

Hardware Review 2

For our capstone project our group was assigned to design a programmable test fixture that will test the BiOM prosthetic. Our client for this project is Dr. Tester who has been conducting studies on the BiOM prosthetic itself. Customer requirements were assigned for this project by our client that had to be met such as the test fixture being durable and functional. The Test Fixture needs to be able to test that the prosthetic ankle can move up and down, to ensure that the motor in the ankle is working and will propel the body that is using it upwards to act like a real ankle when worn.

The group came up with a cube design for this test fixture the reason for this shape was ease of accessibility for the user. The frame of our test fixture will use 2 inch steel pipes that will be attached with a 90° elbow steel fittings in order to get the cube shape. The reason a 2 inch steel pipe was used was because this was the material that would be able to withstand all forces acting on the body of the frame without it breaking and this analysis was shown with the use of Bentley Autopipe, in addition to its low cost and relatively low weight. The steel pipes will be secured on the fittings with the use of two $\frac{3}{4}$ inch bolts that will be placed through the fitting and pipe one on top of the other in order to help secure the pipe to the fitting. A hydraulic cylinder and an actuator will be used to move or propel the foot upwards to initiate its motor to ensure that the prosthetic is working which is the goal of the project, it will be connected on the bottom front part of the carbon fiber feet of the BiOM by a screw. The top of the BiOM will be held stable a fixed by a steel pipe on the top. The pump will provide the energy and forces to push the hydraulic cylinder upwards. An electric motor is also used to convert the electrical energy from the lithium battery to mechanical energy. An Arduino is used to control and provide power to our MTU controller controls the forces applied to the hydraulic cylinder.

Since hardware review 1 we were able to sit down with our client Dr. Tester and explain the complete system and the group was able to get an approval of the work and the clients satisfaction on the progress made.

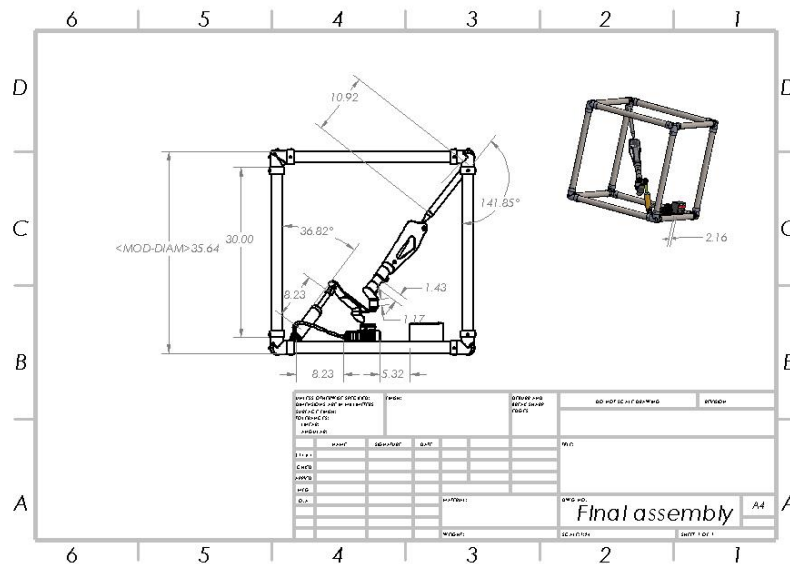
For our next stages we need to find the correct wires and cables to connect all of our parts together and have a complete circuit for it to work. The group needs to begin working on the next 2 sections of the report and fix the corrections that we will receive for the midpoint report. Lastly, we need to figure out the correct parts to connect the leg to the hydraulic cylinder from the bottom and the fixed pipe to the top of the BiOM.

