**Project Identity**

Shampoo-Conditioner Identification Device/ Medicine Reminder

Week 1: 3/12 – 3/17

Kenta Umetsu

**Work Completed**

This week further research on the materials needed for the projects were done. For the Shampoo-Conditioner Identification Device, Sheldon had suggested to buy a large block of plastic and carve out the design we planned. Our budget total is limited to $750 and buying large blocks of plastic is fairly expensive for this kind of budget. Balancing out the quality of the plastic to cost becomes an issue. We have several candidates of plastics for this application but we cannot decide on this yet as the electrical components that are going inside the casing must be finalized so we can calculate the final dimensions needed. The three candidates that I have chosen are polyethylene, polypropylene, and PVC. All of these plastics have been used in the real world for piping and other water involving applications. This kind of property is very crucial as our device will be used in the shower environment so proper water resistance, corrosion resistance, as well as heat resistance must be considered to operate our device the best.

Polyethylene has several different types within itself. It is important to note here that we are specifically interested in the high density type polyethylene. Ultra high molecular weight polyethylene may be a stronger material but it operates under a much narrower temperature range. High density polyethylene has very attractive features because it shares the moisture resistance of low density polyethylene and yet it offers more rigidity and better heat resistance. This material is also flame retardant which contains additives that significantly reduces the tendency to burn and is also designed to be washed down regularly which will happen in a shower environment. With these properties, high density polyethylene is the best choice of the polyethylene types. The cost of a 24” by 12” is roughly $181.00 for this kind of material.

The next candidate, polypropylene is a member of the polyolefin family. This material is one of the most commonly used low cost non toxic plastics. The
characteristics feature a hard smooth surface that prevents bacteria build-up and is chemically resistant. Shower environments can be a hazardous place with bacteria and chemical products so these features are definitely important. Polypropylene is similar to the polyethylene in that it is also flame retardant and is designed to be washed down regularly. The cost of a 24” by 12” is roughly $166.35 for this kind of material.

The third candidate mentioned above was PVC (polyvinyl chloride). There are several types of PVC as well but we want to focus on type 1. PVC type 1 has good chemical and corrosion resistance and it is the most widely used vinyl. It is known to be used in corrosion resistant tanks as well as ducts and fittings. PVC has high impact resistance compared to the other two candidates as well as the flame retardant characteristics and design to be washed down regularly. The cost of a 24” by 12” is roughly $348.06. PVC has the best overall characteristics but with good material comes higher cost so our budget may not be able to support this material cost.

All three of these applications can be used in water environments. The data table shown below displays the operating temperature range as well as the lowest and highest temperature range of the material can withstand.

<table>
<thead>
<tr>
<th>Material</th>
<th>Highest Temperature (°F)</th>
<th>Lowest Temperature (°F)</th>
<th>Operating Temperature Range (°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polyethylene</td>
<td>+100° to +200° F</td>
<td>-99° to -1° F</td>
<td>-40° to +140° F</td>
</tr>
<tr>
<td>Polypropylene</td>
<td>+100° to +200° F</td>
<td>+0° to +60° F</td>
<td>+32° to +170° F</td>
</tr>
<tr>
<td>PVC</td>
<td>+100° to +200° F</td>
<td>+0° to +60° F</td>
<td>+40° to +140° F</td>
</tr>
</tbody>
</table>

For the Medicine Reminder this week, a new prototype design for the medication cabinet is in progress. Upon completion, the new design will be added to the next report.

**Future Work**

Since the snow on Friday has canceled our regular scheduled lab time, some of the things I had planned on discussing with my teammates have been delayed. However, the extra time was spent on researching material which got finished this week and all that needs to be done is to finalize our decision as a group. More research on the smaller parts are now to be pursued in the future to finish all the planning part of the Medicine
Reminder and Shampoo and Conditioner identification device. Updates on the budget will be made in the near future as more parts are ordered for each project.

**Project Review**

A lot of research that needed to be made for the plastic for the shampoo and conditioner identification device was done. All the data has been collected and now the decision is left to be made with the group on which plastic we want to purchase depending on the remaining budget and size required. For the medication reminder, more than half of the updated visio design of the medication cabinet has been done and is projected to be finished within days.

**Hours Worked:** 13