Project Identity

Versatile Painting Solutions
Week 5: 2/15/06-2/22/06
Melissa Banks

Work Completed

This week the first thing accomplished was a trip to the hardware to purchase a few small items. Springs were tested onsite to find one that fit the marker holder application. Wing-nuts and screws were also purchased for that piece. Also_” bolts and nuts were purchased for the arm support. Nylon washers were purchased to prevent damage on the stock from the bolts turning. These were used to connect the stock later on in the week.

During lab hours we tied up more lose ends and started construction. Materials for fiber glassing were purchased. We purchased the chopped strand mat and resin as well as paste wax and mold release. The mold is going to be sculpted out of polymer clay which we also submitted a purchase order for. This type of clay is baked in an oven to harden it. The paste wax is used over the clay and then the mold release is applied on top of that. These materials will be used to make a piece that will support the elbow and possibly the forearm. The forearm support can be done simply with a half pipe. If time permits it can be done with fiberglass to create a more fitted shape.

During the week the GXC adjustable mounting clamp was received. The focus of this week was interfacing the cut 8020 stock to create an articulating arm. The articulating arm consists of 3 pieces of 8”x1”x1” aluminum stock. A hole with a diameter of_” was drilled_” from the edge of each of the pieces. Then the pieces were connected using 2.5” bolts. A nylon washer was place in between each of the pieces of stock in order to provide a low friction interface between the connected pieces of stock. The bolts were secured using nylock washers which will prevent loosening from occurring during use and vibration.

The GCX adjustable mounting clamp was testing and confirmed to mount easily and steadily to a_” circular bar of a wheel chair. Adaptable mounting screws were also shipped with the package. Looking at the clamp we realized another trip to the hardware store was necessary. The screws that were included are too short to use with the stock. Compatible M4 screws were purchased that were longer than an inch. These materials should be sufficient to connect the stock to the clamp.

The 65” piece of aluminum stock will be used as the post, but will likely be cut down to two 16” pieces which will interface with each other to allow for height adjustment of the post.
Future Work

Next week we will focus on construction. The stock needs to be cut into two large pieces for the vertical adjustment. We can drill holes in the stock and attach our slide as well as clamp. We will also learn about fiber glassing technique. If materials come in we will construct the mold and bake that and then apply the paste then mold release. After letting that set then we will move on to applying layers of fiberglass and resin.
It is also important to work on design optimization. I will spend time on improving our arm support. Larger nylon washers need to be placed between the stock and the bolts. This will prevent wear on the stock. Also the raising and lowering mechanism needs to be optimized. Currently we are planning on using a linear slide. This is definitely a point in the design that could use some improvement to promote ease of adjustment.

There is still 65” of aluminum stock left which will be used to interface a post that can be clamped to the chair. The small nylon washers in use now will likely be replaced with larger 1” OD washers.

The incoming clay materials will be used to create a mold for fiberglass composite. The clay is made out of a polymer material which does not require firing, but baking at low temperatures. The clay is made by SuperSculpty and is a ceramic like polymer after baking, and is shatter and chip resistant, it can also be machined and sanded.

After the clay is constructed, it will be coated with Partall #2 wax paste. This is a waxed based compound which is applied to the mold surface to aid in removal. The PVA mold release will also be used in conjunction with the wax paste. The Fiberglass is 1.5oz per square foot of chopped strand mat. The fiberglass will be cured using a general purpose polyester resin.

The linear slide also will be machined so that it can be used with a braking system. A hole will need to be drilled to mount the braking device, and the unused side of the linear slide will also be removed by machining in order to reduce weight and size.

The PVC cross section needs to be mounted to the wrist brace and a device to secure a brush or marker of a variety of sizes needs to be incorporated.

**Project Review**

Parts are continuously coming in and construction is ongoing. Last week our goal was to start putting together our arm support. This was accomplished. Details for other areas in the design such as the padded arm and elbow rests were ironed out. The parts that come in will allow us construct a customized support that is tailored to the shape of the elbow. All materials were purchased and plans are in action for the construction of the device. Now we have all the small parts we can continue to start building connections that will serve as the joints. The aluminum stock is going to be machined further and more parts are in plan to be ordered from 8020 in the following week. Most of these parts are accessories such as end caps and fasteners. So far we have a structure that is easy to adjust which is one of the most important aspects of the design.

By Friday 2/24/06 the clamp should be interfaced with the proper lengths of aluminum stock to create a working post. Also the springs and PVC cross section will be used to incorporate a brush which can secure and adjust the position of a paintbrush.
### Hours Worked

**Melissa:**
- Friday – 4.5
- Monday - 1
- Tuesday - 1.5
- Wednesday - 3

**Total: 10**

**Dan:**
- Thursday – 2
- Friday – 4
- Wednesday – 3.75

**Total: 10.75**

**Noah:**
- Thursday-2
- Friday – 4
- Monday - 3
- Tuesday – 1.5

**Total: 10.5**

### Week 5&6 Timeline

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<thead>
<tr>
<th>Task Name</th>
<th>Duration</th>
<th>Start</th>
<th>Finish</th>
<th>2/06</th>
<th>Feb 19, 06</th>
<th>Feb 26, 06</th>
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<tr>
<td>Trip to the hardware store</td>
<td>1 day</td>
<td>Thu 2/18/06</td>
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<td>Ordered fiberglass material</td>
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<td>Ordered polymer clay</td>
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<td>Connected 3 pieces of extrusion</td>
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<td>Attached 180 degree hinge</td>
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