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MEC299

Resistance prediction of Solar Boat in calm water using Computational Fluid Dynamic Approach

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TABLE OF CONTENTS

1.0	**Introduction**	**5**
1.1	Background of Study	
1.2	Problem Statement	
1.3	Objectives	
1.4	Scope of Work	
1.5	Significance of the Project	
1.6	Expected Results	
2.0	**Literature Review**	**8**
2.1	Swath hull	
2.2	COMPUTATIONAL FLUID DYNAMIC	
2.3	SHIP RESISTANCE	
2.4	Numerical method	
3.0	**Methodology**	**14**
3.1	Modeling	
3.2	Engineering calculation	
3.3	Flowchart	
3.4	Preliminary Results	
3.5	Project Planning (Gantt Chart)	
4.0	**References (IEEE/APA format)**	**19**

1.0 Background of Study

Solar boat is different kind of boat than normal standard boat. It is because the engine that run the boat will using different type of energy. Solar boat will use electricity rather than popular choice that is diesel engine. We could say that the birth of solar boat come from a normal electric boat. Solar boat is very eco-friendly to the environment than conversional boat since the power source itself cleaner and more renewable than diesel that we obtain from petroleum. Diesel engine also will produce carbon dioxide (CO2) that heating up our earth. Our planet currently facing up global warming issue that melt the ice south pole that make water sea level keep rising each year. Even solar boat is a good way to combat to save our planet, but it is very hard to be implement.

1.1 Problem Statement

The issue that are that solar boat are very power limited than conversional boat. It is because the boat itself run with a rechargeable battery that can only be charge using the solar in the daytime. Analysis of its swath hull is very important for solar boat to have a more travel distance. Solar boat usually had a catamaran hull, but this experiment will use swath as hull for the solar boat. Analyze swath is quite difficult since it similar like catamaran but a little bit difference since it torpedoes need to be underwater because of this the boat will have a big drag. It makes solar boat to have very limited travel distance. Computational fluid dynamic "CFD" need to be use properly since analyze resistance of swath hull itself could make boat designer the it designs so it can fix it design to be more efficient and effective to be use for the solar boat.

1.2 Objectives

The main objectives of this project are:

1) To analyze the resistance that solar boat produces in calm water using CFD Software
2) Calculate pressure distribution of swath hull.

1.3 Scope of Work

This research will focus on how analyze boat that going to cover research and development in mechanical engineering from marine side in resistance side using CFD. I'm going to use CFD software to run some simulation that could replicate closed to real world scenario. The CFD software that we will to run simulation to get our data will be CFD software. First, I model solar boat by using polycad that is a free cad program specified for design our ship. The boat will need to have general arrangement, for this task I will use free cad to do it. For analyze our data that we get from **CFD,** I'm going to use Microsoft excel to plot the graft from the data. Excel also could make my analysis easier to be compare with each data we get.

1.4 Significance of the Project

The study important because we know that solar boat is very ecofriendly with environment. The research that will do is very fundamental for a boat development. Resistance have a very big impact on a solar boat. Solar boat is very dependent on the battery and solar panel to run the boat. Meanwhile old school boat is very reliable since it run with diesel that easy to get access its modern day. But our petroleum not going to last forever it. So, the optimize and less resistance solar boat more miles it will go. So CFD is very crucial to make this project to success. This project will show how reliable and accurate CFD that will encourage solar boat market be more affordable.

1.5 Expected Results

These are some expected result

1.The boat will be model using polycad and general arrangement will be done in CAD

2.The Resistance data will be obtained by using ANSYS CFD.