

# SUSTAINABLE CAPSTONE PROJECTS ( SCAP )

## FALL 2024-2025

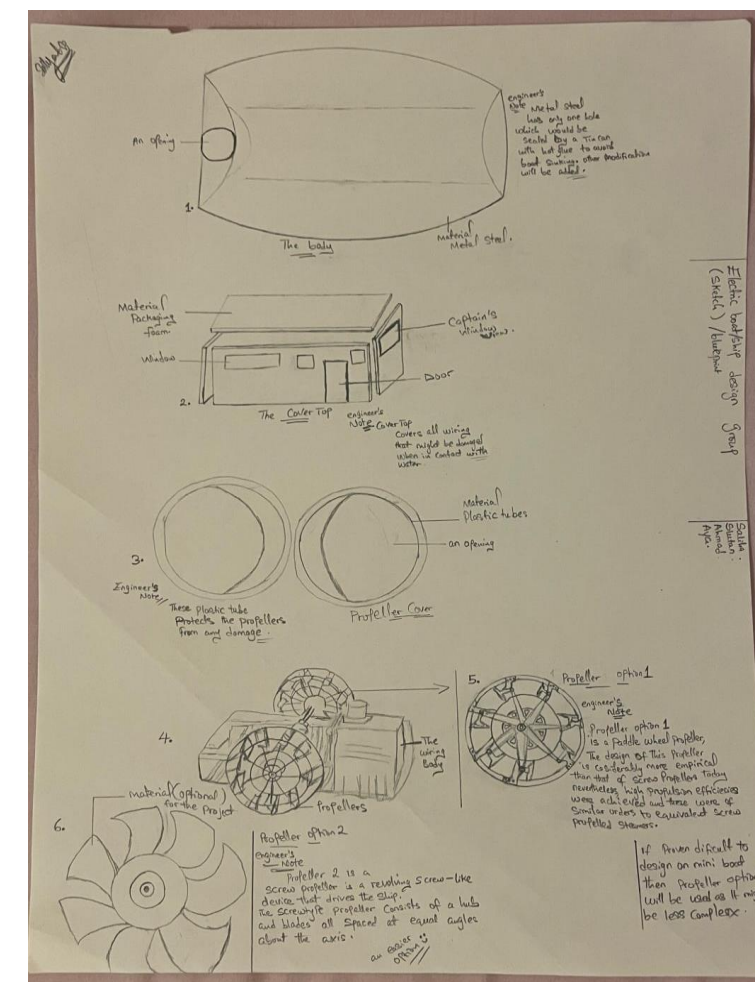
### Electric Boat Design Construction and Testing

