

Individual Lab Report 7

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Team B: Monkey Bot

Teammates: Trevor Decker, Ian Hartwig, Ian Rosado

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Individual Progress

Manufacturing and Assembling Components

I made the four side plates of the 3-stage gearbox on the manual mill. First, the aluminum stock needed to be cut to size on the manual mill. Then, holes needed to be drilled for the bearing as well as for the rod. Lastly, clearance holes for #6-32 screws were drilled on the side to allow for attachment to the rest of three stage gearbox. This was the last component that needed to be completed before the gearbox could be assembled.

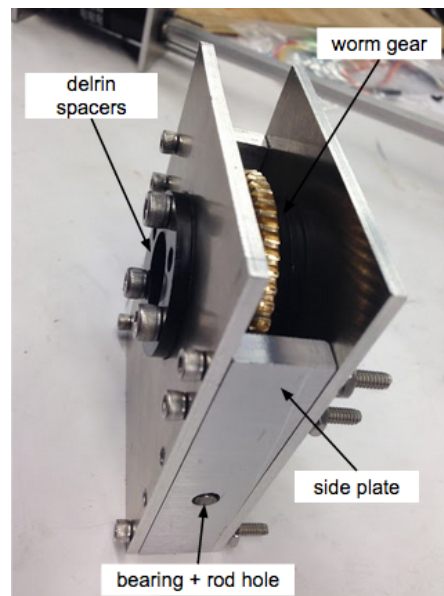


Figure 1. 3-Stage gearbox for pivoting extension arm

I also assisted in the assembly of the extension arm by correcting some of the tightness between the bearing blocks and the slot in the extension arm. I also drilled holes for the mounting of a motor board. In terms of the cleaner, I re-designed the interface with the power chain to include a pin with a through hole instead of just an extruded knob. This is more reliable because it is less dependent on exact dimensions.



Figure 2. Test print of pin on cleaner that would interface with power chain

Website

I worked on updating the written content for most of the website.

Challenges

This week I learned the importance of designing for ease of assembly and knowing the appropriate tolerances for different materials. The extension arm needed some extra machining due to the fit between the bearing blocks and the slots. They needed to slide more freely to decrease current draw from the motor and prevent binding in the ACME rod. I was able to solve the problem by filing down the slot but I have learned to be more careful for future parts. I also learned the importance of material selection. During the test for the pivoting unit, one of the small acrylic spacers on the inside of the 3-stage gearbox broke, causing slop in the worm gear. This occurred because the acrylic piece at that diameter could not withstand the axial force pushing against the side plate during the pivoting motion. Therefore, I am planning on making a longer and larger delrin spacer add strength and to minimize added weight.

Cross-Referencing with Other Team Members

This week, Trevor finished the CAD of the cleaning unit, assembled the extending arm for the system demo and did testing for the extending arm. Ian H. assembled the 3-stage gearbox for the system demo and made the pattern in the worm gear. Ian R. helped with the assembly of the gearbox by cutting slots in the shaft. He also assisted with making another ACME rod to replace the one that was bent from binding.

Future Work

I plan on working on the gripper because it is essential that we can hold ourselves to the frame. I also will test the pivoting unit to make sure it can withstand the dynamic motion of our arm when mounted onto the frame. If either of these systems are not functional, we will have to radically modify the system.