

# **OPTICAL SPECTROSCOPY STUDY ON THE QUALITY OF USED ENGINE OIL**

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## ABSTRACT

One of the current global concerns today is on the pollution happened to the environment caused by used engine oil. Some studies say that oil pollution caused twenty years for the environment to recover to its original condition and a gallon of oil can pollute a million gallons of fresh water [1]. Due to this dilemma, many researchers have been made in order to find the best way in minimizing the quantity of used engine oil disposed; hoping that by doing this can help in controlling the pollution done to the nature. This paper proposes a study using spectroscopic approach on the quality of engine oil where the aim is to find a way to reduce the waste of used engine. Optical spectroscopy concept is apply where percentage of reflectance intensity was measured using MCS600 ZEISS Spectrometer. The data was summarized by a line graph and was verified using statistic approach called *Student t-Test*. The outcome can lead to a conclusion where the higher kilometer of the engine oil, the lower the intensity of light reflectance that will be obtained.

# TABLE OF CONTENT

DECLARATION.....	iii
ACKNOWLEDGEMENT .....	iv
ABSTRACT.....	v
LIST OF FIGURE .....	viii
LIST OF TABLE.....	ix
LIST OF ABBREVIATIONS .....	x
CHAPTER 1 (INTRODUCTION).....	1
1.1    BACKGROUND.....	1
1.2    RESEARCH OBJECTIVE .....	3
1.3    PROBLEM STATEMENT .....	4
1.4    SCOPE OF RESEARCH.....	5
1.5    ORGANIZATION OF THE THESIS .....	6
CHAPTER 2 (LITERITURE REVIEW).....	7
2.1    INTRODUCTION.....	7
2.2    ENGINE OIL .....	9
2.2.1    PROPERTIES OF ENGINE OIL.....	9
2.2.2    GRADE OF ENGINE OIL .....	9
2.2.3    TYPES OF ENGINE OIL .....	11
2.3    SPECTROMETER.....	13
2.3.1    MCS600 ZEISS SPECTROMETER.....	13
2.3.2    OFK 30 MEASURING HEAD.....	14
2.3.3    ASPECT PLUS SOFTWARE .....	15
2.3.4    COLOUR MEASUREMENT .....	15
2.4    LIGHT .....	17
2.4.1    REFLECTION OF LIGHT .....	17
2.4.2    LAW OF REFLECTATION.....	18

# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 BACKGROUND**

Engine oil is a highly engineered fluid designed to allow proper engine performance over a long service life. Engine oil prevent metal parts in engine from grinding with each other by provides a hydrodynamic film between moving components. It also helps in cleans up the engine, reduces corrosion by minimizing engine's exposure to oxygen, improves sealing and prevent friction from happened in order to cool up the engine [2].

Nonetheless, the engine oil has a finite life due to the changes in fluid chemical and physical properties as it will ultimately degrade during use. Their aging behavior depends on the stability of additives such as antioxidants, anti-wear agents, detergents, dispersants, friction modifiers, inhibitors and viscosity improvers [3]. When the engine oil reaches it end of useful life, it must be removed and replaced with fresh oil in order to maintain engine protection. The quality of engine oil is actually the measurement of the oil's ability to perform the above functions that determines the remaining useful life of the oil.

Most of engine's manufacturers or dealers usually will suggest the customers to change the engine oil of their vehicle at a constant time which is usually done during vehicle's servicing or according to the mileage interval where generally once every two thousand kilometers for small vehicle like motorcycle and five thousand