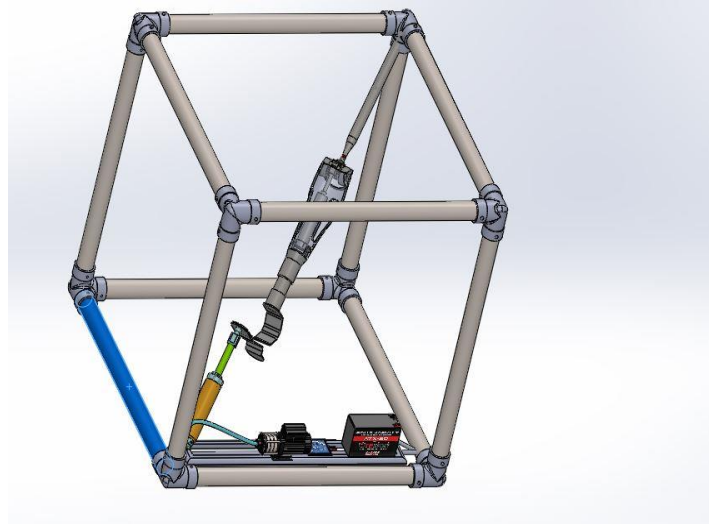
Action items:

Husain AlShammari	Responsible for complete chapter 8 and 9 and showing Dr.Tester the final report before submittal. Begin and complete poster.
Saood alenezi	Responsible for the website and its continuation, going to meet with TA for progress evaluation. Begin and complete poster.
Saoud alenezi	Is responsible for editing the previous report with the BOM and the Gantt chart. Begin and complete poster.
Marzouq alenezi	Is responsible for completing the CAD package in detail, will conduct a meeting with Dr.Oman to make sure the CAD package is on point. Begin and complete poster.
Naser alowaihan	Responsible for conducting further research on alternatives to connecting the BiOM to the Hydraulic cylinder and the fixed steel pipe. Begin and complete poster.

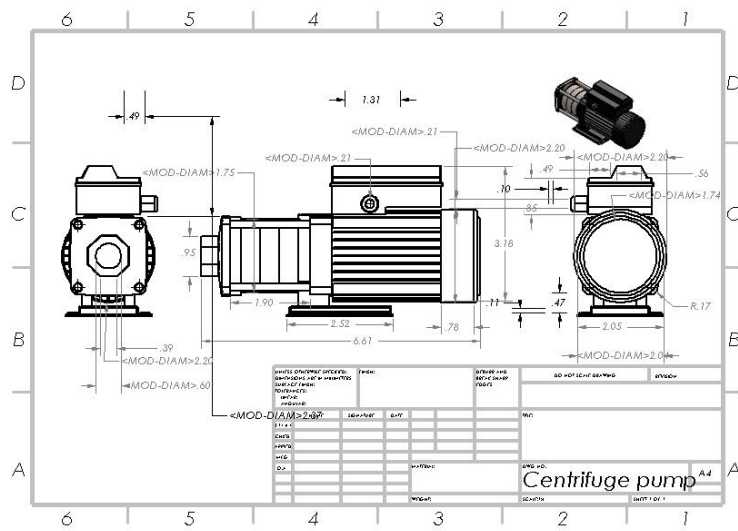
CAD Drawings:

