Work Completed

This week we performed a crucial test on the monitor lift. We want to ultimately find out the limit of the moment on the device. At the very least we want to test the device past the range that it will experience with the monitor attached. The way in which we tested the device was by drilling screws through the mounting bracket and affixing it to a board of wood. This was then connected to the top of the linear actuator. We were then able to hang various items of known weights off of this board and raise and lower the device to see how it reacts. Below is a schematic of the moments that were experienced by the linear actuator.

The Monitor lift was tested beyond the range of moments it will experience with the 27 inch monitor attached. The Monitor will be just around 23 lbs, maybe a little less with the backing plate and the stand removed, and will be placed at a distance of no more than 7 inches away from the linear actuator. With the
materials we had available to us in the lab we were able to test just around 30lbs at a range of 7 inches and the device performed well. The actuator was brought to a height well above the 12 inches it has to go and then down. We also tested to make sure that mid movement it could then be reversed in direction. Also it must be noted that the device was able to hold the weight in a stationary position indefinitely.

We then calculated the desired full base that the linear actuator was to be placed on. We feel that a 2 ft by 2 ft base will more than accommodate our project and design. This week we were able to attach the device to a larger base and affix it using nuts and bolts and cut out regions on the under side of the base itself.

We are currently waiting on a mounting bracket that will be mounted to the linear actuator bracket. This mounting bracket has a fifteen + or – range of motion and is made by PEERLESS. A picture of the mount can be seen below in picture 1.1.

![Mounting bracket showing the screen mounting side facing us](https://www.peerlessmounts.com)

**Picture 1.1** - Mounting bracket showing the screen mounting side facing us

This bracket was designed for our 275T Samsung LCD screen and it was confirmed by PEERLESS that it would work with our monitor. This means that according to them this bracket mount will mount to the monitor we have easily and effectively.

The paint cap removal device is making good progress. We currently have the machined part that will turn the tube mounted to the stem of the motor. This device has been tested and has enough torque and the right shape to untwist the cap easily. This week we worked on constructing a housing unit for this entire device. We have made a housing part for the motor to sit in that will be held in place by a set screw. This machined part will be then affixed to the back wall of the device. The wall
constructed will somehow accommodate the vice. The base of the unit is constructed and will house the rest of the parts in place and provide a stable platform for everything to be mounted to.

A concern that came to mind when testing the paint tube was the fact that when the cap rises off the tube it will push down on the tube itself since the cap is in a fixed position. This was not a problem with the other design because the tube was free to move up. With our current design there will be a downward force on the metal machined piece. One way that we thought to overcome this was to place a small piece of foam on the bottom of the machined piece that will allow the tube to travel downward and allow for removal of the cap as the tube is forced down. If the tube was not allowed this movement then the cap would be stripped as it tried force the tube down. The tube providing force back would put pressure on the cap as it was unscrewing and thus could damage the threads. Below in figure 1.2 is a depiction of what we did to account for this downward motion.

![Figure 1.2- Foam insert shown in the machined metal piece.](image)

This week also saw the creation of the base of the monitor lift. It was attached by screws to 3/16in aluminum sheet that was 2ft by 2ft. Also with concerns to the paint cap remover we machined a housing unit that will accommodate the motor and the vice unit. Tests will be done on both and the completion of the frames will be done next week.

**Future Work**

Future work will consist of mounting the LCD mount to the linear actuator. This may require the use of a more heavy duty bracket to be mounted on the top of the linear actuator.
For the paint cap removal aid we must run more tests at various tube fill levels. Also we must start mounting the switch and the circuit within the whole structure so that it is easy to manipulate and use. Also another important part of this project is to mount the vise on the top of the frame and make it adjustable to account for various paints and tube heights that the artist may come across.

**Hours Worked**

In Lab: 8

Out of Lab: 7

Total Hours Worked: 15