

CHAPTER I

INTRODUCTION

1.1 Background

Technological developments in various fields are very rapidly, especially in the automotive fields, motorcycle assembly manufacturers compete to develop the engine performance capabilities and supporting technologies. Lately, these developments are very significant in terms of aerodynamics and engine performance by increasing the power generated. With the development of vehicle performance, it is necessary to get an effective braking system and also the safety in vehicles. Good braking system must support the power and speed of the vehicle, where the most important part of the braking system is the brake pads, which is a device that works to slow or reduce the vehicle speed. To get maximum braking is required to brake with good braking capability and efficiency, and the quality of these brakes.

The use of asbestos in the manufacture of brake pads are not environmentally friendly because it has a negative impact on health which can lead of fibrosis (thickening and scarring of the lungs), lung cancer, and cancers of the respiratory tract, due to asbestos dust in the form of needles with micron size, not able to be filtered by the nose and we'll inhale directly into the lungs. As with previous studies brake pads

motorcycle can be made by utilizing waste coal fly ash as an amplifier and a mixture of Epoxy Resin and Magnesium Oxide (MgO) as a matrix. In addition to environmentally friendly, waste coal utilization in the manufacturing brake pads has advantages in terms of lower production costs compared brake pads made of asbestos.

In this study selected the utilization of fly ash as an object with a number of considerations, including the amount of fly ash \pm 80% of the total remaining coal combustion ash, fly ash smaller granules (200 mesh) is more potential to cause air pollution and bring the effect is not good for the environment. In addition, fly ash is good material when it met standard criteria required which has pozzolanic properties and good physical properties, such as low porosity and fine particle.

1.2 Objectives of Research

The Objectives of this study are:

1. Investigate the use of coal fly ash as a substitute for asbestos in the manufacture of brake pads.
2. Investigate environmental factors of brake pad performance by spraying with water, sea water and oil.
3. Investigate the adhesive resistance of brake pads due to shear loads between brake pads connection and brake shoes using *Dexton Plastic Steel Epoxy* as connective material.

1.3 Advantages of Research

The benefits of this research as follows:

1. For researchers are to increase knowledge, insight and experience of composite materials research.
2. For the reader is to increase the knowledge of material science, especially concerning alternative materials that are environmentally friendly.
3. In universities, this study can be used as an additional reference for research on composite materials.

Benefits for science research, particularly in the field of mechanics of materials and development benefits for the state and nation:

1. Getting alternative replacement materials in the manufacture of asbestos brake pads that are environmentally friendly and do not harm health.
2. This study can be used as an additional reference for subsequent research.
3. Optimizing waste materials are rarely used and used, are in everyday life.

1.4 Problem Limitation

To further focus of this research, so necessary to restrictions on the problem. The limitations of the study include:

1. **Material**

The material used for the manufacture of non-asbestos brake pads are coal fly ash plus other materials such as MgO (magnesium oxide), while the matrix used is Epoxy Resin.

2. **Examination**

In this study, emphasis on testing problems dibble power, strength, and endurance brake pads, drum made from coal ash (fly ash) as a replacement for asbestos to the frictional force and the current conditions conducted by spraying water, sea water, and oil. And then test the connection between the brakes with the brake shoe.