Deliverable G- Prototype II and Customer Feedback

GNG 1103 – Engineering Design

Faculty of Engineering – University of Ottawa

Team 7

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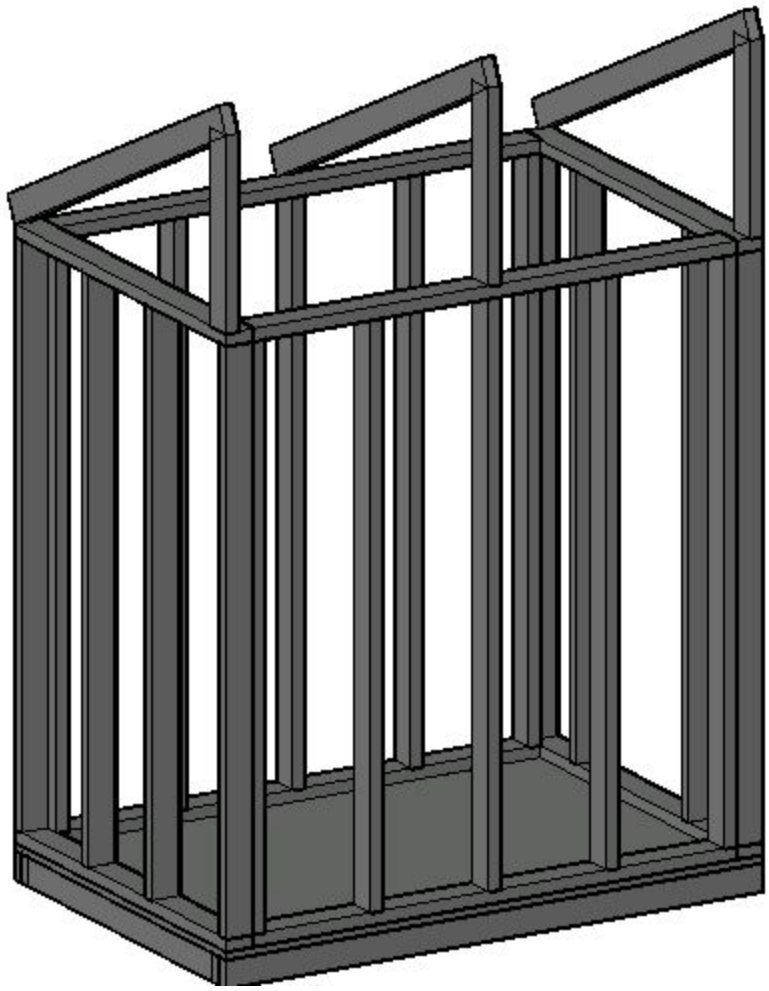
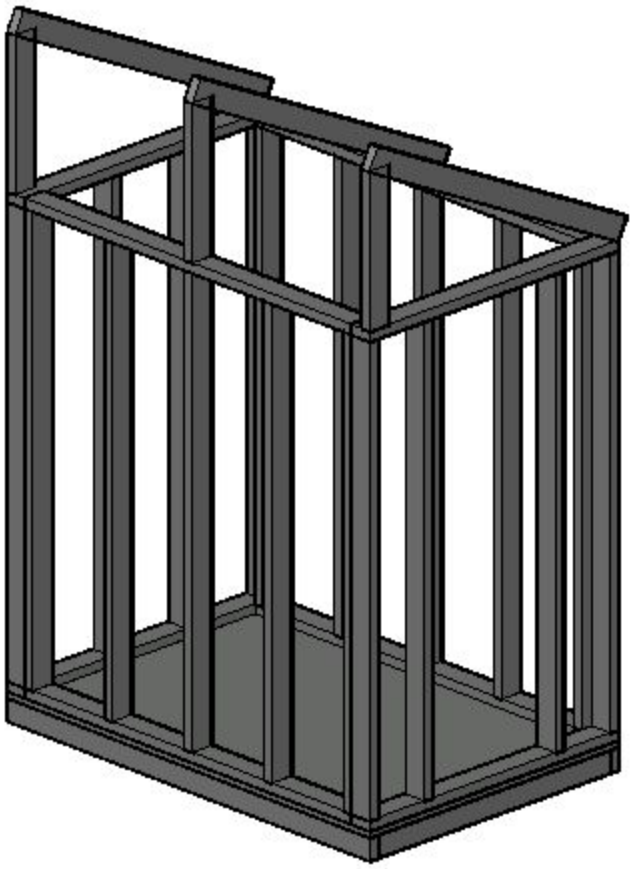
Introduction

