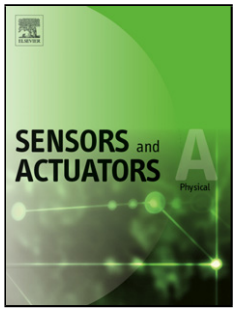

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Liquid Level Sensor using Two Fiber Bundles

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HIGHLIGHTS

- New design of liquid level sensor using two fiber bundle simultaneously
- Based on displacement sensor, the detection mechanism utilizes hydrostatic pressure
- The two-tier liquid level detection principle produces a working area of 130 cm
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Abstract

The two-tier detection of liquid level using two fiber bundles as sensor has been successfully demonstrated. Each fiber bundle is paired with a reflector displacement device (RDD) to detect liquid level in accordance with its detection area. Based on displacement sensor, the working principle of system is by utilizing hydrostatic pressure to shift the reflector attached to the membrane. Detection of liquid level is done through changes of reflected light intensity from the reflector that goes into each sensor probe. The results show that the sensor can be applied to the front slope or back slope area. Working area and resolution of sensors working on the front slope area are 0-130 cm and 1 cm, meanwhile for the back slope area are 0-50 cm and 0.1 cm.

Keywords: liquid level sensor; fiber bundled probe; hydrostatic pressure; front slope; back slope.

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1. Introduction

Optical devices based on optical fiber have been widely developed to detect liquid level. These devices including fiber Bragg gratings [1-3], photonic crystal fiber [4], fiber bundle [5,6], and fiber coupler [7, 10, 11]. The working principle of fiber Bragg grating and photonic crystal fiber is based on wavelength modulation in detecting liquid level. Meanwhile, the working principle of fiber optic, fiber coupler, and fiber bundle is based on the modulation of intensity.

Detection of liquid level based on intensity modulation has been done using fiber bundles coupled with transparent materials in the shape of conical [5] and prism [6] as sensor probes. The detection principle is based on changes in the reflected light intensity from the