#### GROUP MEMBERS

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#### INTRODUCTION

##### Concept



##### Electric Boat Concept: Sustainable *Scrap-Powered Elegance*

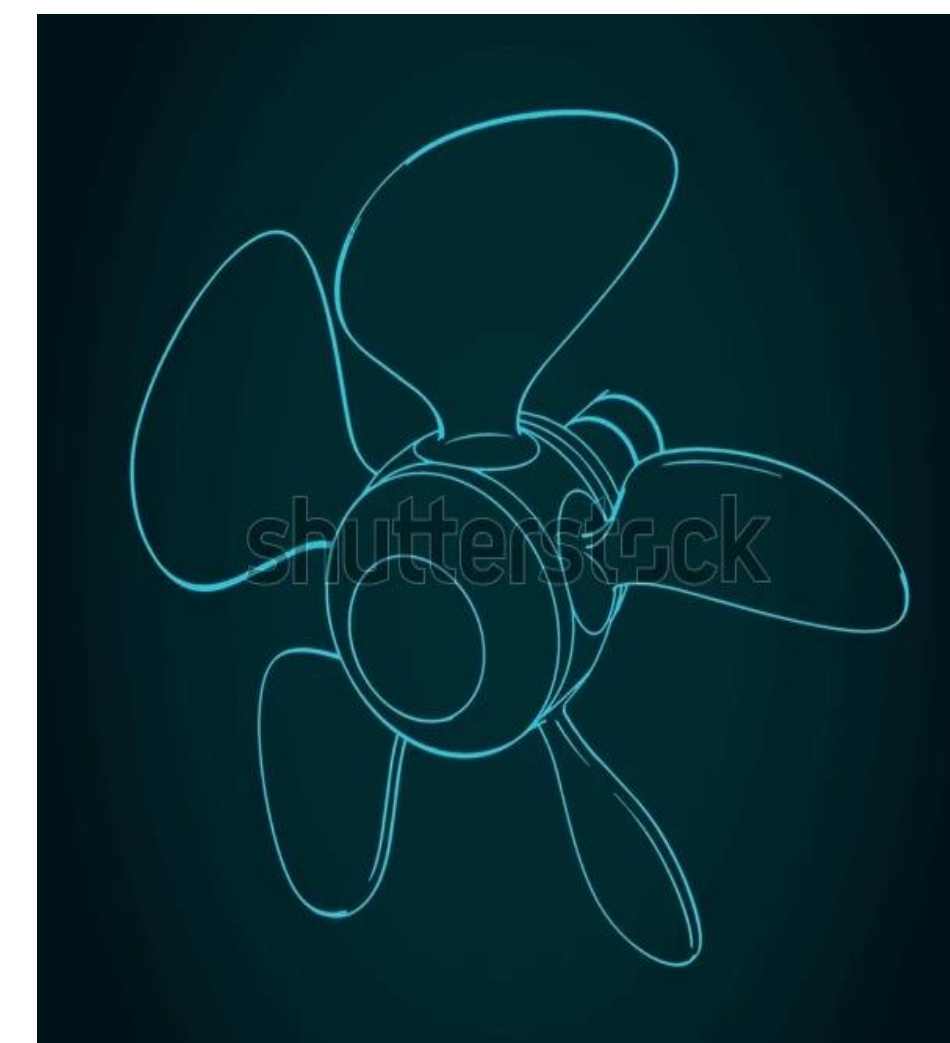
Our project is a fully electric boat designed with sustainability at its core. Built using reclaimed and repurposed materials, such as lightweight aluminium panels, recycled wood and salvaged plastics for body reinforcements, the boat combines eco-friendly construction with modern functionality.

The propulsion system uses a compact, high-efficiency electric motor powered by battery, ensuring zero emissions during operation.

This boat is a testament to innovative design, proving that sustainable scrap materials can create a durable, efficient, and environmentally conscious watercraft. Its quiet operation and clean energy source make it ideal for use in eco-sensitive waterways and for promoting green technology in transportation.

##### Project goal

The goal of this project is to design and build a functional electric boat using sustainable scrap materials, demonstrating the potential of eco-friendly innovation in transportation. Through this initiative, we aim to reduce environmental impact by repurposing waste, promote renewable energy solutions, and inspire sustainable engineering practices. Our project seeks to highlight the viability of combining sustainable design with efficient technology to create a cleaner future for water transportation.



**Screw Propeller for the Electric Boat**  
The electric boat uses a screw propeller as its propulsion mechanism, converting rotational energy from the electric motor into thrust. The propeller is crafted from durable, lightweight materials sourced from reclaimed metals or composites, aligning with the project's sustainable ethos.

This integration of a screw propeller supports the boat's sustainable mission while ensuring reliable and efficient performance.

#### FINAL PRODUCT

The final product is a fully functional electric-powered boat ***built with sustainability and efficiency in mind.*** It features:

**1. Eco-Friendly Construction:** The boat's frame and body are crafted from repurposed and recycled materials, such as a small baby bath tub, recycled wood and toothpicks, foil tape, package cushioning, and plastic and metal tubes. All of these put together demonstrating innovative reuse of waste materials.

