

Individual Lab Report 4

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Team B: Monkey Bars

Teammates: Trevor Decker, Ian Hartwig, Ian Rosado

ILR04

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Individual Progress

Gripper Design

My main focus this week has been designing and manufacturing the improved gripper. My goal is to have a working component to demonstrate for our presentation on Wednesday. All the components are made out of aluminum for this iteration instead of acrylic to provide a more accurate representation of the weight and function of our final gripper design. In addition to modifying existing CAD files to fit our specifications, I also made the Mastercam file for the purposes of using the CNC Mill to create our motor bolt pattern. The bolt pattern is shown below.



Figure #. Motor mount plate

Some of the considerations we took into account were as follows:

- minimizing distance away from the frame to minimize torque from weight
- minimizing weight of gripper unit through geometry and material selection
- maximizing gripping force by increasing contact area
- manufacturability of components and process of assembling the components

Presentation

I helped coordinate meeting times to make sure we can meet to prepare for our Wednesday presentation. I also looked at presentation requirements to make sure covered all the required material.

Challenges

There are still many questions that still need to be answered in terms of the interactions of units in our full design. Therefore, we still need to work towards providing a full CAD model of our robot. In terms of our gripper, there are pins in our design that are a cause for concern

since they will be undergoing shear stress and bending stress but since the area is small, the pins should not yield. Overall, further testing needs to be done to validate our design choices. Since there is still room for improvement, I found a strong clamp that I believe could function as an off-the-shelf gripper, shown below.



Figure#. Kant Twist Gripper

Although this is a promising option, due to width of the clamp and the length of the lead screw, it cannot clear the frame during the pivoting motion. It is mostly made out of steel meaning it is heavier than we would like (0.44 lb to be exact). It would be ideal to be able to use this part since I could attach a motor to it for actuation but I would need to do extra testing since we are still continuing with the gripper design from above.

Cross-Referencing with Other Team Members

Ian R. and I have been working closely with each other to build the gripper so all progress that I have made has helped facilitate his build process and vice versa. The progress that Ian H. and Trevor have been making with setting up the Discovery board and the vision code will also be very beneficial once the robot is built. Overall, I believe our team is doing a good job of working in parallel to accomplish our goals.

Future Work

For the upcoming week, I plan to test the gripper with a load. This will help us determine if the design is to be strong enough to withstand the 60 ft-lb moment we expect. I also wish to figure out the geometry for the final gripper and begin building it. I would also like to work on a full robot assembly.