REMOTE CONTROL POWERBOAT II
(BOAT CONSTRUCTION AND ENGINE INSTALLATION)

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To everybody, with my love and appreciation

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In the name of ALLAH, the Almighty, the most Gracious and the most Merciful.

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Special thanks goes to powerboat builder, Mr.Latif Osman for his help and opinions in constructing the *Remote Control Powerboat II.*

I would like to thanks Ms. Diana ak Spenser for her cooperation and contribution completing this project. Last but not least, I would like to thanks the technician Mr. Zakaria Idris and Mr. Wan Abu Bakar, my friend Kamaruldzaman, Fammy and Hassan.

To my beloved parents, thank you for understanding me.

ABSTRAK

Sistem alat kawalan jauh, merupakan satu cabang di dalam bidang elektronik yang digunakan secara meluas dalam kehidupan kita seharian. Projek ini merupakan projek bot kawalan jauh berkuasa tinggi yang mempunyai kuasa enjin 33 c.c. Projek ini menerangkan secara khusus pembinaan sebuah bot kawalan jauh yang menggabungkan kemahiran di dalam bidang elektronik dan mekanikal. Disamping itu, projek ini juga menerangkan secara ringkas operasi alat kawalan jauh dan mekanikal di dalam bot tersebut. Projek ini melibatkan 3 proses utama iaitu merekabentuk rangka bot, alat kawalan jauh dan sistem enjin.

ABSTRACT

Remote control system device is one of the branch electronic fields, which are widely used, in our daily life. This project is a remote control powerboat with engine 33c.c. In this project, it explain in detail about the construction of the remote control powerboat which combines electronic and mechanical skills. Beside that, it also explain briefly on the remote control and mechanical operation of the boat. There are 3 main processes in building this project, which involved the designing of the mainframe of the boat, the remote control and the engine system.

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CHAPTER 1

INTRODUCTION

1.1 Background

In the technological era, remote control system is widely used to ease our tasks. The remote control system can be implemented in a wide range of electronic devices such as the appliances (TV, radio) and also used in the manufacturing industrial whereby the system is used to control all the equipment like the one used for controlling welding hand robot in automobile industry and many more.

Nowadays, there is a new trends where people, not only the youngsters but also the middle aged man, focusing their interest in a prestige and expensive hobby, which are the remote control cars, planes powerboats and robots. It comes in a wide variety of shapes, speeds and prices (usually expensive).

Even though this hobby is expensive, there is another alternative to make it affordable that building it our self, starting with designing it shapes, and then install all its electronic and mechanical parts.

In this project, I am focusing in modeling a remote control powerboat that uses a bush cutter engine. By using the gasoline engine, the cost of modeling the boats can be reduces.

This is because it uses only petrol to operate. Standard powerboats that are using nitro engine are very expensive in term of fuels and its components. It is expensive due to its small, less noise and light weight components differs from the gasoline engine that is heavy, bulky and produces a lot of noises. For the body of the boat, probably I choose to build it from plywood and fiberglass.

1.2 Project Overview

This project is called 'Remote Control Powerboat II'. The purpose of this project is to develop a remote control powerboat and will be done by two persons. This thesis will cover the designing of the powerboat body including the engine and the remote control section will be done by my friend Diana ak Spenser. For the design of powerboat model, I will use the materials such as plywood and fiberglass. For the engine, I will use 2-stroke bush cutter engine. The servo will control the accelerator and the direction to turn left and right the powerboat. With that, the main objective of this project is to study, understand, design and build a remote control powerboat, which includes:

a) Design the powerboat model using plywood, fiberglass and other materials.
b) Study the 2-stroke bush cutter engine.
c) Study and understand the operation of remote control circuit such as how the circuit works.
d) Expose to the real practical experience design and implement engineering skills.

This part (above) has been implemented in Thesis 1, where as in Thesis 2 include:

a) Building the powerboat using plywood, fiberglass and other materials.
b) Test the powerboat.

Finally, the whole findings, i.e. literature review, designs, test results and so on will be documented and compiled into one Thesis report.

