Title: Mechanical Testing System Coupled with an Environmental Chamber for Hydrogels

Names:
Team: Gabriel Martinez-Diaz, Darcee Nelson, Charlie Haggart, Mike Piche
Client: Prof. Weiyuan John Kao
Advisor: Paul Thompson

Date: 11/6/02 – 11/12/02

Problem Statement: To update an existing procedure to make dog-bone stencils, approved by the American Society for Testing Materials (ASTM), and to test an environmental chamber, built in BME 301, to be used with a mechanical testing system in order to test the mechanical properties of hydrogels including stress, strain and creep.

Restatement of Team Goals:

Tensile Testing
1. IPN testing on Thursday.
2. Testing of the new piece when it comes in.
3. Work on paper

Creep Testing
1. Finish auto cad sketch/ sketch with dimensions.
2. Order acrylic, pulleys, and other parts.
3. Request more specs from Sentech.
4. Work on paper.

Summary of Accomplishments:

Tensile Testing
1. Worked on the paper.
2. Updated PDS with comments from Advisor.
3. Decided to order new bottles to re-fill the chamber with solution.

Creep Testing
1. Finished auto cad sketch of final design.
2. Talked to Bill Hagquist about optimal pulleys to use in design, and decided bottom grip will not be stationary (probably just a heavy weight) so the grip apparatus will be completely removed while the sample is being aligned and then can be placed in the chamber.
3. Met with Dr. Kao to review and approve final design.
4. Updated PDS and worked on paper.

Statement of Team Goals:

Tensile Testing
1. Incorporate new pieces into chamber when they are finished.
2. Testing of the new chamber pieces.
3. Continue work on the final paper.

Creep Testing
1. Place order for pulleys, acrylic for design.
2. Check status of LVDT order.
3. Research data acquisition while waiting for parts.
4. Continue work on the final paper.

Project Schedule:

<table>
<thead>
<tr>
<th>Date</th>
<th>Tasks</th>
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<tbody>
<tr>
<td>9/4 - 9/10</td>
<td>Define team roles and outline semester goals</td>
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<tr>
<td>9/11 - 9/17</td>
<td>Make a schedule for semester, update PDS, and set-up meeting with client</td>
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<tr>
<td>9/11 - 9/20</td>
<td>Testing of existing chamber (temp, seals, visibility, compatibility with Instron 1000)</td>
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<td>9/17 - 9/24</td>
<td>Brainstorm designs for creep testing apparatus, and for modifications of chamber for Tensile testing</td>
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<tr>
<td>9/25 – 10/17</td>
<td>Make modifications to chamber for tensile testing, develop and finalize designs of creep testing apparatus</td>
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<td>10/14-10/17</td>
<td>Work on mid-semester presentation</td>
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<td>10/18</td>
<td>Mid-semester presentation</td>
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<tr>
<td>10/19-11/25</td>
<td>Update PDMS stencil procedure, obtain more EPON masters, finish/test modifications of Chamber for tensile tests, build creep testing apparatus. Finish a draft of the paper.</td>
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<tr>
<td>11/26-12/5</td>
<td>Tensile testing and creep testing/data analysis</td>
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<td>12/5 - 12/12</td>
<td>Preparation of final paper and poster presentation</td>
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<tr>
<td>12/13</td>
<td>Poster presentation</td>
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<tr>
<td>12/14 - 12/20</td>
<td>Final meeting with advisor</td>
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Last updated: 11/5/02

Difficulties: The ME shop fell behind schedule on finishing the new piece for the environmental chamber. They agreed, initially, to have this done by last week, but they didn't. Fortunately, the extension for the grip mount, and the valve and hose barb should be in by Tuesday.

Activities:

Team: Team meeting, 2 hr

Gabriel: Completion of Human Subjects Training, 45 min
Meeting with Charlie to work on the paper, 1.5 hr
Visit to ME shop, 0.5 hr
Worked on paper and updated PDS, 1.5 hr
Emails, research on the aquarium heater, ordered materials, etc. 1 hr

Total: 7.25 hr
Cumulative Time: 64.75 hr

Darcee: Worked on PDS, alternative designs, testing, future work for creep portion of paper, 4 hr
Meeting with Dr. Kao, 0.5 hr
Ordering/researching parts, 1 hr
Emails, progress report, notebook, 1 hr

Total: 8.5 hr
Cumulative Time: 68.75 hr
Charlie: Meeting with Bill Hagquist, 1 hr
Notebook, emails, etc. 2 hr

Total: 5 hr
Cumulative Time: 58.0 hr

Mike: Meeting with Dr. Kao, 0.5 hr
Ordering/researching parts, 1 hr

Total: 4.5 hr
Cumulative Time: 58.5 hr