Team 7 has been tasked to design and develop a greenhouse to grow vegetables year round for an aboriginal community in Le Domaine off of Barriere Lake. Previously, we have defined the problem and have made a working prototype 1 using popsicle sticks. We were given clear feedback on what needs improvement and have made changes since then. Moving forward based on previous feedbacks, we have come up with a prototype 2 design using AutoCad software. The second prototype contains the addition of a newly adjusted dimension along with improved roof design. The new design was shown to Monique again and we have received more constructive feedback on making this greenhouse closer and closer to customer specifications. Explanation below details the entire design process, added adjustment and customer feedback on the second prototype.

Prototype 2

In order to fully visualize the prototype, a CAD 3D model was drawn out according to the design specifications. The new model prototype now featured modifications to the overall size of the green house to be 4x6 ft. Besides the modification, the greenhouse still features a door along the short side of the framework and a slanted roof along the short encouraging snow and rain falloff. The prototype design was made strictly of the wooden skeletal framework of the greenhouse structure.





Prototype Test Plan

What:
As a continuation to improve our design, we build a second prototype using the AutoCad software in order to test our design and establish further confirmation on the overall structure. This prototype uses the software to provide an accurate dimension of the overall structure. Furthermore, by using the software we can manipulate the structure freely and add any addition based on our idea. By creating a software design, we can make bigger adjustment in shorter frame of time as opposed to building a physical structure

Why:
This prototype was designed to have a completely accurate model of exactly what the dimensions of the greenhouse would be. Unlike the previous models of the greenhouse, this prototype takes into account the interior dimensions of the width of the material.

This is to give a full understanding of what the final real-life model should be. Because interior width take up volume, the inside will house less room than the original 6 ft width and 4 ft long dimensions. This prototype shows exactly what the interior will be to ensure that the greenhouse design will have a proper amount of interior volume to house the hydraulic system to grow vegetables.
The required dimensions for the hydroponic team have been confirmed to fit in the dimensions for our Prototype II, therefore the current greenhouse design is successful and the main physical greenhouse design be designed based on these dimensions.

When:
Prototype II was built during the early stages of the main physical greenhouse in the structure lab. This allows early adjustments to be made on the main design with little consequence if such a need arises. With this Prototype II being complete we now have an exact idea of what we're designing with no unexpected interior measurements.

Stopping Criteria:
The hydroponic team for the greenhouse gave their minimum dimensions for their design to require a width and length of 3.5 ft and the height preferably being 6 ft but could adjust if needed. The original design for the greenhouse was to be exterior 4x4 ft but due to the requirements it seemed to be too risky due to the interior being smaller. Therefore the prototype II was adjusted to be exterior 6 x 4 ft to safely house the hydroponic design. With an accurate CAD 3D model, it is easily visualized that the current design will be successful to have a sufficient room for the hydroponic systems.

Feedback
After showing Monique our second prototype, as well as our progression with the construction of our greenhouse, she shared with us potential improvements and comments on our design. Monique mentioned she liked the material we chose to use for our roof, the "corrugated roofing panel", because it is solid (will not break with the weight of the snow), and it also translucent, allowing the sunlight to enter the greenhouse, therefore helping heating the space. Our client was impressed with the shape of the room being angled on only one side, she likes the originality of the design. We will however have to research the ideal angle that will allow most sunlight through the roof, while also making sure snow will fall off. Also, Monique loves our idea of having a ramp instead of stairs to enter the greenhouse, as it increases its accessibility.

She encourages us to cover the base of our greenhouse with some metal, to prevent any mice from entering it. Finally, Monique suggested we place the solar panel facing South in order to maximize its performance.

Conclusion

In conclusion, we were very pleased with the outcome of the second prototype. The overall method to make it worked perfectly in conjunction with design team deciding to change up the dimension. Creating a computerized design helped us to visualize the expanded dimensions as well as the roof structure. Furthermore, it created a more clear and professional prototype to present to our client at the client meeting in class. We are now confident that this is the last big adjustment we will make to the greenhouse. Following this, we can fully put our effort into building the last final product.