APPLICATIONS OF FIBER BRAGG GRATING SENSOR IN WATER LEVEL MONITORING OF AQUACULTURE POND

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ABSTRACT

This paper proposes a fiber optic water level sensor due to the bending of FBG sensor. FBG strain sensor is mounted on the surface of a mechanism called cantilever which the elongation of cantilever causes Bragg wavelength shift of FBG sensor. The FBG must be glued at a specific area on the cantilever surface. The shift in the Bragg wavelength has a good linear response to the bending of cantilever. The effect of cantilever to the FBG sensor is resolved. Agilent VEE interface is used to indicate level of water. The operating principle is described in detail.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

In recent applications, researchers have developed fiber Bragg grating sensor to be used as a water level sensor [10] [11]. Normally, the FBG will be attached to mechanism that will respond to the parameter that we want to measure. But the mechanisms created are not suitable to be used at open and harsh environment especially at aquaculture pond. Aquaculture is the cultivation of animals and plants in an aquatic environment. Today, aquaculture is said to supply an estimated 43% of all fish that is consumed by humans globally. Intensive production by aquaculture often requires accurate and real-time information on the status of the aquaculture pond such as water level. Conventional electrical based sensor is no longer practical when we talk about large scale of aquaculture industry having hundreds of ponds in an area.

The approach proposed using digital formatted optical spectrum spreading technique is too complicated to be used outdoor. Another approach by etching the FBG and putting it directly into the water is not really suitable. Animals in the pond like fish may disturb the sensor or causing damage because the sensor is easily broken. So, I have decided to design a mechanism that can be employed with FBG to monitor water level without submerge the FBG into the water and avoid using lens.