Work Completed

Preliminary Testing and Proposed Solutions

The assembly of the prototype was completed and preliminary testing began. Right away, one major problem was obvious. Because the canvas holder was attached by a single arm, any force applied to the canvas holder caused the arm and the canvas holder to shake back and forth for an extended period of time. When painting, this oscillatory motion, will not be desirable by the artist. After further examination, it was found that the oscillations were being amplified by joints that weren’t braced. To account for this 3 different solutions were implemented.

Solution options explored and Procedures for testing

1. The first idea used was to reduce the length of the second arm. This was done using a spare, 2” piece of 80/20 2525 extrusion.

2. Second, the entire 3rd joint was eliminated from the design.

3. For both options 1 and 2, aluminum braces were borrowed from another team and used to brace the joints.

All 3 solutions were subjected to a trial force applied at the end of the bottom support beam of the canvas holder perpendicular to the beam.

Results
- Solution 1 Trial Results – Reduced the length of movement to some extent. There was still significant movement 10 seconds after the trial force was applied to the canvas holder.

- Solution 2 Trial Results – significantly reduced the movement caused by the application of the trial force. However, there was still movement in the canvas holder after 10 seconds.

- Solution 3 Trial Results – same results as the solution 3 trial results. The movement was significantly dampened but not eliminated entirely.

**Conclusions**

After initial experiments, it was decided that adding an additional arm was necessary, using one of the shortened arm designs. Accordingly, a parts order and further machine shop work was done.

**Parts Order**

The solution to be implemented will require another pivoting joint, bringing the total number of pivots on the easel to 4. The order requisition and quote was generated and placed on Friday the 24th.
Machine shop work

The solution to be tested required a simple M6 tap of the end of an existing piece. More machine shop work is planned for the week after spring break after the initial steps for implementing the solution are in place.

Future Work

The next work week will consist of assembling the prototype with the design changes explained above, and testing the new prototype. More machine shop work is also anticipated to build arm braces, and a second shortened arm. There will also be a trip to radio shack to buy a battery service kit for the LED lamp system.

Project Review

The assembly and initial testing of the easel have illuminated a problem with the design and appropriate measures have been taken to address the issue. The project is on schedule and still on budget.

Hours

11 Hours
Pictures

Figure 6.1 – Testing the Easel with an applied load.

Figure 6.2 – Threading the end of a piece of aluminum extrusion with an M6 tap.