Deliverable G

uOttawa

GNG 1103

Group D-1.4

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INTRODUCTION

After the work done from prototype 1 and the new ideas and solutions gained from its work, we completed work towards our second prototype. The recent client meeting allowed us to clarify specific details about the project along with gaining some feedback from the client on what we have done so far. This has continued to help us develop and update a multiple of aspects of our project, such as; electrical components, type of materials, budget constraints, piping system and dimensions. The goal of the deliverable G is to again analyze these feedbacks and continue to improve the detailed design. We will create second prototypes and document their outcomes/results, and finally, outline a prototyping test plan for our third prototype.

Analysis of Client Feedback on the Detailed Design:

- Client was satisfied with inlet design
- Prototype 1 only focused on metrics and dimensions of the system. Client suggests focusing more on technical details on how to achieve the desired temperature and electrical components.
- Team did work on electrical components and discussed ideas on how to achieve the final temperature, but was not included in the presentation.

Prototype 2 Updates and Analysis:

Updated Metrics:

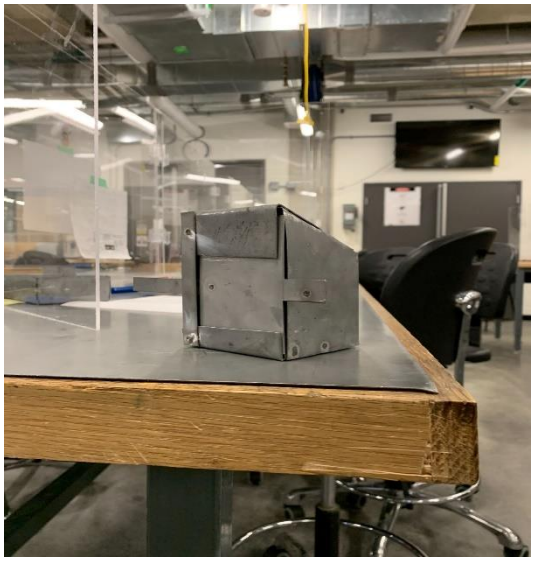
Components	Dimensions
Inlet box size	5x5x5 inches
Shutters / Air entry slot size	2x3 inches
Diameter of all pipes	0.75 In
Outer pipe length from inlet to chamber box	12.5 In
Chamber box size	1ft x 0.625ft x0.625ft
Inner pipe length without joints (1 layer)	Roughly 7 inches per pipe

Analysis From Prototype 2:

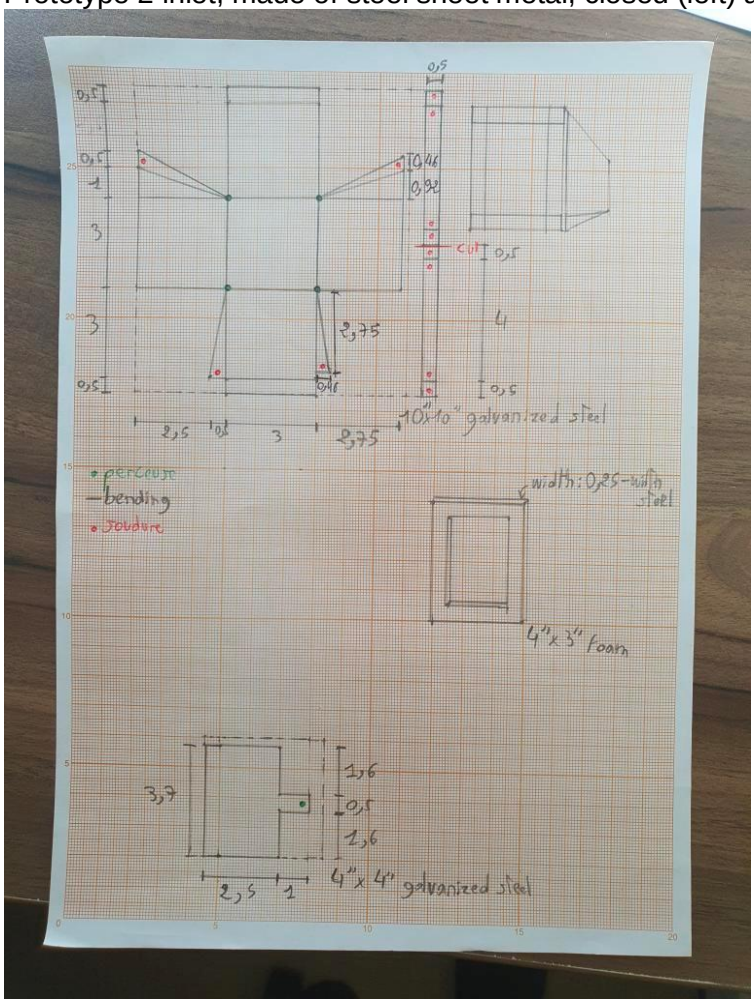
- As a result of trying to make our prototype out of realistic materials, as a group we have decided to move towards smaller design dimensions
- In addition to this, when making a proper model for the inlet we have decided to Re-evaluate the inlet design, and create a potential improved version of what we had tested.
- The metal worked inlet test needs to be recreated, to make it not only look better but to be better functional. The first test allowed us to get a better practical understanding of how to update our inlet and other designs
- Circuitry was updated and virtually tested to confirm it works, through the following prototype we will do a physical test of this electrical work, for final product integration.

