DESIGN AND DEVELOPMENT OF A LOAD SENSOR BASED ON SINGLEMODE-MULTIMODE-SINGLEMODE FIBER STRUCTURE AND A HIGH DENSITY POLYETHYLENE AS THE LOAD SUPPORTING MATERIAL

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ABSTRACT – A Load sensor is very important for load measurement system in industry and transportation sectors. One type of prospective load sensor is optical fiber-based load sensor. Optical fiber-based load sensors have advantages such as cheap, ease in fabrication, and have good sensitivity. In this work, load dependency of Singlemode-Multimode-Singlemode (SMS) fiber structure with a multimode fiber graded index type is investigated theoretically and experimentally. A High Density Polyethylene (HDPE) as the load supporting material is used. The SMS fiber structure is sandwiched between the laminate of HDPE with a dimension 20x10x1 cm. The power output of SMS fiber structured was measured due to the applied load. It is shown that the sensor has a good linearity of range 1765,2 – 3922,8 N, sensitivity of 1,18x10⁻³ dBm/N and resolution of 4,2 N.

Keyword — Singlemode-Multimode-Singlemode, HDPE, Load sensor, optical fiber.
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