UNIVERSITI TEKNIKAL MALAYSIA MELAKA

A DEVELOPMENT OF MOTORCYCLE ENGINE OIL PERFORMANCE MONITORING SYSTEM USING FIBER OPTIC CABLE

This report submitted in accordance with requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor Degree of Engineering Technology (Telecommunications) (Hons.)

by

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TAJUK: **A DEVELOPMENT OF MOTORCYCLE ENGINE OIL PERFORMANCE MONITORING SYSTEM USING FIBER OPTIC CABLE**

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APPROVAL

This report is submitted to the Faculty of Engineering Technology of UTeM as a partial fulfilment of the requirement for the degree of Bachelor of Engineering Technology Electronic (Telecommunication) (Hons.). The member of the supervisory is as follow:

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ABSTRACT

‘**ANALISIS FIBER OPTIK KONSEP UNTUK MENDALAMI SENSOR MINYAK ENJIN (MOTORSIKAL)** adalah untuk menyiasat kandungan kepekatan cecair minyak enjin yang terkandung di dalam enjin (motorsikal), yang digunakan di Malaysia pada masa ini. Berdasarkan maklumat yang diperolehi, penggunaan minyak enjin adalah perkara yang sangat penting dalam penggunaan motorsikal. Dalam penggunaan minyak enjin (motorsikal), mempunyai pelbagai jenis minyak enjin yang boleh dikategorikan dari pelbagai sudut seperti dari sudut ketahanan kepekatan minyak enjin (motorsikal) yang akan berkurangan dari hari ke hari, bergantung kepada penggunaannya oleh si pengguna. Di Malaysia, penggunaan minyak enjin (motorsikal) sering kali digunakan dalam penjagaan enjin (motorsikal) dalam memastikan enjin yang digunakan menjadi proses yang baik dan bertahan lama dari apa – apa kerosakan. Bagi mengenal pasti setiap hari kepekatan minyak enjin setelah penggunaan adalah berubah dari hari ke hari, laporan ini yang berasaskan sistem penderiaan dirangka bagi mengenal pasti kualiti minyak enjin ini yang berubah kepekatannya. Dengan meletakkan sampel minyak enjin yang di ambil dari enjin motorsikal setelah digunakan pada hujung optical sensor, keputusan bacaan uji kaji tersebut akan memberikan jawapan kepada kajian ini sama ada tinggi kepekatannya atau rendah kepekatannya, kandungan minyak enjin (motorsikal) dan sekaligus dapat memperbaiki ataupun menaik taraf teknologi dalam sistem mengawal dan memastikan tahap kepekatan penggunaan minyak enjin (motorsikal) di Malaysia.

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ABSTRACT

'ANALYSIS of FIBER OPTIC SENSOR into the CONCEPT for ENGINE OIL (MOTORCYCLE) is to investigate the content of a liquid concentration of engine oil in the engines (motorcycles), which is used in Malaysia at the moment. Based on the information obtained, the use of engine oil is very important in the use of motorbikes. In the use of engine oil (motorcycle), has a range of engine oil that can be categorized from various angles such as in terms of durability of engine oil concentration (motorcycle) which will be reduced from day to day, depending on its use by the deceased user. In Malaysia, the use of engine oil (motorcycle) often used in engine care (motorcycle) to ensure that engine used be good process and survive from what – what damage. For identifying the daily concentration of engine oil after usage is changing from day to day, this report is based on sensing system is designed to identify quality engine oil that changed concentration. By putting the engine oil sample taken from motorcycle engines once used at the end of optical sensors, the results of the experiments are reading reply to this study whether high or low concentration, content concentration engine oil (motorcycle) and thus to improve or upgrade the technology in the system of controlling and ensuring the level of concentration of use of engine oil (motorcycle) in Malaysia.

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DEDICATION

This research was dedicated to:

My parent:

ABDUL RAZI BIN ABDUL LATIF

ROSLINDA BINTI ZAINAL ABIDIN

Which has a lot of encouragement and education and inspiration in success, pray and always love this self with sincerely heart.

Thank you also to my brothers, sisters and friends it is worth from class 3BETT

They are always be my side, they are a great help during difficult and easy, feel confident, guidance, and advise you on which motivated to myself.

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Thank you also to my parents who support and encourage. sibling who gave a positive view and spirit, and assistance and support from friends, housemate and classmate who helped me in completing this task.

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CHAPTER 1

INTRODUCTION

1.1 Project Background

Fiber optic is a sort of media correspondence that is regularly utilized as a part of this century as can be found in the utilization of web media utilizing optic fiber channel associations from branch as correspondence sight and sound to clients. In this way, the client can get to the web rapidly not at all like 20 years back the utilization of the telephone wires made of copper wire as a medium of transmission of information. Fiber optic made exceptional from fiber glass react at light. With the favorable position is with optic fiber through the speed of light, the information will be acknowledged rapidly.

