

# Offshore Wind Turbine Prototype: Project Portfolio

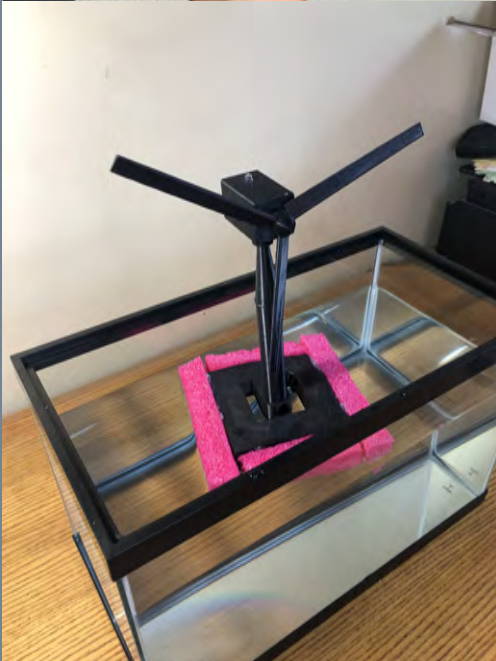


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# Project Introduction



The reason why I decided to take on this project was to build upon and develop new skills during the pandemic. I was looking forward to working on projects with other people through classes and clubs but due to COVID, this was not possible. I wanted to work on a wind turbine because it relates to what I want to do in the future which is work with renewable energy technology.

I had a lot of fun putting together this portfolio even though I don't know much about graphic design and I probably broke a lot of basic rules. I also enjoyed filming the turbine working and at one point I had to be standing on my desk with my cat playfully attacking my leg. Anything for the perfect shot. So overall, I had a lot of fun retouching on some of my engineering skills and developing my design and filming skills.

# Personal Introduction



Hi, my name is Eduardo Rangel, I'm a third year mechanical engineering major at CSULB, and I currently work at the CSULB Office of Sustainability as a Sustainability Student Assistant. I primarily work on social media content, data collection for various reports and assessments, and work on implementing the 'Zero Waste' program across campus.


I eventually want to work with renewable energy technology to push for a more sustainable and equitable future. I fell in love with the idea of one day working towards creating a more sustainable future through engineering in a high school innovation project and that love and passion have grown ever since.

In my free time, I enjoy running, lifting weights, reading non-fiction books, playing basketball, playing video games, skateboarding, hiking, and spending quality time with my friends!

# Design Process

## Research


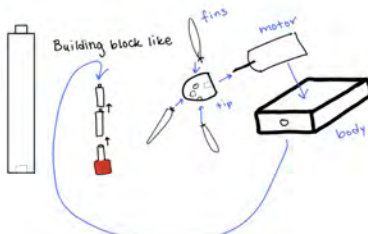
Researching potential designs



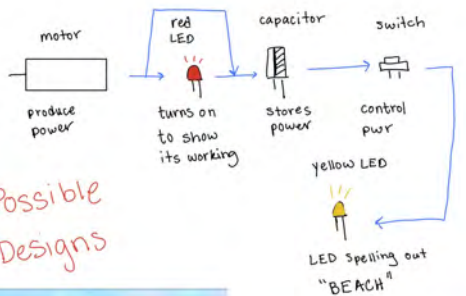
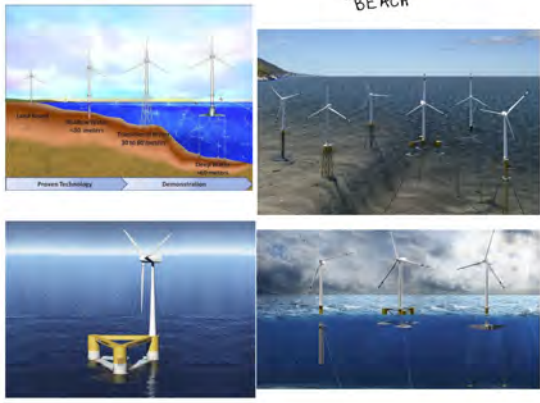
- ① Stand
- ② hole for motor
- ③ node
- ④ fins

how to design nod + fins?

• add light to indicate its working on

Possible Designs

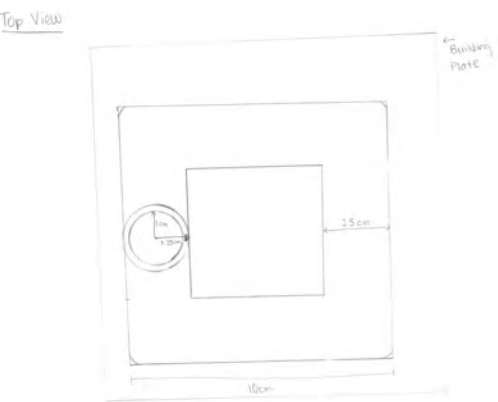
I started my research by referencing how others designed their wind turbine and got an idea of how I would design mine.

Originally, I wanted to add a capacitor to light up a LED sign that read "Beach" but ultimately decided to only pursue it if time permitted.

