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**MEC 299**

**PROPULSION SYSTEM DESIGN OF SOLAR BOAT**

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## **ABSTRACT**

This project is about utilising CAD software to design a solar boat propulsion system. A solar boat is a maritime solution for combating global climate change. CAD is an excellent tool for designing propulsion systems and analysing resistance. The problem statement is that a solar boat must carry a large load of batteries and solar panel, making it difficult to travel long distances, thus it must be thoroughly analysed to make it efficient in travelling resistance. The goal of this project is to use CAD software to construct the propulsion system and analyse the resistance of the solar boat. To achieve the goal, we must use PolyCAD to produce a model of the boat, as well as PolyCAD and Rhinoceros to develop general arrangements and weight estimates. The expected outcome is that the propulsion system will be designed successfully and resistance from the propulsion system will be analysed.

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# CHAPTER 1

## INTRODUCTION

### 1.1 Background of Study

The human population is heavily reliant on fossil fuels. Almost all vehicles that facilitate human mobility run on fossil fuels. Electricity producers, on the other hand, are dominated by fossil-fueled generators, such as oil or coal. Scientists, ironically, classify fossil fuels as non-renewable energy resources. This means that there will be no more oil or coal in the globe at some point in the future, and people will be unable to use a vehicle or electric equipment if there is no substitute for fossil-fueled technology.

Renewable energy is studied by researchers in a variety of sectors, including marine engineering. Designing ship propulsion systems and ship electrical installations is one of the responsibilities of a marine engineer. A diesel engine is used in the traditional ship propulsion system, and a diesel generator is also used in the traditional ship electrical system. Both of these instruments require a significant amount of diesel fuel. As a result, marine engineers were in charge of creating renewable energy-based technology for ship electrical sources and primary propulsion systems in order to keep ships running when petroleum became scarce. Because of the volatile price of oil, using renewable energy-based technology may help lower ship running costs.

Because ships are such an important mode of transportation, research into renewable energy in ships is critical. The ship is not only important for people transportation, but it is also a very efficient vehicle for logistics distribution. Solar energy is one renewable energy option that has seen a lot of development in ship applications. A solar panel, also known as a photovoltaic (PV) panel, is a solar energy converter that runs quietly and, unlike a wind turbine, does not have any revolving pieces that could impair ship stability.

Solar power is one of the best ways to save money on gas while having a minor impact on the environment. Many factors must be considered when building a solar-powered boat, including the electric motor's speed and torque, energy efficiency, energy consumption, energy storage capacity, and the boat's design.

Furthermore, due of their low emissions and great efficiency, the electric boat contributes to environmental health. The solar boat system also aids in the reduction of energy waste and the maximisation of energy output. It can be accomplished by combining the system with a few devices that can detect ambient light intensity in order to maximise solar energy harvesting. Solar energy is captured using a solar panel and then stored in a battery that can hold a huge amount of electricity for extended periods of time, perhaps replacing diesel engines.

Currently, all of these vessels are propelled by a different method of propulsion. One of which has profited from solar energy usage. Solar energy is a technology that uses the Sun's radiant light and heat to generate electricity. Over the years, solar energy has been widely utilised in a variety of traditional technologies. Consider how you could use the Sun's energy to warm water and generate power with a heat engine.

Photovoltaic (PV) energy has been widely used in marine vehicle applications, either as a primary, auxiliary, or hybrid energy source. In the case of a solar-powered boat, when PV energy is used as the major source of energy to provide the energy needed for propulsion, the ship design must be low-power. Another consideration in the construction of a solar-powered boat is the cost of the PV system; with the proper choice of PV system size, the lowest cost can be achieved.

SWATH (Small Waterplane Area Twin Hull) technology makes use of underwater hulls, which allow the vehicle to move smoothly even in relatively high waves. By improving the underwater shape of these hulls, the possibility of comfortable low-drag ships with electrical or even solar propulsion becomes a reality.

## **1.2 Problem Statement**

Solar boats have a number of issues to deal with, as well as some other factors to consider. There are numerous issues with regular electric-powered boats. One alternative source that may be able to alleviate this problem is the solar electric boat. It must not be neglected as it is important factor for the boat to function well. The propulsion system that will be used for the solar boat must be chosen in order to calculate the force of resistance. The propulsion system needs to be stabilised in order to improve boat control and performance. In order for the boat to have a decent