- If the circuits work well in the following test(which they should), integration into the system will be easy and should check off that portion of our final design.

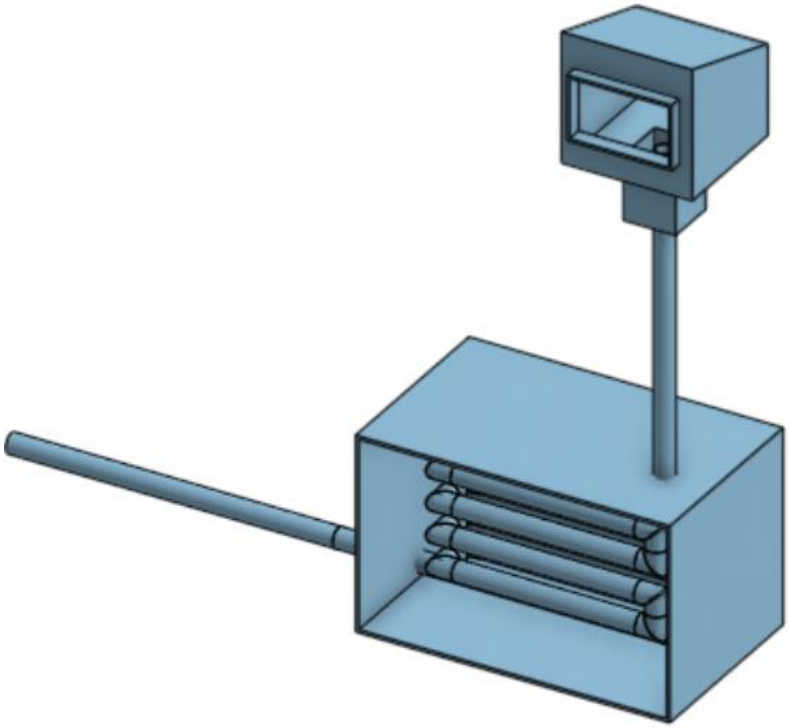
Photos of Prototype 2:



