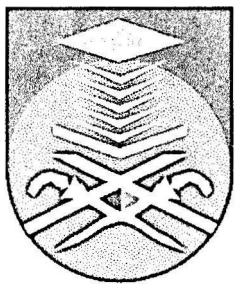

DEVELOPMENT OF A FRICTION AND WEAR TESTING MACHINE; FABRICATION

MUHAMMAD RIDHWAN BIN SIKH OMAR

(2002333734)

A thesis submitted in partial fulfillment of the requirements for the award of Bachelor Engineering (Hons) (Mechanical)

Faculty of Mechanical Engineering

Universiti Teknologi MARA (UiTM)

NOVEMBER 2005

ACKNOWLEDGEMENT

Praised be to Allah for all His gifts, gracious and merciful.

First of all, I would like to take this opportunity to express my gratitude and appreciation to my honorable supervisor, Associate Professor Dr. Darius Gnanaraj Solomon for his continue support, generous guidance, help, patience and encouragement in the duration of the thesis preparation until its completion. I feel so glad and lucky to have such a good advisor likes him and without his continuous support, I do not think that I could complete my final year project accordingly.

My deepest appreciation is convey to head researcher for LRT brake pad project's, Professor Dr. Mohammed Nor Berhan, for his continuous support especially in term of financial and approval.

I also like to acknowledge Mr. Fazli and Mr Johari, sheet metal workshop attendants, Mr. Farid, welding workshop attendant, Mr. Ziyaidi, strength laboratory attendant, Mr. Hazleen, computer laboratory attendant, library attendants, hardware and auto part dealers and other people who have helped and gave full cooperation to me.

Last but not least, thank you very much is extending to all my family members and friends especially to my classmates for their understanding and supporting either materially, morally or even ideas in making this report even better.

ABSTRACT

This report is about development of a pin on disc, friction and wear testing machine. For this project purposes, a flat mating surface between the disc and the specimen is focused. The scope of the project are to fabricate a machine where it can hold a brake pad material having a rectangular shape of size 10mm x 10mm with operating speed of 95 rpm with up to 200N load and conducting a friction and wear test in wet condition. This report gives some literature survey about the machine, its advantages and disadvantages over other types, shown technical drawings for each component and complete fabrication in forms of CATIA and AutoCAD, procedures in conducting friction and wear test in wet condition and also the data analysis. In this report, related information from many sources such as books, websites, catalogs and lecturers (through discussion) about friction and wear are provided.

TABLE OF CONTENTS

CHAPTER I

INTRODUCTION

1.1 Introduction To Tribology

The word *Tribology* having its origin from Latin word *Logia* which means 'a study' and the Greek word *Tribos* or *Triben* which means 'to rub'. Therefore, tribology is defined as a study of a science and technology that deal with the design, friction, wear and lubrication of interacting surfaces in relative motion or rubbing of sliding surfaces. Tribology includes 3 subjects or components which are friction, wear and lubrication. The functioning of many mechanical systems depends on friction, lubrication and wear values. However, for this thesis purposes, I only concentrated on two main elements which are friction and wear.

In any machine, there are lots of components or parts that operate by rubbing together. Some examples are bearings, gears, cams and tappets, tires, brakes, and piston rings. All of these components have two surfaces which come into contact, support a load and move with respect to each other. Sometimes it is desirable to have low friction to save energy as in the case of tires or high friction for safeties as in the case of brakes. Usually we do not want the components to wear and that is the reason that they are lubricated.

In development of this friction and wear testing machine, I have chosen pin on disc with flat mating surface type over other type of machine that available in the