GNG1103 - Prototyping Test Plan

Construction Group 1

GNG 1103 - D

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Why are we doing this test?

*This is an introduction. Capture the reasons for the test, giving enough background information to justify doing **any** prototyping at all. Is the **general** objective one of: learning, communication, de-risking, etc.*

We are doing this test to find any faults or errors in our design. By building and dismantling our prototype, we can identify any aspects that can be improved, and ensure that the design is structurally sound. The prototype proves that the structure can be easily assembled and will remain standing. The general objective is one of learning. We aim to learn of any improvements that can be made to our design.

Test Objectives Description

*What are the **specific** test objectives?*

- Our prototype needs to improve the livability of the shed, building Code and R-value improve livability.

Aspect 1: Window
Objectives:

- Needs to meet Ontario Building Code as a means of egress.
- Needs to be in an appropriate place.
- Needs to be of appropriate material.
- Needs to be a high enough R-value.
- Needs to let in enough sunlight.
- Needs to be big enough for people to escape.

Aspect 2: Door
Objectives:

Needs to meet Ontario Building Code as a means of egress.
Needs to have a high enough R-value.
Needs to be tall enough for a 6’ 4” person.
Add to the aesthetic appeal of a house.

Aspect 3: Siding
Objectives:

- 40 year longevity
- Protection against wind
- Protection against rain
- Protection against dust
- Prevention from wood rotting, mold growth, and other interior damage

Aspect 4: Roof Shape and Size
Objectives:

- Sufficient size for solar panels

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- Sufficient slope to shed water
- Low enough slope to make roofing easy
- Weather conditions? -- rain or snow
- Shape is suitable for harsh Canadian weather condition

Aspect 5: Roofing material
Objectives:

- 25 year longevity
- Able to withstand Canadian winter

*What **exactly** is being learned or communicated with the prototype?*

- The general ease of construction
- The structural stability
- The most efficient process for assembly
- The feasibility of incorporating other systems into the structure

What are the possible types of result? What are the criteria for test success or failure?

- Success - the design is structurally sound and the assembly is very easy
- Moderate success - the design is structurally sound, but the assembly is difficult
- Moderate failure - the design does not hold its shape but the assembly is easy
- Extreme failure - the structure collapses

How will these results be used to make decisions or select concepts?

The results will be used to identify any improvements. For example, we may need to change the type of fasteners used, or the structure may need more bracing to hold its shape. Other improvements may be stronger materials

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What is going on and **how** is it being done?

*Describe the prototype **type** (e.g. focused or comprehensive) and the reason for the selection of this type of prototype.*

This prototype is comprehensive, as it includes all parts of the shed (in terms of constructing the shed).

Describe the testing process in enough detail to allow someone else to build and test the prototype instead of you.

In this prototype, the shed must be disassembled and reassembled in a different place. In order to do this, the roof must be taken down first. Once the roof is removed, the different wall panels can be taken down. Using a wrench and a drill, each of the screws and nuts can be removed from the panels.

To reassemble, the floor panels are placed and fastened together using screws. Next, the sill plates are screwed to the floor. Then the wall panels are placed on the sill plates and braced plumb. Top plates are attached on top of the walls, and the roof is constructed last.

*What is being observed and how is it being **recorded**?*

We are observing the stability of the prototype and recording any difficulties we have during construction.

What materials are required and what is the approximate estimated cost?

Material	Cost per unit	Quantity	Cost	Total cost
2x6x8’	$11	10	$110	**$490**
2x4x8’	$ 2	54	$108	
structural screws (box of 100)	$ 16	1	$16	
7/16” OSB	$ 15	9	$ 135	
Vinyl siding	$ 65 / box	1 box	$ 65	
J – trim	$ 7 / 10 feet	80 feet	$ 56	

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When is it happening?

*How long will the test take and what are the **dependencies** (i.e. what needs to happen before the testing can occur)?*

The shed will be disassembled and reassembled a floor higher in STEM. The shed must be assembled by the Design Day presentation, on March 29th, 2019, at 10:00 AM. The shed will take at most 6 hours to disassemble, transport, and reassemble on the first basement of STEM.

When are the results required (i.e. what depends on the results of this test in the project plan)?

The results are required by March 29th, 2019.