Heating mat

Deliverable G

Team 10

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Contents

Introduction

The goal of this deliverable is to devise a test plan and develop the second prototype from the feedback given for the first prototype. A prototyping test plan will be outlines based on the "Prototyping Test Plan" provided in lecture 11. Furthermore, the second prototype will be developed, and it will be used to achieve the objectives the team has set out in this plan. This deliverable is divided into three main sections: prototyping test plan, 3D model of the Design, and client feedback.

Prototyping test plan

Why?

Why is this test being done?	Testing this prototype allows the team to see how some of the critical designs turn out in real life. The team will be able to identify flaws and weaknesses associated with the design model and correct them in the final prototype. The effectiveness and functionality of the prototype will once again be tested to see if they hold up in the same manners as before. Furthermore, safety or functionality issues related to wiring or assemblement will be identified and fixed.
What are the specific test objectives?	The test objectives include functionality, safety issues, ease of building, and design. This second prototype will be built using materials found around the house as well as critical components purchased. This method of prototyping allows us to test if critical components of our system functions properly and how hard it is to build them. It also allows us to determine if there are existing issues with the design of the mat or safety issues.
What is communicated and learned through the prototype?	The prototype allows the team to learn the building process of some of the critical components of our system and overall learn how to assemble the final model. This prototype also gives the team insights for the third prototype in terms of dimension/sizing, design adjustments, and what or what not to do. This prototype is also extremely important because it will communicate to the group the flaws of our design that may not be reflected by our physical prototype, thus the reflection upon the second prototype is critical to our success.
How are results assessed?	The results will be accessed by each member of the team using a 1-5 scale with 5 being the most practical and 1 being the least practical. This method of "practical/ non-practical" categorization allows for the team to identify the most important issues within our system and seek out those first. By prioritizing the most critical and important issues, this prototype will be able to meet the clients' needs more efficiently and overall improve the quality of our next prototype.

What are the criteria for success and failure?	The success criteria for this prototype will be determined by if the physical components can be built while addressing the design criteria set by our client. This prototype can be deemed successful if most or all the client's needs are met while few issues are found. On the contrary, the prototype will be deemed a failure if it cannot meet the client's needs and too many issues are found within our system.

What

What is the prototype?	This prototype will be built physically using some materials purchased and some materials found around the house. This prototype will include the most critical component of the final prototype which is the heating wires, and the silicon rubber mats. The dimensions and design calculated and found in deliverable F will be applied in this prototype, while some changes may be applied accordingly. This prototype will be critical as it will allow us to build the perfect final prototype.
What materials are required and what is the approximated cost?	- Anti-slip waterproof silicone rubber sheet (CDN$16.72) - Prototype snow melting heating cables (pre-owned) - Glue (pre-owned) - Cardboard (pre-owned) - Tape (pre-owned) Estimated Cost = CDN$20

How

What information will be measured? Is this important data?	The dimensions of the design can be measured through this prototype, if a full functional physical prototype was to be built then one can test if the mat will melt snow. One can obtain the rate at which snow will melted, required energy for the mat to work.
How will the results be recorded?	Test of dimensions of parts and total size of the tile can be identified and recorded on excel, If the dimensions are not compatible. then it could be changed. until coherent and perfect. After getting the required parts, them performing multiple tests, one can start upgrading the research by collecting the rate of snow melting and such. The recordings will be stored in a control panel that will be installed later.

When

How long will the testing take and are there any dependencies for the testing to happen?	The tests will take a few hours as it is going to be judged by the team members and other potential users of heating mats such as family and friends. There are no dependencies as it is a model made on an online software which is accessible to everybody.
When are the results required and what depends on the results?	The results are required before 14 March 2021 as it is due date for Deliverable G. The results from this protype will influence the third protype's developments. Without this prototype's results, the group cannot improve the product and it will delay the rest of the project plan. The Gantt chart provided explains the estimated test periods with the given time constraints taken into consideration.