Fiber optic is presently not just centered around telecom arrange as information transmission media. Fiber optic innovation choices that can supplant traditional link flag work as electrical transmitter. Where is fiber optic utilized as a sensor or concerning the fiber optic sensors (FOS). Advantage from optical fiber as sensor has many focal points contrasted and electrical Sensors which have been utilized for a long time. Fiber optic has a few points of interest, including a little measurement, lightweight, safe against electromagnetic unsettling influence, can be utilized as a part of the period as in incorporated into high temperature or high pliable, high affectability and the capacity to feel and to send offer assistance. Moreover, the optical fiber is additionally not perishable, it has isolate the power does not effortlessly get terminated or blast thus of an electron as a venturing stone on the event of an electrical Sensor.

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Engine Oil (motorcycles) it's in the motors to fill a few needs. In the first place, clearly, oil goes about as an ointment. In the event that the motor is working effectively, there is no metal to metal contact - everything is riding on a thin film of oil. In any case, oil has a few other imperative occupations to do. Oil flows all through the motor, and cools parts that can't get close to a water coat. For instance, it's getting to be distinctly basic in game bicycles to splash oil on the underside of the cylinder to cool it. There are no water coats at all in your transmission. Bike transmissions are oil cooled.

Along these lines, a sensor has been created in view of optical fiber in correspondence framework and also called fiber optic sensors (FOS) with the end goal of measuring the concentration of the engine oil (motorcycles) until it's concentration become less.

1.2 Objective

1. To study fiber optic sensor operation.
2. To develop fiber optic sensor (FOS) for various concentration detection of engine oil.
3. To analyse performance of fiber optic sensor (FOS) for concentration detection activity.

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1.3 Problem Statement

This experimentation is run on the basis of curiosity and to build a sensor based on fiber optic to test the concentration of engine oil for motorcycles in Malaysia. Why do we need oil? Put oil in engines to serve several purposes. First, obviously, oil acts as a lubricant. If the engine is operating correctly, there is almost no metal to metal contact - everything is riding on a thin film of oil. However, oil has several other important jobs to do. Oil circulates throughout the engine, and cools parts that cannot get near a water jacket. For example, it's becoming common in sport bikes to spray oil on the underside of the piston to cool it. There are no water jackets at all in your transmission. Motorcycle transmissions are oil cooled. The piston rings do not do a perfect job of sealing. Some combustion by products will slip past the rings into the engine. This can be little particles of carbon. Remember, diamond is carbon that was combined under heat and pressure. These little carbon particles can be quite damaging to the engine. Another job of the oil is to hold these particles in suspension until the oil filter can grab them. Also, if the gasoline has sulphur in it (it does), this sulphur can react with water and oxygen to make sulphuric acid. This is some stuff that is seriously bad for the engine. The oil has special ingredients in it called buffers to neutralize acids. Finally, the engine can get internal build ups of tars, waxes, and other gunk. The oil has solvents to try to dissolve this stuff and get and keep the engine clean. But a lot of people underestimate the issues related to the concentration of engine oil, and review the quality of the engine oil is changed from time to time, where a lot of people are not aware of the extent of these changes occurred until the expiry of helps. The effects of the view changes in concentration and durability of this engine oil, can result in bad effects on the use of a thing that engine, example car, and motorcycle. One sensor has been developed by using fiber optic cable to detect the changes of concentration engine oil in Malaysia for every day after use it. Normally people can detect the concentration of engine oil but two methods. First, by using the millage or distance that has been define by the engine oil. Secondly, method to detect the concentration engine oil by using hearing sound of engine, but for this time with the use of glass fiber on fiber optic sensor and with the speed of light is able to determine the concentration engine oil.

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1.4 Scope of Project

The scope of this project to study and to develop fiber optic sensor by application to engine oil (motorcycles) concentration detection in motorcycles. With the availability of this scope, it will facilitate the process of experimentation and as a guide to achieve our objectives. This scope, conducted to study fiber optic sensor, fiber optic, engine oil (motorcycles) concentration and sustainable. The main focus for this project can be classify as:

- The basic of fiber optic communication system.
- The implementation of fiber optic sensor for sodium hypochlorite.
- The system of fiber optic communication application.

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CHAPTER 2

LITERATURE REVIEWS

2.1 Introduction

Literature review is a place where a review in view of the title that had been found and talked about in detail in light of the goals and extent of the venture to additionally fortify the review, all procedures, materials and apparatuses that will be utilized to concentrate in light of hypothetical and insightful reference that is gathered from books, Web locales, and diaries. In Chapter 2, the apparatuses utilized will be portrayed as a model in which the utilization of fiber optic sensor (FOS) as media that will be utilized as a material to test, engine oil (motorcycle) is the principle component to be test. In this review, the utilization of test strategies since perusing is not by any means exact, so it should be tried a few circumstances to get the best outcomes.

