



اَوْبُو سَيِّدِي تَكْوَلُو كِي مَارَا
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**UNIVERSITI TEKNOLOGI MARA
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MEC299

**HULL DESIGN & STABILITY ANALYSIS OF SOLAR
BOAT**

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CHAPTER 1

1.0 INTRODUCTION

1.1 BACKGROUND STUDY

Since 19th century, people all over the world use and depend on fossil fuels for almost all vehicles and machines. To ease human mobility, almost all vehicles are powered by fossil fuels[1]. Back in 19th century, gas was being used for street lighting in London. Nowadays, the main purpose of fuels is to generate electricity, providing 40% of the world 's electrical power supply in 2005. During Industrial Revolution, the consumption of fossil fuels increased and were rapidly adopted all around the world because they were flexible and concentrated than traditional energy such as water power.

Since that, most countries around the world burning fossil fuels to generate power but end up causing climate change. This can lead to global warming as carbon dioxide is released into the atmosphere causing more heat is trapped on earth through the greenhouse effect[2]. With the increasing human population around the world, the primary sources of fuel are limited in stock caused by consumption of fuels since it is non-renewable energy. This means one day, fuels and coals will run out and we can no longer use that in cars, boats, machines and others. Besides, burning fossil fuels can caused air and water pollutions which is harmful to people.

Researchers in various fields all around the world including marine engineering are studying about renewable energy. One of them is sun by using application of solar since it is renewable energy, eco-friendly and easy to get from nature. The application of solar on the boat is a great idea. It can reduce the consumption

of fuels but not cut out the fuels usage completely. We choose SWATH boat as our design. SWATH boat is a great design as it minimizes hull cross-section area at the sea's surface and give maximum amount of balances of buoyancy of the ship. By using the advantages of SWATH boat, we can put solar and engine on the boat without having to worry about flip over and unstable.

1.2 PROBLEM STATEMENT

Although choosing SWATH as main design, there are pros and cons about it. One of them is expensive. The cost for a solar panel in Malaysia is nearly RM15000. This is because Malaysia has higher living costs and more expensive labour costs than its neighbouring countries. SWATH also requires higher maintenance cost than other boat. Besides, it has limited payload capacity, tends to have deeper draft and sensitive to payload.

1.3 OBJECTIVES

1. To learn and design how to make a boat using PolyCAD by studying the hull design.
2. To analyze and calculate the stability of boat to prevent it from fall over.

1.4 SIGNIFICANT OF STUDY

Nowadays, price of fuels become a little bit pricey since it limited and become burden to people especially Malaysian. Unlike country like Korea, Japan and others which use public transport such as train, bus and others while mostly Malaysian depend on personal vehicles on their daily routine. According to studies, Malaysia's air quality have been dominated by three major sources of air pollution from mobile sources, stationary sources and burning sources for the few decades. Emissions from vehicles have been major source of air pollution, contributing to at least 70-75% of the total air pollution[2]. This will affect to the public health and environment especially for children asthmatics, elderly and others. Besides, Malaysia become one of the largest natural gas production in the world. Hence, it becomes one of the main Malaysia's income sources. Recently, Malaysia faces petrol shortage in some places due to overwhelming demand in some places[3]. In a few decades, Malaysia probably will run out of petrol and cannot generate income from it.

Since the fuels is nonrenewable energy, researchers seek the alternative ways to reduce the consumption of fuels by looking for renewable energy such biomass, wind, water and others. So, we decide to use application of solar technology on our boat. Since it is renewable source, we can easily get it from nature especially on the open sea. We also put diesel engine as a backup plan in case we cannot get enough energy from sun especially in rainy day. Solar technologies convert sunlight into electrical energy either through photovoltaic(PV) panels or through mirrors that concentrate solar radiation[4]. This energy can be used to generate electricity or be stored in batteries or thermal storage. Solar is also eco-friendly. Thus, we can prevent and reduce air pollutions which is harmful to human and nature.