1.3 Objectives

1. To investigate the design of a powerboat shape.

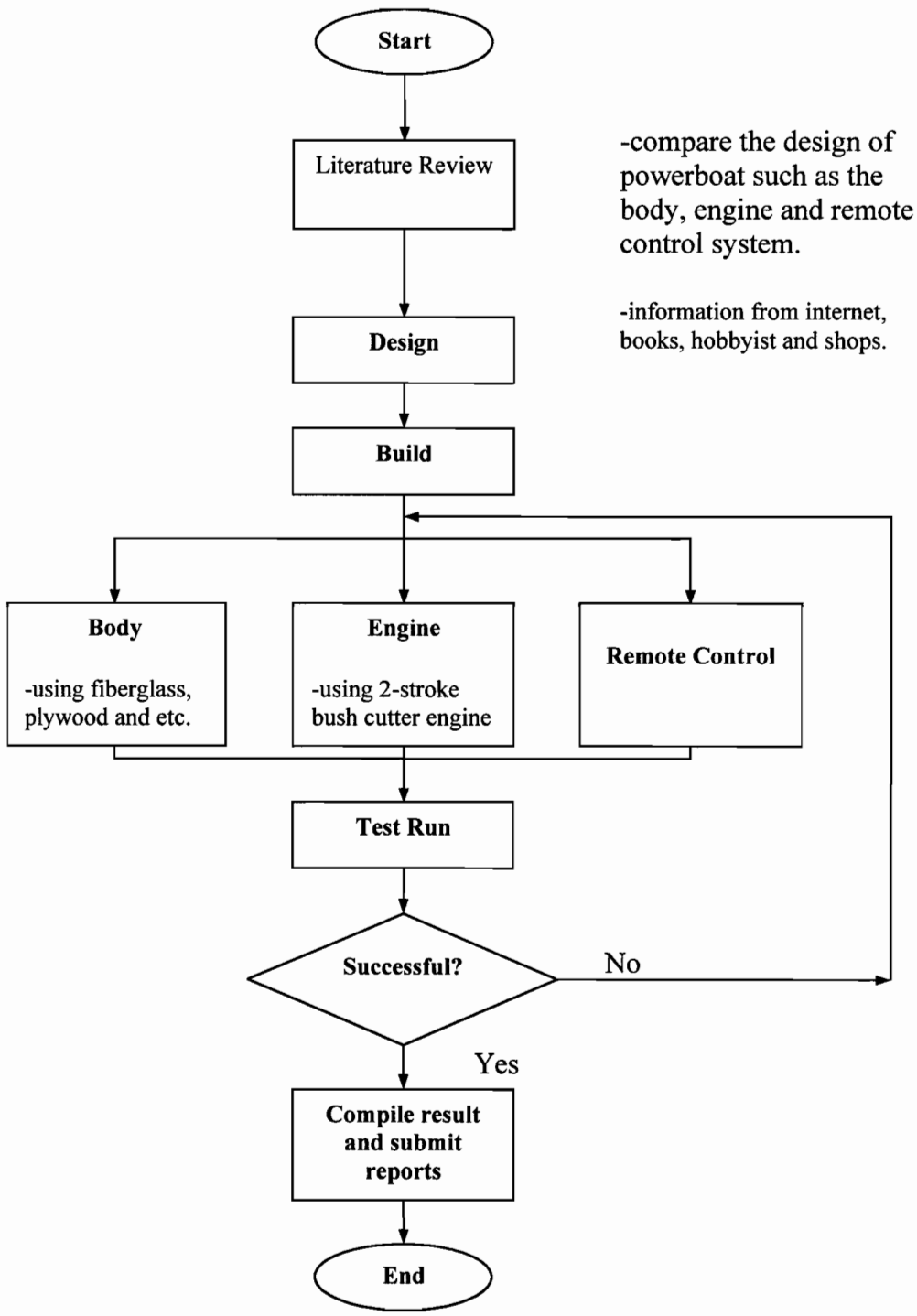
2. To study and analyses the various types of bush cutter engine and select one suitable for this project.

3. To analyze the basic functional operations of transmitter and receiver of an existing remote control system.

4. To build and test the powerboat.

1.4 Methodology

In order to complete this project, the method chosen is as in chart 1 below.



