Traumatic Brain Injury Reducing Army Combat Helmet

Team 6
Week 2
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**Work Completed:**

This week focused on revisions regarding to the trial experiment from the week before. Several changes were made to the overall procedure and a new experiment was set up based on the revised steps. For example, the first two layers of polish on the mold were not taken off in the last week even though they should have been. The purpose of these polishes were misunderstood and were originally thought to be a dry layer of paste around the helmet to seal all the cracks and create a smooth surface. However, the true purpose of these two is like liquid sandpaper, in that it is applied to the surface, buffed, and then washed off. It can also be thought of as a scratch removal liquid used for a CD. In addition, the third layer of the wax was originally not layered enough and not allowed to dry in time. Previously, the entire experiment was performed in one Friday afternoon session. The revised procedure was spaced out throughout the entire weekend until Monday to provide ample time for everything to dry.

Figure 1 is a layering diagram of the two experiments performed for each week.
Figure 1: Flow Diagram of Mold Polish Application

**Trial 1**
- Apply First Polish
- Wait 30
- Apply Second Polish
- Wait 30
- Apply Wax Layer
- Wait 30
- Apply PVA Layer
- Wait 30
- Repeat 2 Times

**Trial 2**
- Apply First Polish
- Remove First Polish with Water
- Apply Second Polish
- Remove Second Polish with Water
- Repeat 4
- Apply Wax Layer
- Wait 1 Hour
- Repeat 2
- Apply PVA Layer
- Wait 30
- Repeat 2
- Apply PVA Layer
- Wait 30
- Kevlar Process
It’s important to note that the second experiment was performed before the materials ordered last week arrived. Therefore, the technique of Epoxy application by dabbing was not tested. Gloves were again used to smear the Epoxy around, which means that there is a possibility that the Kevlar moved around during this process and potentially created air bubbles. However, much less Epoxy was used this time, which instantaneously resulted in less drip and a potential for a better finish.

**Future Work:**

The second experiment is currently drying overnight and will be finished tomorrow. If it comes out much better than the original, the revised process will be assumed to be good enough and preparations will begin for the mold of the final shell for the project. This involves about 8 hours of mold preparation and very careful measurement of about 20 layers of Kevlar. The tricky part of this is that each piece is slightly larger than the proceeding layer, which makes cutting and measuring a delicate process.

**Hours Worked:**

Four hours were spent preparing the mold on Friday and about four hours were spent finalizing the mold, mixing the Epoxy, and layering it on with the Kevlar on Monday for a total of about 8 hours.