Painting Solutions for Limited Mobility
Weekly Report #6
Wednesday Feb 22nd – Wednesday March 1st

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Team #1
BME 291
1 March 2006

Work Completed:

During the week of February 22nd – March 1st the arm mold was constructed using special polymeric clay which will now be hardened into a more ceramic-like substance using a regular cooking oven at 250° F. The fiberglass, mold release supplies, and polyester epoxy were all received this week from US composites.

Other materials received included 4 larger nylon washers which are 1.125” OD with a ¼” inner diameter. These washers allow the device to pivot more freely and will decrease the amount of wear due to fatigue which will occur when pivoting the device in different coordinates.

One piece of metal stock was cut to 2’ which will be used as a main support post that will interface with the GCX clamp. A small steel plate was also obtained which can be used as a mounting plate in order to interface the clamp to the main support post.

The PVC cross section piece, which will be used for multi-position attachment of the paint brush to a glove, has been completed. This contains a spring-loaded pin which will allow the brush to rotate to any angle.

Future Work:

The steel plate which will be used to interface the main support post and the GCX clamp still needs to be cut down and drilled with holes in order for the clamp to be mounted properly and securely.

Next week will be the first week of constructing the fiberglass mold from the composites. Since the mold has already been constructed, the fiberglass simply needs only to be layered and cured inside the mold. Once the fiberglass piece is constructed, it then needs to be sanded and have a hole drilled in the bottom to allow for another pivot joint to be mounted in the bottom.

Once the entire device is constructed it needs then needs to be tested to ensure that it can provide durability as well as functionality for the client.
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 also needs to have the brush mounted to it and be tested to ensure its stability and functionality.

**Work for the Next Few Weeks:**

- Harden polymeric clay mold in oven
- Create the fiberglass model using fiberglass composite and polyester epoxy
- Machine the model to optimum size and application
- Cushion support using foam
- Machine steel face plate
- Add second hinge
- Interface clamp
- Construct paint brush attachment

**Project Review:**

In the following week after break, the initial construction of the device should be 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 100%. 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:**

- Obtain a template wheel chair
- Dismiss use of ball joint
- Incorporate fiberglass mold into design
- Supplementary ordering of fiberglass, and fasteners
- Decision for use of gas spring
- Interface clamp with post
- Creation of swivel joints
Updated Timeline:

<table>
<thead>
<tr>
<th>Task Name</th>
<th>Resource Name</th>
<th>Start</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harden Polymer Clay</td>
<td>Mellisa</td>
<td>Fri 3/3/06</td>
</tr>
<tr>
<td>Create Fiberglass mold</td>
<td>Mellisa</td>
<td>Mon 2/6/06</td>
</tr>
<tr>
<td>Machine Mold</td>
<td>Dan</td>
<td>Mon 2/13/06</td>
</tr>
<tr>
<td>Cushion Mold</td>
<td>Melissa</td>
<td>Wed 2/15/06</td>
</tr>
<tr>
<td>Cut steel face plate</td>
<td>Dan</td>
<td>Mon 2/13/06</td>
</tr>
<tr>
<td>Interface face plate</td>
<td>Dan</td>
<td>Mon 3/13/06</td>
</tr>
<tr>
<td>PVC cross section</td>
<td>Noah</td>
<td>Fri 3/3/06</td>
</tr>
<tr>
<td>Fasten 8020 pieces</td>
<td>Dan</td>
<td>Thu 12/8/05</td>
</tr>
</tbody>
</table>

*Changes Made to Timeline:
- Cut steel face plate
- Interface Steel face plate

Hours Worked:

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thursday 2/23</td>
<td>1:00 Pm – 3:00 Pm</td>
</tr>
<tr>
<td>Friday 2/24</td>
<td>12:30 Pm – 5:00 Pm</td>
</tr>
<tr>
<td>Monday 2/27</td>
<td>3:00 Pm – 3:45 Pm</td>
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<tr>
<td>Tuesday 2/28</td>
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<tr>
<td>Wednesday 3/1</td>
<td>10:00 Am – 3:00 Pm</td>
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Hours total = 12.25 Hours