WATERWAY CONTINUOUS MONITORING USING FIBER OPTIC SENSING SYSTEM

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ABSTRACT

This thesis presents a waterway monitoring system using fiber optic sensing approach that can monitor certain parameters of water. The optical fiber based system can continuously monitor and alert the authorities if sudden changes in parameters happen. The problem with the existing system is that the system is either labour intensive or requires data connection. The objective of this project is to develop a continuously monitoring system that can detect the changes in parameters along waterway such as river which also will be focused throughout development of this project. The scope of work for this project are to design a system that cover long distance monitoring and allow detection of changes in different parameter such as oil detection, water level and pH of water. The methodology for this project is the information will be transmitted by light information through the optical fiber. The information will be fed to a detector that converts light to difference in voltage signal and optical analyzing tools that communicate to a PC and microcontroller. As a findings for this project, the functionality of this project can be illustrate by considering situation when there is change in parameters along the river such as changes of pH from pH 10 (alkaline) to pH 4 (acidic); the difference in output voltage signal of the electronic pH sensor will be converted into light signal and cause shifting of central wavelength. This information regarding the exact location of the situation will be sent to the authorities for further action. The benefit of this project is to ensure fast action from authorities in case any hazardous condition happens.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

In this chapter, background and motivation about the project will be described. Basically it also explained about the basic concept of the project. Also, in this chapter will state the problem statement and several objectives based on the existing problem. Moreover, it will also touch on the scope of the project work and the organization of the project report.

1.2 BACKGROUND AND MOTIVATION

This projects presents waterway monitoring system using fiber optic sensing approach which provides continuous monitoring on environmental factor including water quality control for waterway such as rivers. This system can be implemented to any waterway which becomes major water resources for the country. The importance of ensuring the continuous monitoring on waterway is because of water is one of the important aspects in human life as well as other live forms such as plant and animal [1]. Any activities associated with agriculture and industry also need continuous supply of water. The demand of fresh water continues to increase from time to time due to the development of agriculture and industrial activities as well as increase in human population [2]. The problem with the existing system is the system is not reliable due to the medium which is used to convey the information is easily affected by the surrounding atmosphere such as the usage of copper cable along the monitored areas. The copper cable will corrodes and eventually need to be replaced with new one which increase the maintenance cost. The usage of optical fiber as the main medium is because it offers unique advantages, such as immunity to electromagnetic interferences, stability, repeatability, durability against