CHAPTER 2

LITERATURE REVIEW

2.1 The Types and Styles of Boat

There are several different types of powerboat available. The hull is the obvious part of the boat. The hull makes a direct contact with the water and supports the mast and fittings on sailboats, the engine, strut, drive and rudders on motorized boats. R/C boats may be classified in two main types:

2.1.1 Mono

The type of boat which bottom surface offers a continuous wet surface when running. The hull is a one piece, shaped like a "V", normally found on real boats. Their inner space eases the installation of any type of engine.

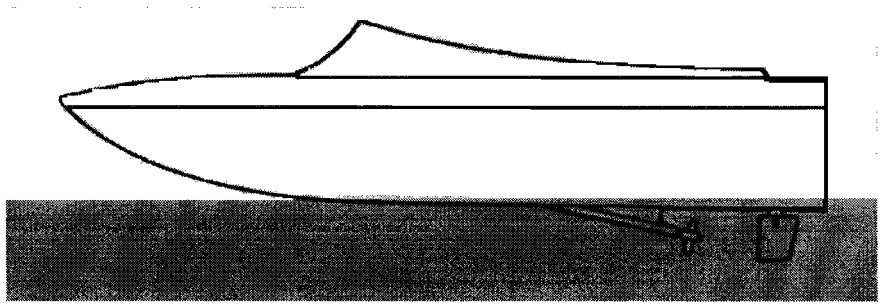


Figure 2.1.1 (a) Mono hull boat basic design

The mono hull types can be classified as:

2.1.1.1 DeepVee

The angle between a horizontal plane and the hull varies from 16° to 28°. By design they tend to cut the water when running and so are known for their good handling, easy drivability and the ability to handle rough or choppy water [5].

Figure 2.1.1.1 Deep Vee mono hull style

2.1.1.2 Monohull (shallow V)

The angles is not higher than 16°. This design more faster than Deep Vees, although more tricky to adjust and run [5].

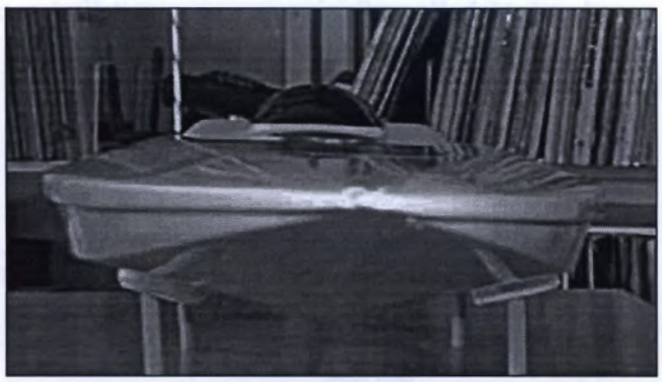


Figure 2.1.1.2 Shallow V mono hull style

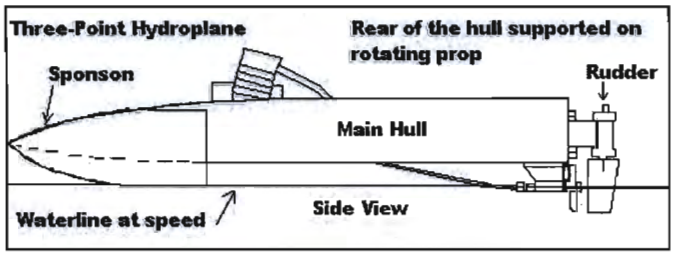
2.1.1.3 Cracker box

Based on the full size APBA hull the cracker box has a very flat to 3 degree V hull. This design tends to side-slip on turns and requires skill to drive well [5].

Figure 2.1.1(d) Cracker box mono hull style

2.1.2 Hydroplane

The other hull types are generically called hydroplanes. They are hulls with sponsons and run on water over 3 or more surfaces not contiguous. The drawing bellow clearly shows the difference to the former model [5].



The hydroplanes types can be classified as:

2.1.2.1 Hydro

This design consists of two sponsons at the front and normally running on the prop at the rear end. They are fast boats and very critical to adjust and drive.

Figure 2.1.2.1 The Hydro boat style

2.1.2.2 Catamaran

The catamaran hull consists of two hulls called "sponsons" joined by an elevated superstructure containing the drive and control components. The elevated superstructure creates a "tunnel" and the wind passing through the tunnel creates a lifting effect on the hull reducing drag and increasing performance. Catamaran hulls are typically faster and easier to drive than other hydro hull types, although more critical than monos on those conditions [5].