

# CHAPTER 1

## INTRODUCTION

### 1.1 Background

Tribology, the collective name given to the science and technology of interacting surfaces in relative motion, is indeed one of the most basic concepts of engineering, especially of engineering design. It is an obvious but fundamental fact that the ultimate practical aim of tribology lies in its successful application to machine design. The most appropriate form of this application is tribodesign, which is regarded here as a branch of machine design concerning all machine elements where friction, lubrication and wear play a significant part [1].

One of the important factor that will influence the successful application to machine design is wear parameter. Wear is the removal of the material from the metallic surface when two surfaces rub with each other. If there is more removal of the material, the component will become weaker and eventually break. In order to reduce this effect, lubrication is needed.

Current lubricants are formulated from mineral oil and frequently different types of additives are used which is not environmentally friendly [2]. Additives in commercial lube oils contain sulfur and phosphorous-based components, which are dangerous to the environment [3]. Therefore, the scientific world is now looking for alternative lubricants that are more environmentally friendly. Some bio-based lubricants or biolubricants have attracted attention due to their good friction and wear characteristics.

In this research, olive oil, sunflower oil and corn oil will be used as the base oil (without additives) and they will be applied to self aligning ball bearing in Ball Bearing Wear Apparatus. After the test, the scar diameter and surface wear of inner race and outer race lubricated by olive oil, sunflower oil and corn oil will be investigated and it will be observed by using optical microscope.

## 1.2 Research Purposes

The purposes of this research are to compare scar width and wear pattern of ball bearing lubricated by three different biolubricants.

## 1.3 Research Advantages

The advantages of this research are to know scar width and wear pattern of ball bearing applied with three different biolubricants.

## 1.4 Problem Limitations

The problem limitations of this research are :

- a. Base oil used were olive oil, sunflower oil and corn oil,
- b. The bearing that is used was self-aligning ball bearing,
- c. The rotation test were carried out on ball bearing wear apparatus.

## 1.5 Writing Systematic

This study consist of five parts. Chapter 1 contains introduction that describes background, research purposes, research advantages, problem limitations, and writing systematic. Chapter 2 consist of literature review which contains the basic theories used in this study. Chapter 3 describes methodology that was used in order to find the result. Chapter 4 explained the result of this study by presenting the pictures of wear observed by using optical microscope, the comparison chart and table. Chapter 5 explained the conclusion of this study.

