ Make sure only half of the end mill bit is being used at all times while facing.
- Repeat this for all the other 5 sides of the cube.

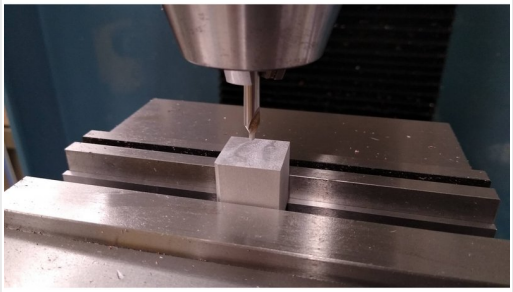
Step 5 — Centering the Stock



- Take off the end mill bit and replace it with the edge finder.
- Lower the edge finder so that about half of the small tip will hit up against the cube's side.
- Find the center of the cube. Use the DRO (digital readout).
  - Use the edge finder to find the edge of one side of the cube. Set this value to zero (this is the edge of your part).
  - Raise the edge finder up and move in one axis towards the center of the cube. You would be going ½ of what your length after facing (should be about .375 in. if faced correctly).
  - Move it another .1 in. in the same direction (this accounts for the diameter of the edge finder, which is .2 inches). Set this new position as zero.
  - Repeat the above 3 points to find the center of the cube in the other axis.

Step 6 — Adding Center Holes





- Take out the edge finder tool and replace it with the drill collet.
  - You should also put a small center drill bit into the collet.

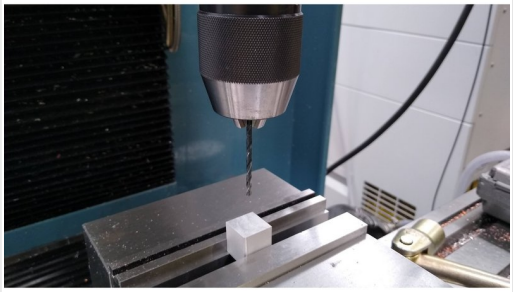
  ⓘ Make sure not to remove the cube from the clamp otherwise you will have to repeat steps 5 again.

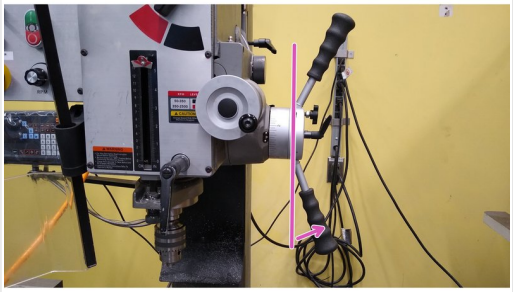
- Turn on the machine and set the rpm to 700. Drill center holes into the cube using the DRO.

  ⓘ You don’t have to make the holes too deep.

  ⓘ Refer to the attached drawing pdf when making center holes (you will only be moving in increments of ¼ inches).

Step 7 — Drilling the Stock





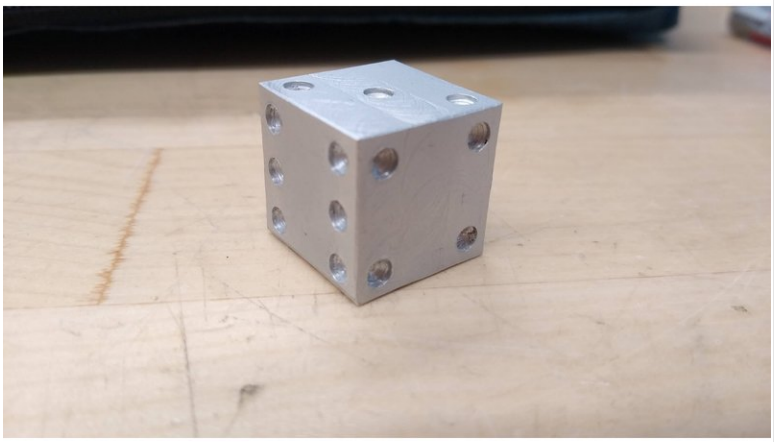
- Take out the center hole bit and replace it with a ⅛ in. or .125 in. diameter drill bit.
- Turn on the machine and make sure the rpm is set at 700. Drill .05 in. holes into the cube in the same place as the center holes using the DRO.
  - Use the precision knob and go slowly, making sure you don't drill too much. While drilling, you typically want to go in a bit and then retract, and do that process over and over again (you probably don't need to do this since the hole is not too deep).
  - Make sure to apply a bit of cutting fluid before cutting the holes.

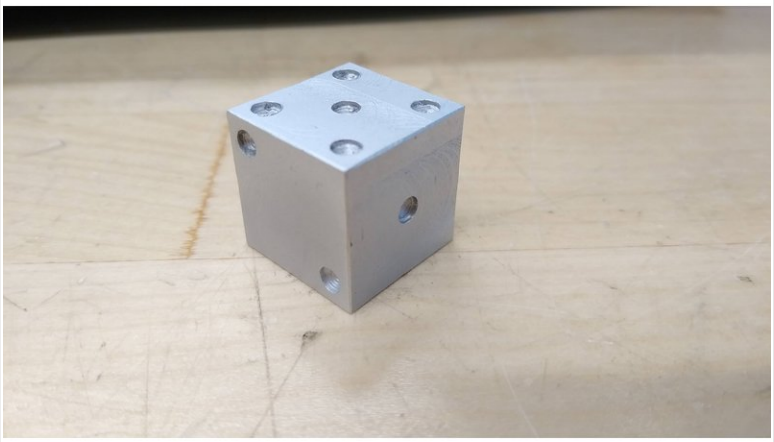
  ⓘ Feel free to make the holes deeper, just keep in mind that the holes might overlap with holes from adjacent sides.

ⓘ To use the precision knob, you have to first lock the main lever that controls the height.

- You lock this lever by pushing the handles so that they make an angle rather than being parallel to each other.

Step 8 — Repeat and then Complete





- Repeat steps 5 through 7 for the other sides of the cube until you have yourself a complete die!