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Monitoring of the Deep-seated Landslide using MEMS- a Case Study of Lantai Landslide, Taiwan

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Due to the rapid development of the microelectromechanical system (MEMS) with low cost and high flexibility, the MEMS is applicable to sensing in many different categories. In this study, the MEMS was installed at the Lantai study area in the Taiping National Forest Recreation Area in Northeastern Taiwan for monitoring of the deep-seated landslide behavior, which has been causing frequent damages to the connecting road. The data in the field were collected, and the earthquake events and significant landslide events data were collected to make a correlation to the MEMS data. Spectrum analysis of the field data was conducted to understand the characteristics of the data, and it was found that the MEMS identified the earthquake events nicely for earthquakes inducing seismic intensity larger than 3 at the site. The distribution of the site reaction referring to the Arias intensity using the Wind Rose suggested a sliding motion with the sliding direction consistent with the main aspect of the slope. The analysis of the long term tilting condition of the MEMS also suggested an increase in inclination angle, which is consistent with the Wind Rose results. The MEMS used in this study appears to provide a feasible method for long term monitoring of the deep-seated landslide behavior in Lantai area and provides satisfactory results.

Keyword: MEMS, deep-seated landslide, field monitoring, tilt, Arias intensity