2.2 Fiber Optic

Fiber optics is noteworthy building impedes in the telecom base. In 1880 Alexander Graham Chime and his accomplice Charles Sumner Tainter made an underlying move towards optical fiber correspondence, the Photophone, at Ringer's as of late settled Volta Research office in Washington D.C. At first made in the 1970s, fiber-optic correspondence structures have transformed the data exchanges industry and have accepted a significant part in the happening to the Data Age. The fiber optics resentful about America began in the mid-1980s.At that time systems worked at 90Mb/s. At this data rate, a single optical fiber could manage around 1300 synchronous voice channels. Today, systems ordinarily work at 10 Gb/s and past. Because of its central focuses over electrical transmission, optical strands have, as it were, supplanted copper wire correspondences in focus frameworks in the made world. As an

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improvement that changed the scene of overall exchanges, optical fiber has a future as impressive as the convergences of light it bars all through the world. In view of its closeness with various advancements, creating cost-ampleness, and practically vast transmission limit, optical fiber can create and change in accordance with future customer demands for voice, data, and video limit. The advancement of the fiber optics industry over the span of late years has been perilous. Analysts expect that this industry will continue developing at an immense rate well into the next decade and past.

2.2.1 Benefits of Fiber Optics

Optical fiber Optical fiber systems have numerous central focuses over metallic-based correspondence structures. These purposes of intrigue include:

Long-distance signal transmission. The low tightening and unrivaled sign trustworthiness found in optical structures allow any more extended intervals of sign transmission than metallic-based systems. While single-line, Unlike the framework interface UTP STP still raises the probability of tapping, this can't be used for optical fiber connect framework as it can submit data without any redirections or interruptions.

Fiber optic framework connection can be overhauled easily without altering the present connection structure. voice-review copper systems longer than a couple of kilometers (1.2 miles) require in-line motion for pleasant execution, it is not unpredictable for optical structures to go over100 kilometers (km), or around 62 miles, with no powerful or latent taking care of.

Large bandwidth, light weight, and small diameter. The present applications require a continually growing measure of transmission limit. Along these lines, it is crucial to consider the space goals of various end customers. It is common to put in new cabling inside existing funnel systems or channel. The tolerably little separation crosswise over and light weight of optical connection make such foundations basic and rational, saving productive divert space in these circumstances.

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Non-conductivity. The present applications require a continually extending measure of transmission limit. In this way, it is essential to consider the space goals of various end customers. It is conventional to put in new cabling inside existing funnel structures or channel. The respectably little separation crosswise over and light weight of optical connection make such foundations straightforward and sensible, saving gainful divert space in these circumstances.

Security. Not in any way like metallic-based systems, the dielectric method for optical fiber makes it hard to remotely perceive the sign being transmitted inside the connection. The most ideal approach to do all things considered is by getting to the optical fiber. Getting to the fiber requires intervention that is successfully recognizable by security surveillance. These conditions make fiber incredibly charming to administrative bodies, banks, and others with genuine security concerns.

Designed for future applications needs. Fiber optics is sensible today, as devices costs fall and optical connection esteeming remains low. Generally speaking, fiber plans are less unreasonable than copper. As information exchange limit demands increase rapidly with mechanical advances, fiber will continue having an irreplaceable impact in the whole deal achievement of telecom.

(Nick Massa, 2000)

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2.2.2 Advantages and Disadvantages

2.2.2.1 Advantages of Optical Fibers

It is a very high information carrying capacity.

1. Less attenuation (order of 0.2 db/km).
2. Small in measurement and size and light weight.
3. Low cost when contrasted with copper (as glass is produced using sand ...the crude material used to make optical fiber is free… .).
4. Greater safety and and insusceptible to EMI and RFI, dampness and erosion.
5. Flexible and simple to introduce in tight directs.
6. Zero resale value (so theft is less).
7. Is dielectric in nature so can be laid in variedly delicate environment.
8. Difficult to tap fibers, so secure.
9. No cross talk and unsettling influences.

2.2.2.2 Disadvantages of Optical Fibers

1. The ending hardware is as yet expensive when contrasted with copper equipment.
2. Of is sensitive so must be dealt with deliberately.
3. Last mile is still not absolutely fiber-ised because of expensive endorser premises hardware.
4. Communication is not absolutely in optical space, so rehashed electric – optical – electrical transformation is required.
5. Optical intensifiers, splitters, MUX-DEMUX are still being developed stages.
6. Tapping is unrealistic. Specific hardware is expected to tap a fiber.
7. Optical fiber joining is a specific procedure and needs expertly prepared labor.
8. The splicing and testing gear are exceptionally costly when contrasted with copper hardware.

(Dr. Thaira Zakaria Abbas, 2011-2012)

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