Individual Lab Report 6

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Team B: Monkey Bot
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Individual Progress

Manufacturing Components

Over the last week, I have dedicated over 24 hours to making components in the machine shop. Most of the parts required multiple steps which included facing the stock down to size, cutting out appropriate holes and contours on the manual or CNC mill and tapping the holes if necessary. The following four parts were made this week: transfer gearbox plates, motor mount plate, ACME bearing plate and stage 3 gearbox plates.

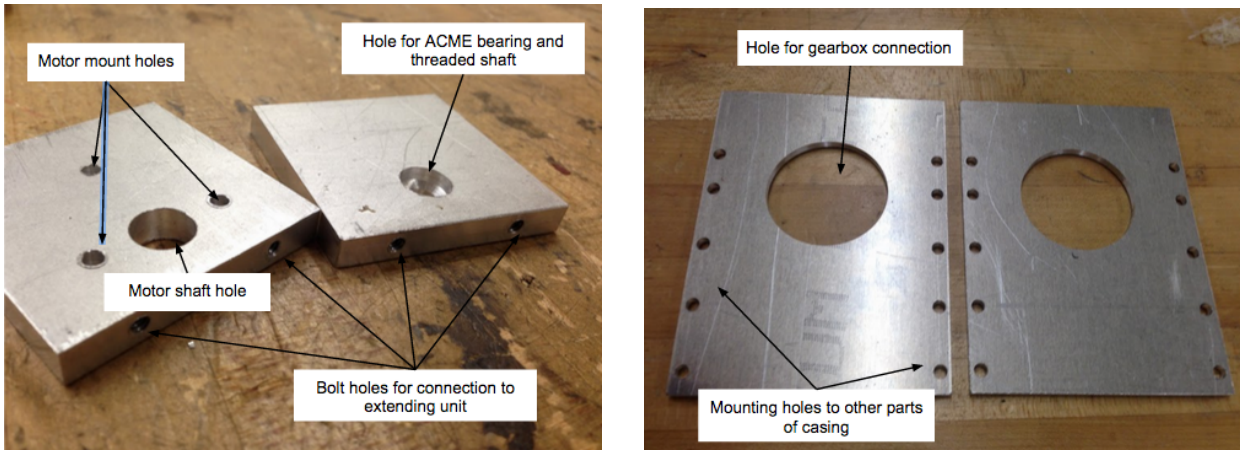

Figure 1. Aluminum motor mount plate and ACME bearing plate on the left and two of the gearbox plates on the right (four total). These are just some of the parts that were manufactured.

Before manufacturing any of the parts, I checked the sizing of holes and compared them to the dimensions of the other parts they were interacting with. This ensured that the components would fit together the way I desired. I also confirmed all the bolt hole sizes to make sure adhered to standard sizes for clearance and tap holes. We are mostly using #6-32 screws for mounting. For the parts that required a CNC mill, I created all the Mastercam files and set-up the machine to ensure all operations would run smoothly.

Challenges

Due to some inaccuracies in the manufacturing process, some parts did not fit together perfectly and these issues were figured out during the assembly of components. As a result, parts needed to be modified after to help with fitting. For example, the shaft hole in the middle of motor mount plate was slightly lower than desired, causing misalignment between the mounting holes and the motor bolt holes. Therefore, I had to go back and increase the diameter to allow the shaft to move up a little. Also, One of the transfer gearbox plates had to be

manufactured again due to an incorrect setting of the machine zero position. This caused all the holes to be offset by 0.1 inches and this part could not be salvaged. Moving forward, it would be valuable to have all the components present so that I can confirm alignment as I machine and problems can be fixed on the spot. Overall, the limiting factor of building our robot is the speed at which we can manufacture parts and I will have to continue to work in the shop in order to stay on schedule.

Cross-Referencing with Other Team Members

As Trevor continued to modify the CAD models and confirm dimensions, I was able to manufacture parts that would fit well with other parts of the robot. Trevor also made progress on the cleaning unit which would allow me to begin the manufacturing soon. I worked with Ian H. to create different parts to help with assembly. Ian R. has been working on the gripper more independently this week in terms of testing but all of the group members have been active in the brainstorming process for our next iteration.

Future Work

For the upcoming week, I plan to continue fabrication of the components and assemble the extending arm and the gearboxes by next week. Mounting holes also still need to be drilled into the extending arm to attach the various components. I will continue to help develop the cleaning unit and gripper because those are two units that currently need the most attention.