Thesis Title	Design and produce a small size shear force sensor
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Abstract

This study presents the detailed steps for designing and fabricating the small shear sensor. The goal of this study is to measure the shear force in the direction that is parallel to the surface. This sensor can be implemented for the limp-socket interface for disable people. When the shear force between the limb-socket is too much, the patients will feel irritation and get injured. Moreover, the micro shear sensors can be beneficial for robot soles. This sensor can help for gait analysis and walking pattern. In a case that the friction force is high, the movement of the robot will be inaccurate and that will result to the error in computations for overall systems. In this study, the study on micro shear sensor is focused to find the relationship between the change in electrical capacitance and the values of shear force. The design of the prototype is a rectangle shape. This sensor consists of two Printed Circuit Boards (PCB) with multiple electrodes and the dielectric material between the two electrodes. Polydimethylsiloxane (PDMS) is also used for adhesion and flexibility of the micro shear sensors. Test set-up for micro shear sensor consists of engineering instrument for measuring the electrical capacitance in order to formulate a relationship of shear force and measured values. From the testing results, these micro shear sensors is demonstrated the relationship between the electrical capacitance and the shear force ranging for 0 to 1,000 grams. Moreover, the effect of pressure force is minimized. From this study, the micro shear sensors will be used for a prototype in several researches in the future.

Keywords: Electrical Capacitance / Prototype Sensors / Shear Sensor