Painting Solutions for Limited Mobility
Team Weekly Report #11
Wednesday March 5th – Wednesday April 12th

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Team #1
BME 291
12 April 2006

Work Completed:

- Completed support
- Connected all interfaces
- Finished arm rest cover
- Tested application to wheel chair
- Application of pivot joints on articulating arm

During the week of April 5th to April 12th, several advancements were made on the positioning system. I fastened the support to the articulating arm, as well as constructed the pivot joint. Initial tests showed that the linear slide would be more effective on the opposite side of the support post, so slide was switched to the opposite side.

The order parts arrived and were immediately placed in the design to enhance the rotation of the articulating arm. Previously the joints were constructed using bolts; however, the new pivot arm screws rotate much more freely without any chance of loosening.

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.

For most of this week I have written several pages for the operation manual which should come to about 70 pages in length total.
Future Work:

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 construction of the device has been completed. 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:

<table>
<thead>
<tr>
<th>Task Name</th>
<th>Resource Names</th>
<th>Start</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Final Adjustments</td>
<td>Noah</td>
<td>Wed 4/12/06</td>
</tr>
<tr>
<td>2 Testing</td>
<td>Dan</td>
<td>Fri 4/14/06</td>
</tr>
<tr>
<td>3 Strength</td>
<td>Dan</td>
<td>Fri 4/14/06</td>
</tr>
<tr>
<td>4 Durability</td>
<td>Noah</td>
<td>Fri 4/14/06</td>
</tr>
<tr>
<td>5 Ease of Use</td>
<td>Dan</td>
<td>Fri 4/14/06</td>
</tr>
<tr>
<td>Optimization</td>
<td>All</td>
<td>Fri 4/14/06</td>
</tr>
<tr>
<td>7 Report Writing</td>
<td>All</td>
<td>Fri 4/14/06</td>
</tr>
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### Hours Worked:

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friday 4/7</td>
<td>12:30 Pm – 5:00 Pm</td>
</tr>
<tr>
<td>Sunday 4/9</td>
<td>2:00 Pm – 6:00 Pm</td>
</tr>
<tr>
<td>Monday 4/10</td>
<td>10:00 Am – 2:00 Pm</td>
</tr>
<tr>
<td>Tuesday 4/11</td>
<td>9:00 Am – 2:00 Pm</td>
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<tr>
<td>Wednesday 4/12</td>
<td>10:00 Am – 3:00 Pm</td>
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**Hours total = 22.5 hours**