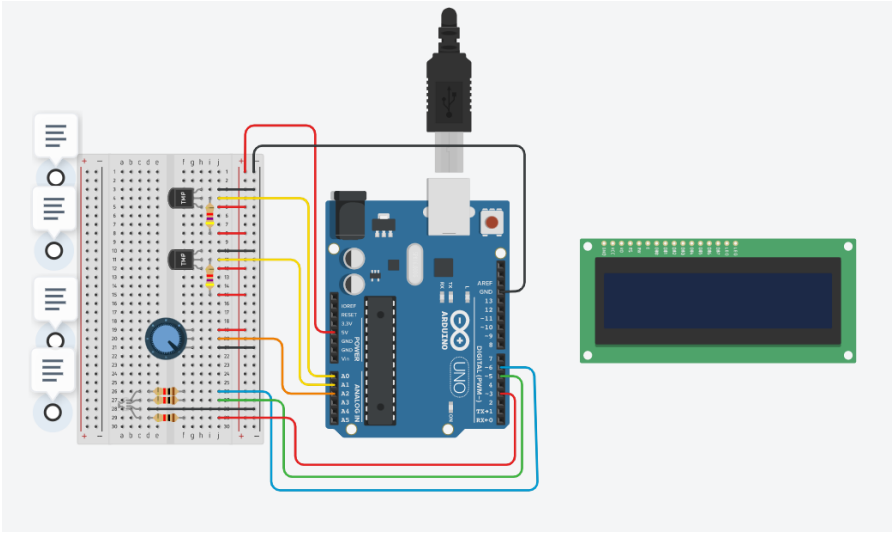
Prototype 2 inlet, made of steel sheet metal, closed (left) and open (right).



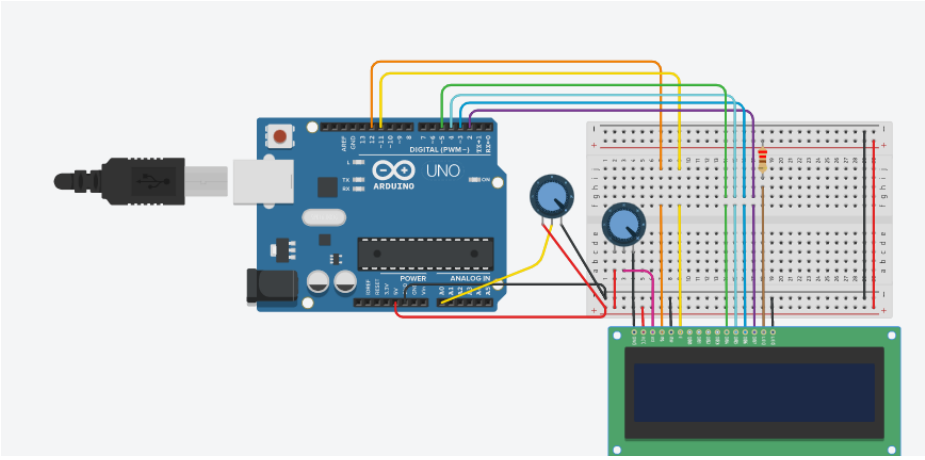
Overall Design of THEC system



Electric design



Testing potentiometer (get an input from user and display it on a screen)



Test Plan for Prototype 3:

Objective and concepts to be tested (What):
-Redo inlet design
-Simulation of inner pipes
-Design and material of chamber box
-Sump pump
-Test and get electrical
-Power source
-Outer pipes

Testing method (How):
-For the inner pipes, based on the design we have made in this prototype (on OnShape), verify and analyze the air flow efficiency, resistance and heat loss/transfer with Simscale which will perform a thermal simulation.
-Test out different chamber box
-We need to test if the heat transfer by conduction between the heating chamber and the pipes, then between the pipes and the air is effective enough, using calculations.
-We need to test if the entire electric / electronic part (temperature sensor/ fan blower) is actually working. The fan blower will be represented with a LED. The code and the electronics can either be tested using Tinkercad or with the actual components.
-For the inlet design, we just have to make sure that the inlet's hole allows a sufficient airflow
-For the sump pump, we need to verify it will collect the water/condensation efficiently.
-Confirm the used power source (arduino and solar panels).

Stopping criteria (When):
We will stop development on prototype 3, once we feel as though our objective has been effectively met, and we have no needed changes to the design. Once reviewed objectviley by the team and accepted feedback from others, we will see that the prototype is done.
All these objectives must be completed by next week.