Weekly Report #2

Team 6: Traumatic Brain Injury Reducing Army
Combat Helmet

Kristin Ohanian
Jim Veronick
Damian Frankiewicz
Overall Design

- Chin Guard
- Neck Guard
- EPS layer
- Kevlar shell
**Completed Work**

- **Revision in Mold Prep**
  - First two polishes now removed
    - Polishes originally thought to be dry layers
    - Actual use is similar to that of a CD scratch remover
  - Final wax layer applied 4 times and given ample time to dry

<table>
<thead>
<tr>
<th>Step</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Add First Polish</td>
</tr>
<tr>
<td>2</td>
<td>Rinse and Remove First Polish</td>
</tr>
<tr>
<td>3</td>
<td>Add Second Polish</td>
</tr>
<tr>
<td>4</td>
<td>Rinse and Remove First Polish</td>
</tr>
<tr>
<td>5</td>
<td>Add Wax Layer</td>
</tr>
<tr>
<td>6</td>
<td>Allow Wax Layer to dry for 1 Hour</td>
</tr>
<tr>
<td>7</td>
<td>Repeat for 4 Hardened Wax Layers</td>
</tr>
<tr>
<td>8</td>
<td>Add PVA Release Film</td>
</tr>
<tr>
<td>9</td>
<td>Allow PVA to dry for 30 Minutes</td>
</tr>
<tr>
<td>10</td>
<td>Repeat for 4 Dried PVA Layers</td>
</tr>
<tr>
<td>11</td>
<td>Begin Kevlar Process</td>
</tr>
</tbody>
</table>
Week 1 Procedure

1. Apply First Polish
2. Wait 30 min
3. Apply Second Polish
4. Wait 30 min
5. Apply Wax Layer
6. Wait 30 min
7. Apply PVA Layer
8. Repeat 2 Times
9. Kevlar Process

Week 2 Procedure

1. Apply First Polish
2. Remove First Polish
3. Repeat 2 Times
4. Wait 30 min
5. Apply Second Polish
6. Remove Second Polish
7. Repeat 4 Times
8. Wait 1 hour
9. Apply Wax Layer
10. Apply PVA Layer
11. Repeat 2 Times
12. Apply PVA Layer
13. Repeat 2 Times
Completed Work

- Purchase Order
  - Cleaning Purposes
    - Acetone
    - Putty Knife
    - Pumps for Containers
    - Resin Brush
    - Wax Paper
Completed Work

- Helmet Locking Mechanism
  - Design and Create in Machine Shop
    - Hollow metal shaped like a wedge with a spring inside
    - On a swivel to allow chin guard to slide over
    - Wedge will spring up after chin guard passes to lock it in place
    - Wedge can be pressed down to release
Project Review

- **Successes**
  - Improved Preparation Technique
  - More Epoxy-Kevlar Experience
  - Better Cleanup
  - Locking Mechanism Progress

- **Issues**
  - Did not have materials ordered
    - Could not practice Epoxy brush dabbing
Future Work

- **Next week**
  - Cut Kevlar layers
  - Prepare actual mold
  - Build Prototype Shell

- **1 Month**
  - Chin guard mold
  - Chin guard
  - Neck guard mold
  - Neck guard