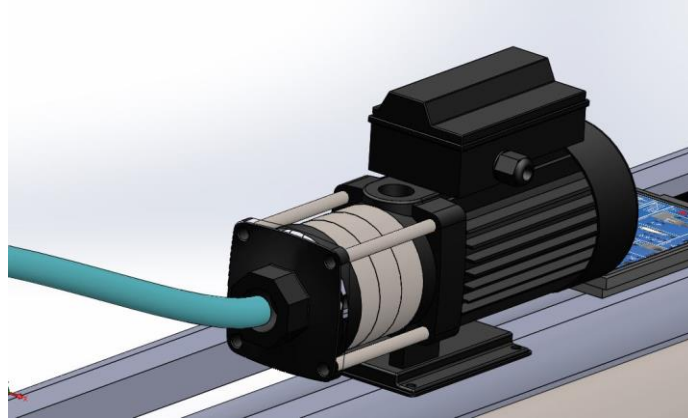
Final Assembly:-



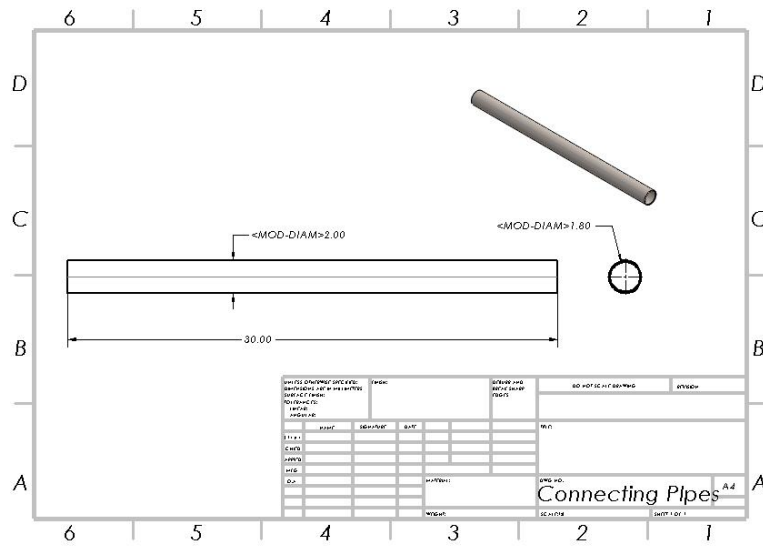


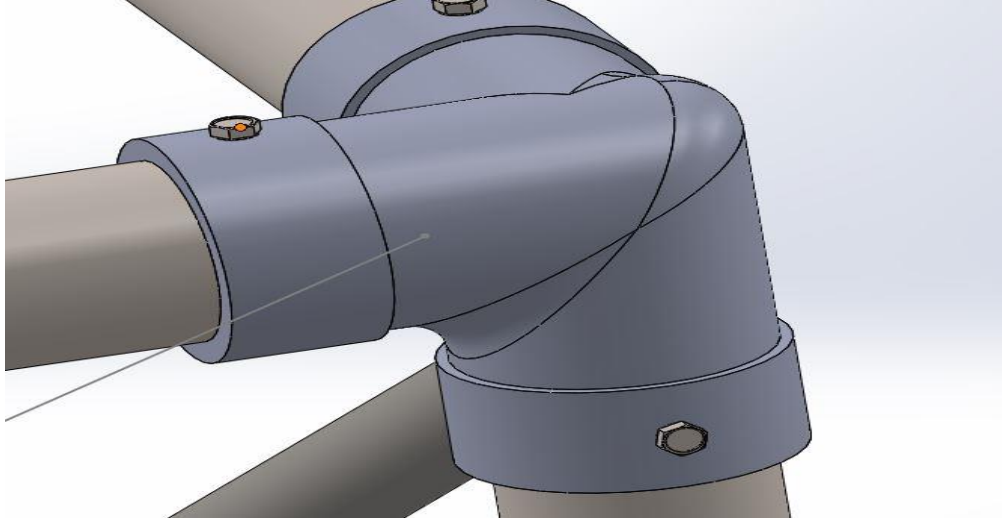
Pump :



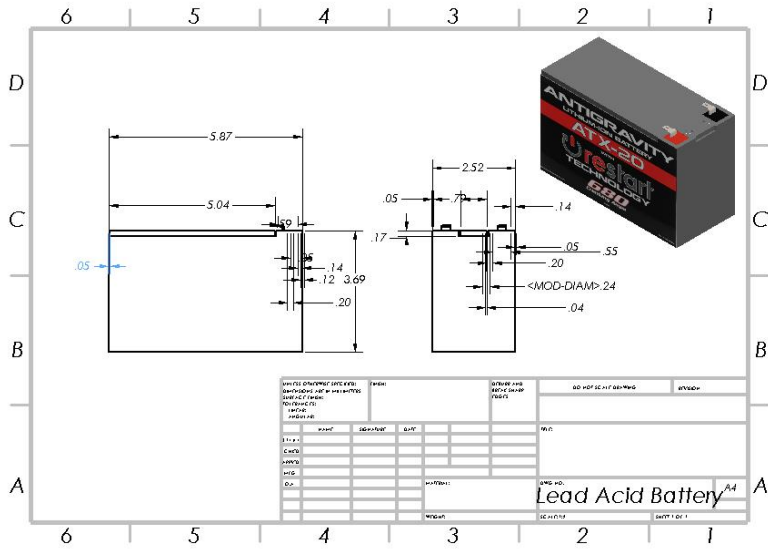


Pipe:-





Battery :-



MTU controller

Hydraulic cylinder :-