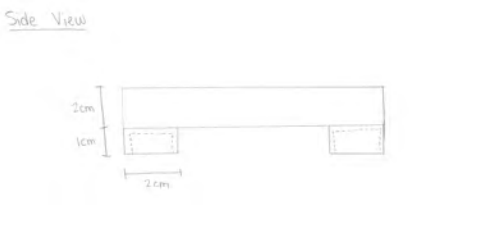
I finished researching actual offshore wind turbines and chose the square platform design with the pole centered in the middle.

## Ideation

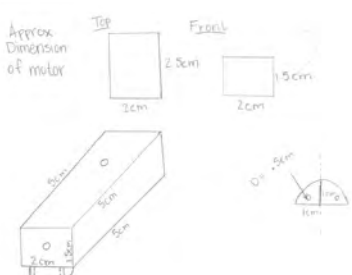


Top View

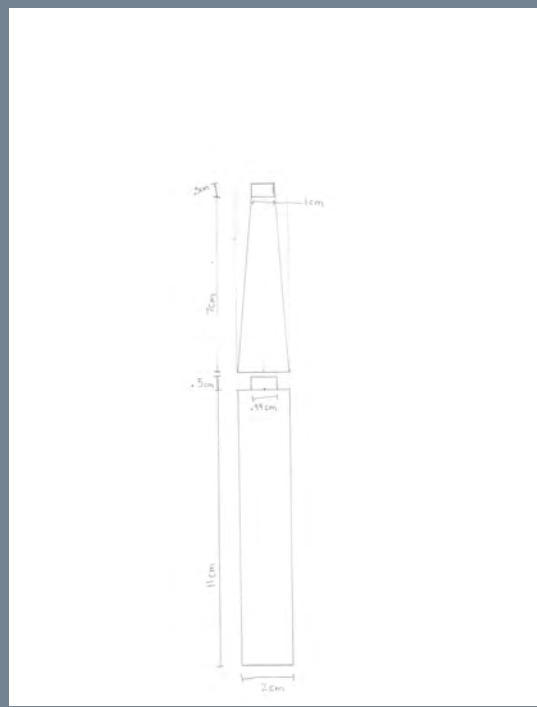
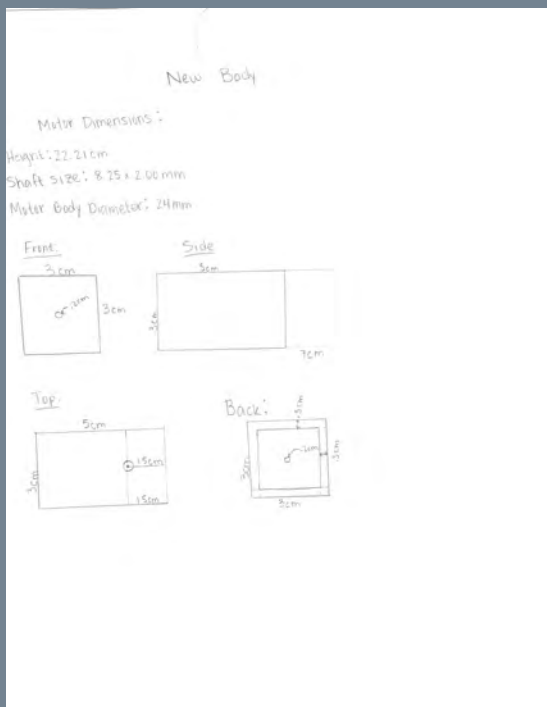


Side View



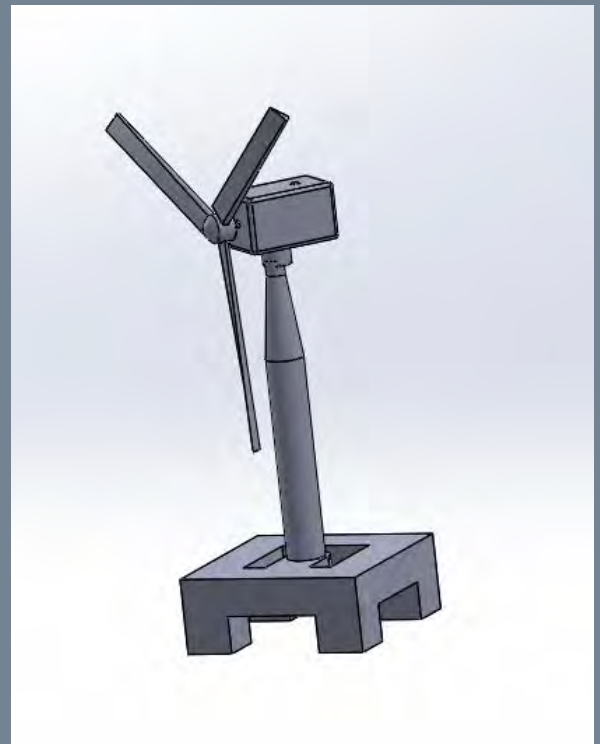
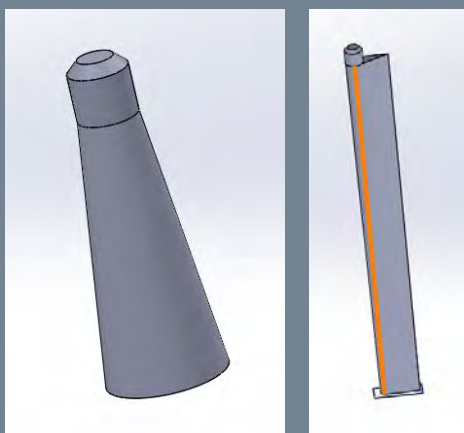
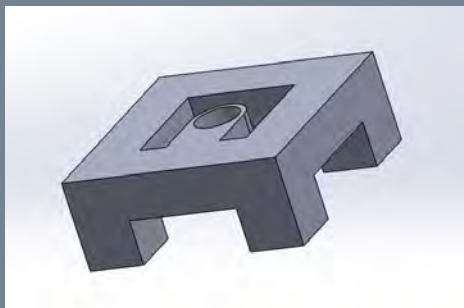
Approx Dimension of motor