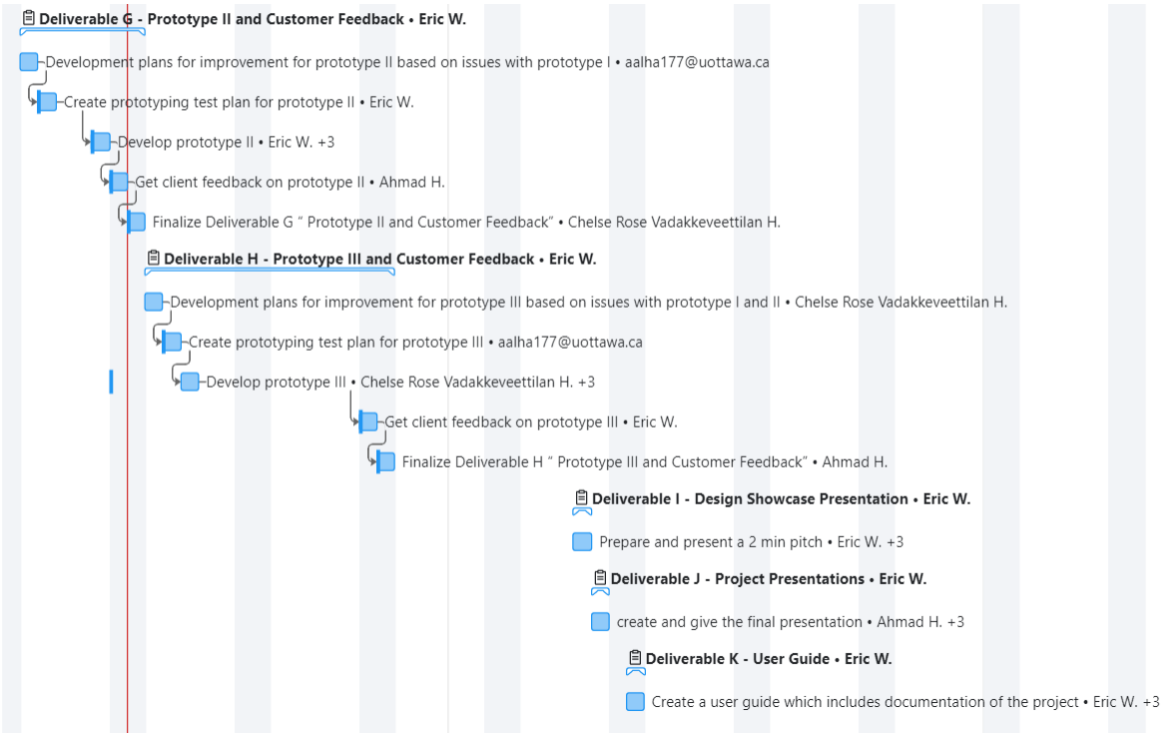
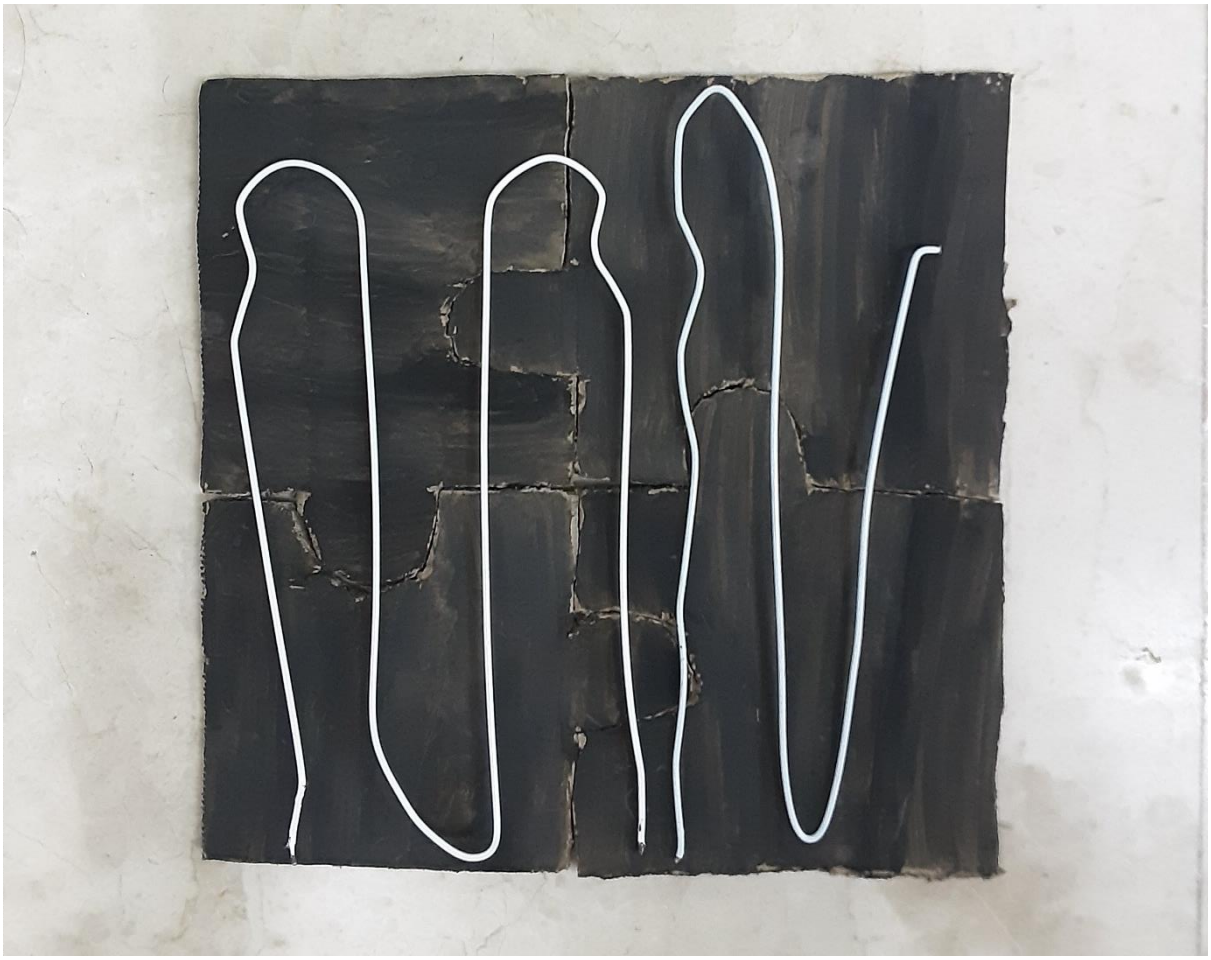


Figure 1. GNG1103 Team 10 Deliverable G Gantt Chart

Client Feedback

Jonathon was able to see the first prototype when the team presented the critical components of the heated mat and explain how all the critical parts fitted together. He appreciated the simplicity of the mat, the colour, and the connectivity of each piece. He complimented the ability of the mat to be easily customizable in any type of surface. He suggested that there could be the additional of a way to get rid of water that may remain on the mat. The group took all the client's comments into consideration as the second prototype was built. The team examined how well the connectivity of the mats would be as the connectivity and customisability should be maintained in a practical manner.

Second Prototype



Conclusion

In conclusion, the group made a second prototype which was physically testing the connectivity of the concept. It was influenced by the first prototype and the comments of the client. The group decided to keep the connectivity method as the prototype, the client, and the prototype test proved the functionality to be practical and feasible.