Prototype II and Customer Feedback

Group 10
Jason Jang
Joudi Fayad
Pablo Florencia Villarreal
Jacob Hodgins
Feyisayo Owolabi

March 12th, 2022

Table of Contents

1 Introduction

This document summarizes our work completed during the week of March 10th. This report consists mostly of our work on the second prototype, the feedback received from the client on our design, how we have considered/implemented the feedback, and any updates/changes from our first prototype.

2 Outline of Customer Feedback

After the presentation of our first prototype, the client wants us to add another form of ventilation aside from the dutch door. This was the only feedback we got from the client. To solve this problem we decided to

3 Prototype II and Tests

What:

For this prototype we decided to make a 3D model using the solidworks application on the VMware horizon student lab portal. We considered the client's feedback after our presentation on march 8th and developed design solutions. The client advised us to find implementations for additional ventilation in the greenhouse besides the dutch door.

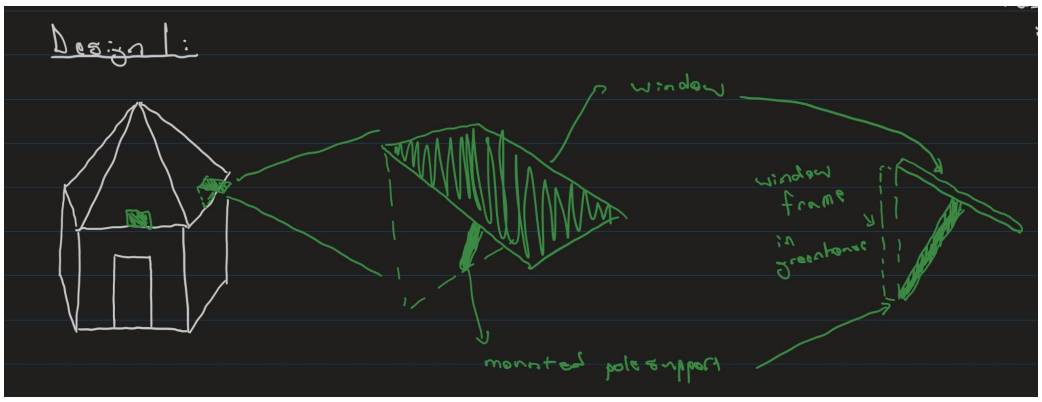
Why:

We wanted to find solutions for adding additional ventilation on paper where we can properly plan our new design implementations so that when we return to the makerspace, we only have to worry about installation.

How:

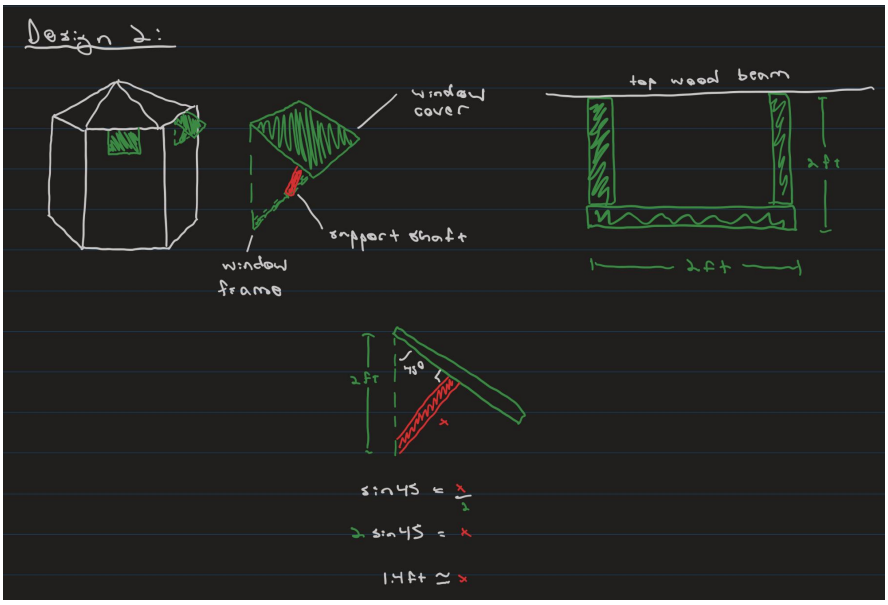
<u>Design 1:</u>

One of the designs considered for ventilation was to add retractable windows in the roof of the greenhouse. Some flaws with this design is the difficulty of implementation; we will have to cut the wood at an angle in order to line the window up with the incline of the roof. Additionally, rain can leak into the window quite easily as it rolls down the roof. This is undesireable as we don't want uncontrolled movement of water within the greenhouse (the hydroponics system requires electricity and is water sensitive).



Design 2:

Another design considered was to connect square window frames to the top beams in each frame; the one exception is the frame with the door as there is not enough space in the frame to add a window at the top. The design is fairly similar to the previous design, however there are less complications with the installation involved angled cuts and rainfall is less likely to fall/seep into the window. The dimensions of the window frame will be 2 ft by 2 ft, with the support shaft having a length of roughly 1.4 ft.



The second design is the design that all group members agreed to go forward with. We transferred this design to solidworks in order to better visualize the implementation of the design. For the next deliverable, we will modify the design to have the frame of the greenhouse be made of would and quantify the weight of the beams and the resistance to flexing/bending.

Solidworks model here:

When:

The second prototype was created on March 10th, 2023 about three weeks before the design day of the main greenhouse prototype that will be presented on that day. This prototype gives us a clearer view on what the client wants.

4 Update to Target Specifications, Design, or BOM

We have considered ways to add ventilation to the greenhouse structure as per the feedback received from the client during the third client meet on March 8th, 2023. There were also some modifications made to the dimensions of the greenhouse to each side of the base as 4ft and total height- 8 ft to conserve materials.

5 Test Plan for Prototype III

What: For the final prototype we are going to do a strength test of the materials in the greenhouse; that is, the strength of the wood beams under compression and flex. The test will consist of calculations in the solidworks 3D modelling program and therefore does not have a specific test duration. We will use this test to quantify the strength of the wood that we are using, and determine if we should adjust dimensions to account for lapses in compression strength or undesired bending.

Why: The strength test is to make sure the materials used in building them have enough stability. Before the next text we will also figure out more tests that can be done to ensure the structure is built properly.

How: This would be done by searching up the maximum load that can be put on the materials and test that exact load to make sure it withstands it. Then in the solidworks program we will get results for the wood material based on how the structure has been developed and determine if any adjustments can be made

When: This will be completed by the end of the next deliverable.

6 References

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