Project Deliverable G

Prototype II and Customer Feedback

GNG 1103 – Faculty of Engineering – UOttawa

Hydroponics Group 1

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Introduction

This prototype will be the last one before the final prototype that needs to be ready for design day. After receiving feedback from our first client meeting, we will be adjusting our first prototype so that it reflects the suggestions made by our client. This prototype will focus on developing key subsystems. The nutrition system is designed to combine compost with water to provide nutrition which can be used by the plants. The circulation system will pump the water to the top of the hydroponics system proper. The aeration system will aerate the water. Prototype II was developed using 3D modeling in order to minimize costs and stay within our $100 budget.

Results from Prototype I

The client (Monique) was satisfied with our first prototype. She was intrigued by our composting and nutrient system. She also told us that she would communicate with local schools in order to see whether or not a compost system would work. If the compost system were to be feasible and applicable, the team agreed that a composting guide would need to be provided with the design.

Prototype II Digital Design

Prototype II was created using Solidworks. Figures 1, and 2 display the 3D model of our prototype II using Solidworks. Testing of the pumps obtained from the Makerspace lab were conducted in order to ensure that water can be pumped at a sufficient level. Based on the testing results, we could visually observe that the water pump was strong enough to pump water through the pipes and at a considerable height. Thus, we can confirm that our pump will have enough power to power our hydroponics system. The test plan for the project will be submitted along with this document.

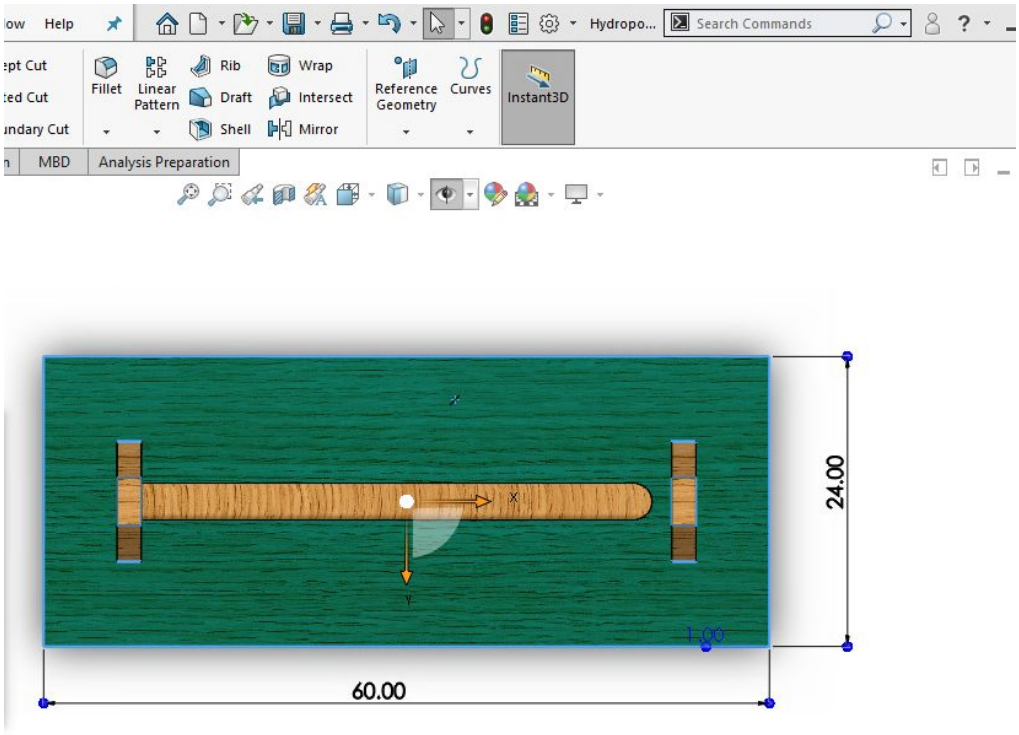

Figure 1: Top view of Prototype II in Solidworks

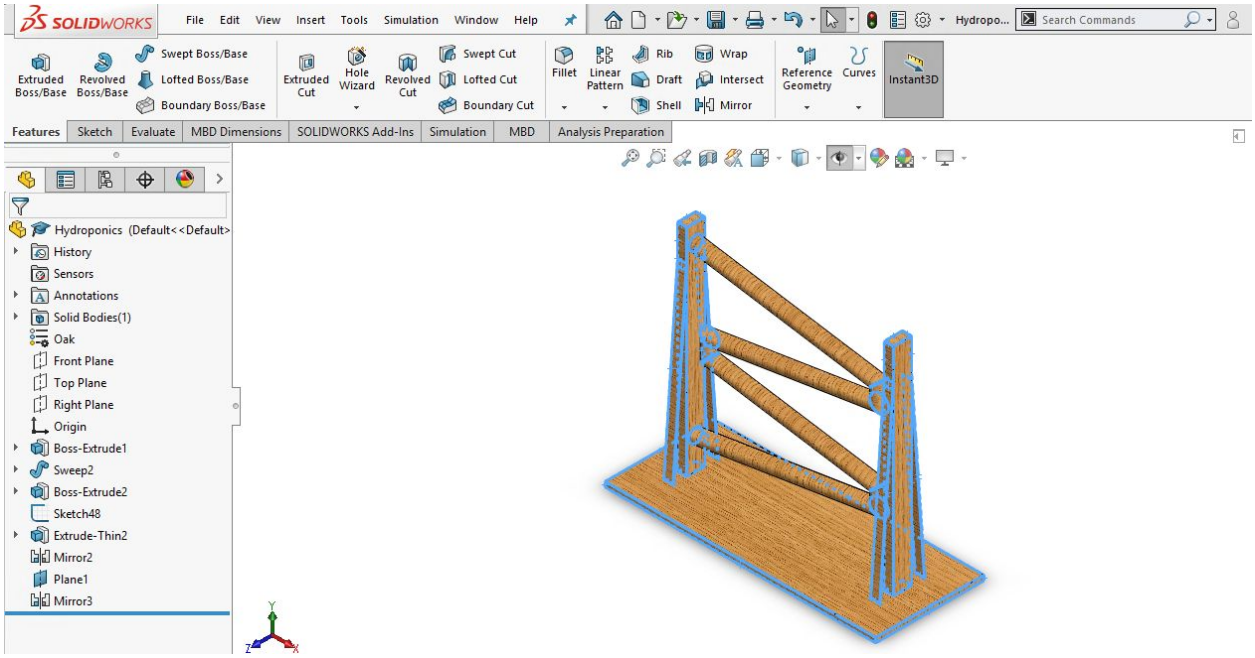

Figure 2: Prototype II in Solidworks

Remaining Tests

To test the nutrition system, the team will mix ideal compost with water for 48 hours and examine the nutrition content produced, as to whether the compost mix will provide enough nutrition to sustain the plants.

To test the circulation system, pumps received from the makerspace will be tested with a variety of piping at various head heights. This data will then be analyzed to provide parameters for the pump which is to be purchased for the final system.

To test the aeration system, further research is needed to determine which type of aeration system will be used. Afterwards, the Dissolved Oxygen (DO) levels will be tested with the chosen system throughout the circulation system in order to check that the levels are above the minimum required for healthy plant growth.

Client Feedback

A presentation was conducted this week and recorded by the TAs. These presentations will then be submitted to the client for their final feedback. The client's feedback will then be incorporated into our final design.

Conclusion

The second prototype will help us determine our flow rate, and our pump selection. It will also help us complete our final prototype by optimizing our design. This prototype will help us make all the final decisions and purchases required in order to construct our $100 hydroponics system.