- **2 Weeks**
  - Finishing Work on Shell
  - Other Kevlar Pieces
<table>
<thead>
<tr>
<th>Task Name</th>
<th>Duration</th>
<th>Start</th>
<th>Finish</th>
<th>Predecess</th>
<th>Resource Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obtain Motocross Helmet from Greg</td>
<td>1 day</td>
<td>Mon 11/17/06</td>
<td>Mon 11/17/06</td>
<td></td>
<td>Greg Lutkus</td>
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<tr>
<td>Obtain ACH</td>
<td>11 days</td>
<td>Mon 11/17/06</td>
<td>Mon 12/1/08</td>
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<td>Greg Lutkus, Sean T</td>
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<tr>
<td>Schedule Lab time</td>
<td>21 days</td>
<td>Fri 11/14/08</td>
<td>Fri 12/12/08</td>
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<td>Dr. Hennessey</td>
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<tr>
<td>Order sealant, paint</td>
<td>1 day</td>
<td>Wed 1/21/09</td>
<td>Wed 1/21/09</td>
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<tr>
<td>Practice composite work</td>
<td>1 day</td>
<td>Fri 1/30/09</td>
<td>Sat 1/31/09</td>
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<tr>
<td>Make mold for shell</td>
<td>1 day</td>
<td>Mon 2/2/09</td>
<td>Mon 2/2/09</td>
<td>5</td>
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<tr>
<td>Make shell</td>
<td>2 days</td>
<td>Tue 2/3/09</td>
<td>Wed 2/4/09</td>
<td>6</td>
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<tr>
<td>Adjust shell via sanding, sealing</td>
<td>1 day</td>
<td>Thu 2/5/09</td>
<td>Thu 2/5/09</td>
<td>7</td>
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<tr>
<td>Order wire mesh for neck guard, chin guard molds</td>
<td>1 day</td>
<td>Thu 1/29/09</td>
<td>Thu 1/29/09</td>
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<tr>
<td>Drill holes in shell</td>
<td>1 day</td>
<td>Fri 2/6/09</td>
<td>Fri 2/6/09</td>
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<tr>
<td>Paint shell</td>
<td>2 days</td>
<td>Mon 2/9/09</td>
<td>Tue 2/10/09</td>
<td>10</td>
<td></td>
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<tr>
<td>Order rubber stopper</td>
<td>1 day</td>
<td>Thu 2/5/09</td>
<td>Thu 2/5/09</td>
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<tr>
<td>Make neck guard mold</td>
<td>2 days</td>
<td>Fri 2/6/09</td>
<td>Mon 2/9/09</td>
<td>9</td>
<td></td>
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<tr>
<td>Make chin guard mold</td>
<td>2 days</td>
<td>Mon 2/9/09</td>
<td>Tue 2/10/09</td>
<td>9</td>
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<tr>
<td>Inspect and adjust molds</td>
<td>1 day</td>
<td>Wed 2/11/09</td>
<td>Wed 2/11/09</td>
<td>13, 14</td>
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<tr>
<td>Make neck guard</td>
<td>2 days</td>
<td>Thu 2/12/09</td>
<td>Fri 2/13/09</td>
<td>15</td>
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<tr>
<td>Make chin guard</td>
<td>2 days</td>
<td>Thu 2/12/09</td>
<td>Fri 2/13/09</td>
<td>15</td>
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<tr>
<td>Adjust guards via sanding, sealing</td>
<td>1 day</td>
<td>Mon 2/16/09</td>
<td>Mon 2/16/09</td>
<td>16, 17</td>
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<tr>
<td>Drill holes in guards</td>
<td>1 day</td>
<td>Tue 2/17/09</td>
<td>Tue 2/17/09</td>
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<tr>
<td>Paint guards</td>
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<td>Thu 2/19/09</td>
<td>Thu 2/19/09</td>
<td>19</td>
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<tr>
<td>Attach rubber stopper to neck guard</td>
<td>0 days</td>
<td>Mon 2/23/09</td>
<td>Mon 2/23/09</td>
<td>20</td>
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<tr>
<td>Attach guards to shell</td>
<td>1 day</td>
<td>Mon 2/23/09</td>
<td>Mon 2/23/09</td>
<td>21</td>
<td></td>
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</tbody>
</table>
Budget

- Estimated Total Cost ~$1200
- Spent so far:
  - $671 on Kevlar and supplies
  - $30 on recently ordered supplies
  - Total: $701
Hours Worked

- Mold Preparation – 7 hours
  - 4 hours Friday – Everyone
  - 2 hours Saturday – Kristin/Jim
  - 1 hour Monday - Damian

- Research, Ordering – 2 hours
  - Kristin

- Epoxy Reaction/ Kevlar Layering – 3 hours
  - Damian

- Locking Mechanism Research – 1 hour
  - Jim