Painting Solutions for Limited Mobility
Weekly Report #10
Wednesday March 29th – Wednesday April 5th

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Team #1
BME 291
5 April 2006

Work Completed:

- Sanded fiberglass finish using edge grinder
- Milled the aluminum attachment clamp bracket
- Milled articulating arm joint ends
- Elastic securing device
- Mounting of arm rest to articulating arm

During the week of March 29th to April 5th, several advancements were made on the positioning system. I cut and milled the aluminum attachment clamp bracket so that it would be of minimal size and decrease unnecessary weight of the device. This likely will not significantly affect the strength of the material.

Another task performed while enduring the wait for the arrival of the joint parts, was machining the articulating arms. Each arm was milled at the end to produce a completely flat surface, consistent within .005”. This will allow the joint to be secured with an interfacing of maximal surface area and eliminate any loosening or instability that may occur after cyclical loadings.

The fiberglass arm rest is mounted to the end articulating arm, using a combination of 3 durable nylon washers, a decking bolt, and a nylock nut to prevent loosening.

An elastic device was added to the exterior of the support in order to secure the arm to the support system to the client.

Future Work:

The following parts were ordered Monday March 27th

- 4 x 4185 (machining cost separately)
- 2 x 4197 0 degree Pivot Nub
- 8 x 3280 Double Economy T-nuts w/ screws
- 4 x 3785 1/4X20 Economy T-nut and 4 3/4” screws for these slots
These parts need to be fastened in order to complete the project, however their arrival depends on the time of completion. The project can be completed quickly after the parts arrive because the major machining has already been completed and the stock has been modified.

The prototype needs to be tested to ensure that it is optimal for its application. The support will be attached to a template wheelchair that serves as a model for Tom’s actual chair. The template chair is more simplified than the actual chair Tom uses, however the device is designed to be implemented on a variety of chair sizes.

Lastly, the PVC cross section also needs to have the brush mounted to it and be tested to ensure its stability and functionality. This will be tested by attaching the brush to a test subject and observing the ease of use at each brush angle setting.

**Work for the Next Few Weeks:**

- Purchase 2.75” bolts and nylock nuts
- Create the fiberglass model using fiberglass composite and polyester epoxy
  - Machine the model to optimum size and application
- Cushion support using foam
- Machine Aluminum face plate
- Add second hinge
  - Interface clamp
- Construct paint brush attachment
  - Incorporate spring locking mechanism in PVC cross section
- Testing of Prototype
  - Strength
  - Application
  - Durability
  - Ease of Use
- Minimize Weight of Device

**Project Review:**

The initial construction of the device should be completed by the end of this week. The second part of the design process will be entirely testing and troubleshooting. The goals for the testing process will be to provide the most durable and helpful device possible. In this case, the positioning system should provide as many different positions as possible, while reducing the chances of failure due to fatigue and wear that could be caused during use.

Although the design indicates that it can provide positioning at any painting position, this will need to be tested empirically to determine whether the positioning is...
optimum. If testing indicates a lesser rate, there is still time for improvements to be performed on the design to increase functionality. Plans are already under consideration to make the device more adjustable and stable.

**Updates to Timeline:**

- Prototype Testing

**Updated Timeline:**

**Hours Worked:**

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<thead>
<tr>
<th>Date</th>
<th>Time</th>
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<tbody>
<tr>
<td>Thursday 3/30</td>
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<tr>
<td>Friday 3/31</td>
<td>1:00 Pm – 5:00 Pm</td>
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<td>Monday 3/27</td>
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<tr>
<td>Tuesday 4/4</td>
<td>9:00 Am – 12:00 Pm 7:00Pm – 8:00Pm</td>
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<tr>
<td>Wednesday 4/5</td>
<td>9:45 Am – 1:45 Pm</td>
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**Hours total = 12 hours**