

Active Roof System

Progress Check

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Overview

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- Forming a Hypothesis
- Testing Methods
- Ordering Material
- Construction Plan
- Active Roof Rotation System
- Planned A/C System
- Spring Timeline
- Team Job Assignments
- Conclusions

Brief Project Description

- Amount of power consumption due to cooling and heating of large warehouse buildings it too high
 - Project will investigate roof designs that will lower this power consumption
 - Control, Passive & Active Roofs

Forming a Hypothesis

- Currently establishing a calculation plan to:
 - Estimate Prototype Power Consumption
 - Power used by A/C unit (and motors for the Active Roof)
 - Use estimation to later validate our collected data
 - Working closely with client (Dr. Shafer)

Testing Methods

- Testing in simulated Environment
 - Indoors using a heat lamp on a constructed arc
 - Testing one prototype roof at a time
- Testing will represent an expedited day
 - Only 2 hours long
 - Manually move heat lamp into new position every 5 minutes

Ordering Materials

- The main materials to begin constructing the prototypes buildings have been ordered
 - Arrive within a week:
 - Wooden Dowels
 - Poster Boards
 - Cork Rolls
 - Mylar

Construction Plan

- Already have a work bench and cabinet reserved in 98C
- 1st will construct the prototype building
 - Most Time Consuming Projects
 - Construction and testing of
 - The rotation system for the Active Roof panels
 - The A/C system

Construction Plan Cont.

- The prototype building will be used for all three roof systems
 - The control, passive and active roofs will be interchangeable
 - Switch them out during testing

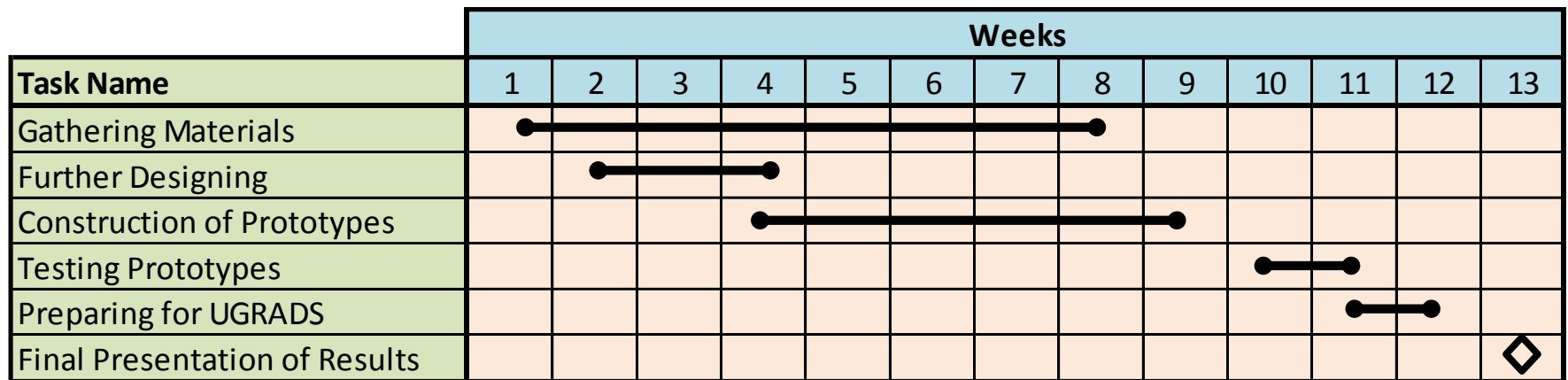
Active Roof Rotation System

- Attach a gear to a Servo Motor
- Gears will also be on the rods attached to the bottom of the reflective panels
- Bike chain or similar will connect all the gears together
- Motor controlled by an Audrino Board

Planned A/C System

- Pump ice water through copper piping
- Use coils of copper piping to radiate cold air
- Arduino will control pump

Spring Timeline



Team Job Assignments

Team Member	Job Assignment 1	Job Assignment 2
Mohammed Alkhalidi	Temperature Measurement System	Power Usage Programming (Audriuno Board)
Coy Cody	Construction of Prototype Building	Construction of Passive Roof
Donovan Hard	Construction of Prototype Building	A/C System Design & Construction
Marissa Munson	Active Roof Programming (Audriuno Board)	Construction of Active Roof Panels
Krysten Whearley	Active Roof Rotation Design & Construction	Forming a Hypothesis (Heat Transfer Analysis)

Conclusion

- We are currently working on calculations to estimate the amount of power output by the A/C system
- Will test indoors (controlled environment)
 - Simulated Sun and expedited day
- Main materials have been ordered
- Constructing 1 prototype building
 - With interchangeable roof system
 - Control, passive and active roofs

Conclusion Cont.

- Active roof system
 - Rotated using gears in parallel rotated by a chain attached to a motor
- A/C system
 - Coils of copper pipes
 - Ice water pumped through pipes
- Plan to be done with construction in a max of 6 weeks and then begin testing