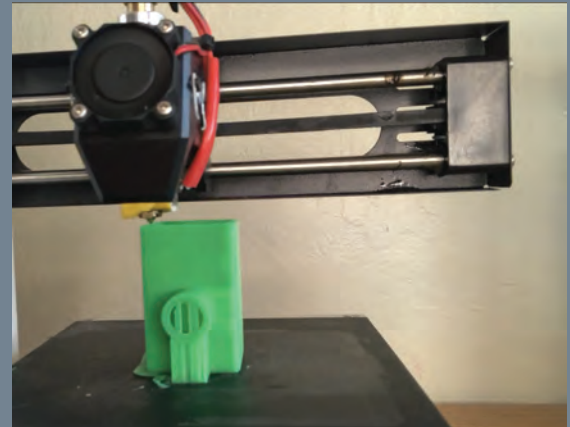
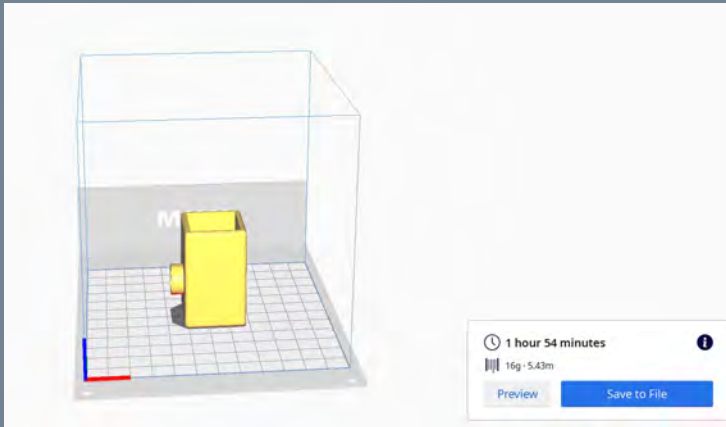
I began setting my parameters based on the size of my 3D printer and from there I chose dimensions I thought fit best.

## Modeling



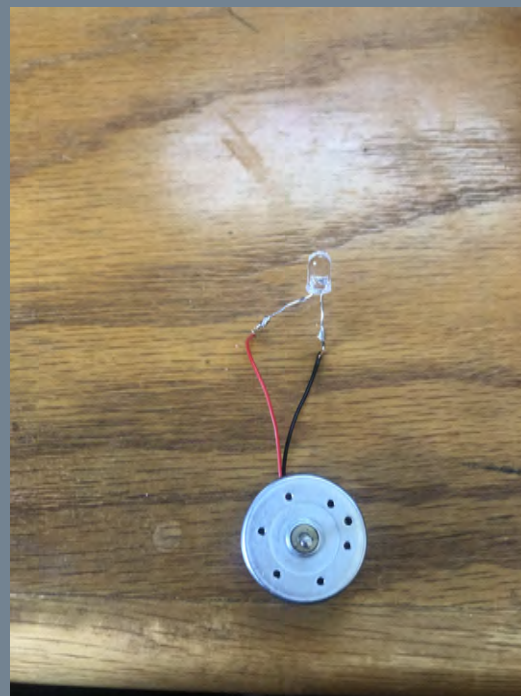
After finalizing the dimensions, I modeled them on Solidworks. I spent most of my time here because of design and dimension changes.

# Printing



After I finished modeling on Solidworks, I saved the file as an STL file type, uploaded the file into the 3D printing software called Cura, saved the file as a gcode, uploaded the gcode into a micro SD card, inserted the card into the printer, and printed the parts.

# Soldering



I purchased a mini generator and soldered a LED to it creating a simple circuit.





# Issues

## Getting the Dimensions Right



In the attempt to get the dimensions just right to fit together like legos, a lot of prints were made. Getting the dimensions just right ended up taking most of the project time.

## 3D Printer Wire Rupture



As I was starting to test the dimensions, I discovered a wire that's essential to the printing process ripped but luckily a quick solder fixed it.

# Behind the Scenes