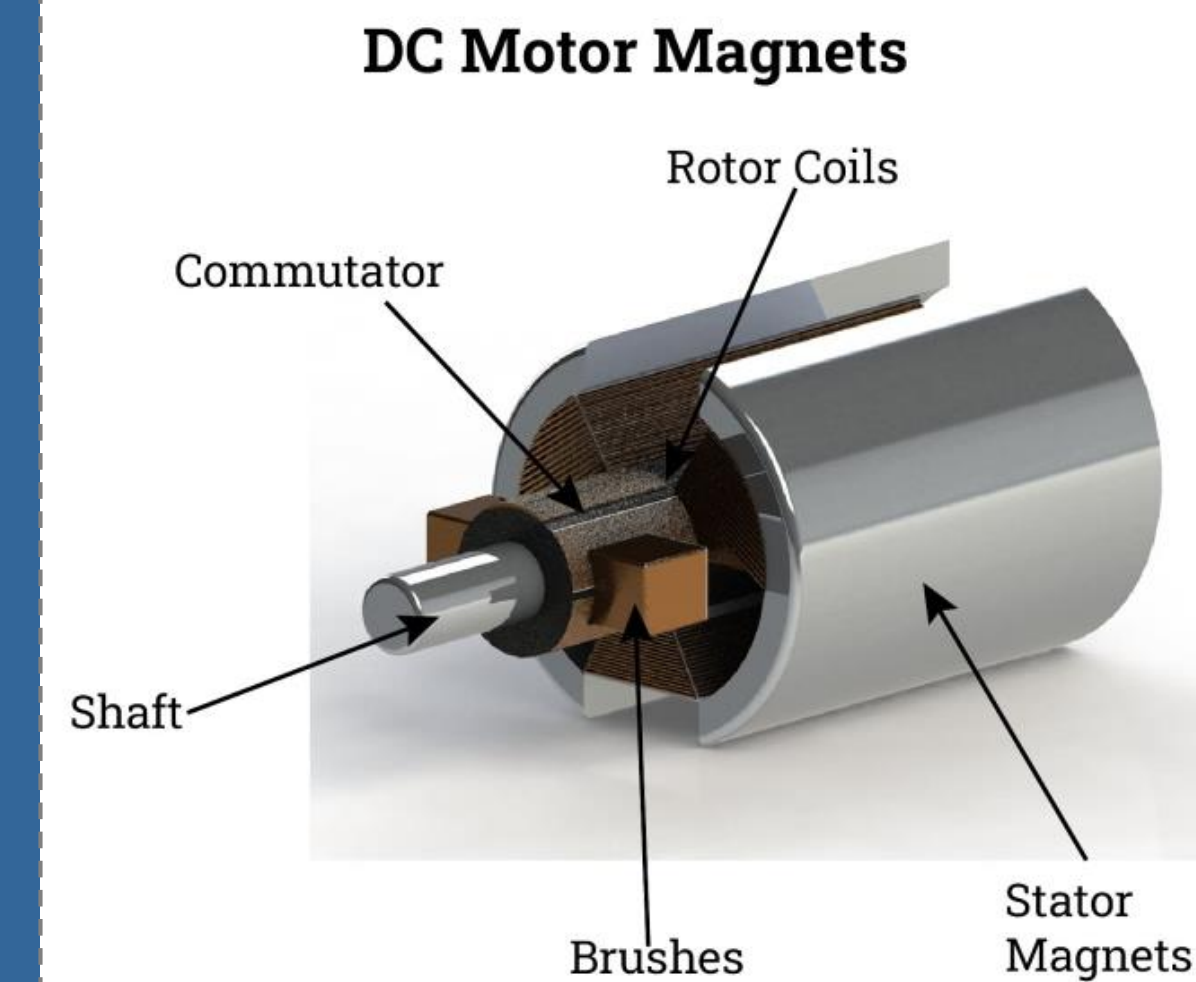
**2. Electric Propulsion System:** Powered by a compact electric motor, the boat operates emission-free, running on energy stored in a changeable battery system.

**4. Screw Propeller Design:** The reclaimed-material screw propeller ensures smooth and efficient water propulsion, emphasizing performance and sustainability.

**5. Modern Features:** Equipped with a user-friendly control system, safety features like space-efficient seating.

This project successfully showcases how sustainable design, renewable energy, and innovative engineering can merge to create an environmentally friendly alternative for water transportation.

#### RESULTS AND DISCUSSION



During the project, we faced significant challenges with the old, used DC motors. They were difficult to work with, requiring constant replacements to achieve reliable performance. Additionally, assembling the components proved challenging due to a malfunctioning glue gun, forcing us to rely heavily on superglue for most of the construction. Despite these setbacks, we managed to overcome the difficulties through persistence and problem-solving, successfully completing the electric boat.



#### CONCLUSIONS

This project successfully demonstrated the feasibility of building a functional electric boat using sustainable scrap materials. Despite challenges with unreliable DC motors and assembly issues, our persistence and adaptability allowed us to overcome these obstacles. The final product highlights the potential of combining renewable energy and recycled materials to create environmentally friendly solutions for transportation, inspiring future innovations in sustainable engineering.

