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MEC299

**HULL DESIGN AND STABILITY
OF AMPHIBIOUS BOAT**

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ABSTRACT

Amphibious boats were developed to deal with the issue of natural disasters such as floods in the city. These amphibious boats are a great alternative during floods in the city as there is no place to launch lifeboats. This study will help many people, especially when it involves floods because these ships can save flood victims. This research was conducted to provide convenience to rescuers while performing rescue activities. This is because boats are usually parked in rural areas, as floods usually occur in rural areas. Thus, the existence of this study can ensure the safety of the public during floods. The hull design for the amphibious boat as well as the stability of the boat for this project will be obtained during the completion of this proposal.

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CHAPTER 1: INTRODUCTION

1.1 Background of Study

This project focus on the Hull Design and Stability of Amphibious Boat. An amphibious boat is a means of transport viable on land as well as on or under water.[1] The first known self-propelled amphibious vehicle, a steam-powered wheeled dredging barge, named the Orukter Amphibolos, was conceived and built by United States inventor Oliver Evans in 1805, although it is disputed to have successfully travelled over land or water under its own steam.[1]

Boats come in a wide variety of shapes and sizes and so do their hulls. Despite the variety, all hulls are designed to do one of only two things either displace water, or ride on top of it, which is called planing.[2] These planing hulls are designed to rise out of the water as they reach higher speeds.[3] The amphibious vehicle's design process captures the functionality relating to aerodynamics, structure, and performance standards. Currently, there are only 4 companies in the world who manufacture amphibious boats spread across the 5 continents from East to West such as Sealegs, ASIS Boats, Iguana Yachts and Ocean Craft Marine.[4]

These boats were created to help solve the problem of natural disasters such as floods in the city. This is because in the city there is no space to launch a lifeboat, so this amphibious boat is a suitable alternative when facing floods. The amphibious rigid inflatable boat is most suitable to be used to access roads or areas cut off by floods.[5] A lot of people will receive benefit from this study especially when floods hit because of this boat was able to rescue flood victims. These benefits mean it is an asset that should be owned by all first responders, civil defence and rescue departments. [6]

1.2 Problem Statement

When natural disasters such as floods occur in a place such as in an urban area with a lot of rapid development, there are no facilities to launch boats to rescue flood victims. If there is no such facility, then it is quite difficult for the rescuer to perform the rescue process. Therefore, the authorities need to think of other methods so that the rescue process can be done such as amphibious boats that can rescue people faster than regular boats because these amphibious boats can move on land and water which can facilitate everyone. To overcome the problems, the study about amphibious boat can help to solve the problems encountered. Amphibious boats can also be employed on roads or canals where wheeled transit would be inefficient owing to terrain or traffic congestion. Amphibious boat is a boat with wheels or a boat that has

capabilities to go over land whether designed with wheels or tracks transferring from one medium to another without trouble or obstacle at any time.[7]

Contrary to popular belief, an amphibious boat has a more sustainable total impact than a regular motorboat. To begin with, amphibious boats do not require any infrastructure to operate. Second, it spends less time in the water and does not require the use of hazardous materials in the hull. Finally, amphibious boats are easy to maintain and are composed of sturdy materials that can have a tremendous impact on land and at sea.

In conclusion, perhaps these amphibious boats are more often used for recreation but can also be used as lifeboats to help in the event of a natural disaster. Without this boat then the people who drowned during the floods in the city center could not be saved because this boat is indeed important during a disaster. Therefore, the purpose of this project is to get the design of the boat to get the stability analysis so that the boat to be made does not experience any problems during the rescue process takes place.

1.3 Objectives

The main objective of this project are:

1. To produce a suitable hull design for amphibious boat by using PolyCAD software.
2. To analyse the stability of the amphibious boat using PolyCAD software.

1.4 Scope of Work

The scope of work in this project are:

1. To create the hull design using software PolyCAD to get the data about stability of amphibious boat.
2. The duration of this study is 10 weeks using topics and theories that will be discussed in this proposal.
3. To obtain the dimensions of amphibious boats to help the community when natural disasters occur so that no accidents occur during the rescue process.