#### REFERENCES

How To Make RC Boat Using PVC Pipe At Home  
[https://youtu.be/AjzB1ZV07hc?si=Ptnzg5haqcpZYt\\_il](https://youtu.be/AjzB1ZV07hc?si=Ptnzg5haqcpZYt_il)

#### MATERIALS USED IN CONSTRUCTION

##### Re-Used/Recycled Materials:

- DC motor (reused)
- Baby bath tub (recycled)
- package cushioning (recycled)
- Wood (reused)
- plastic and metal tubes(Recycled)

##### Other Materials:

- Foil Tape
- Tooth picks

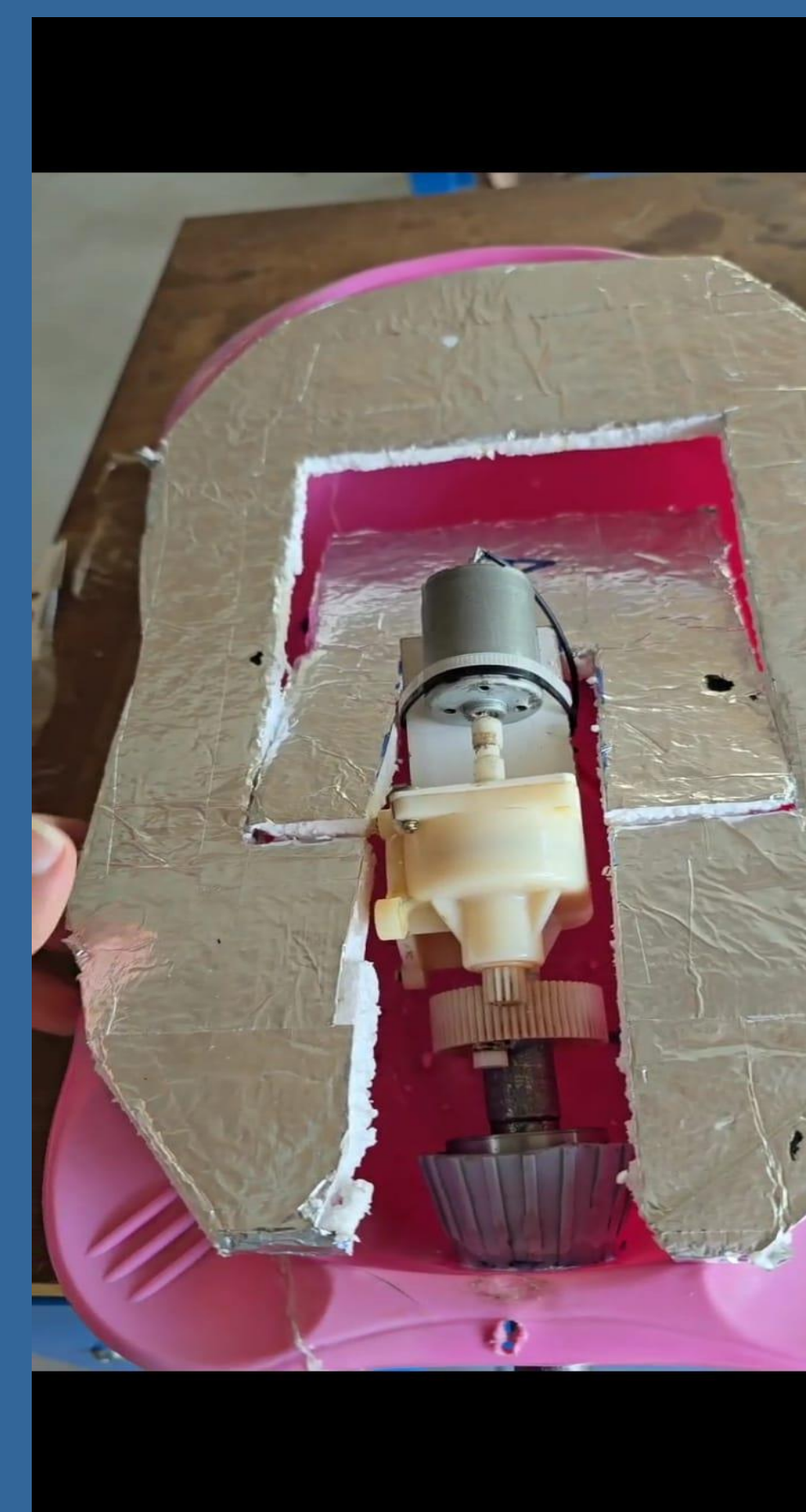


Figure 1. Covering the electric propulsion system.



Figure 2. Testing the Motor to be certain it does not malfunction...again.