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The detection of a deep seated rock slide using remote sensing techniques

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Lushan is a well-known hot spring district in central Taiwan and the major formation is named as Lushan formation, which is consisted of black- and dark-gray argillite, slate and phyllite with local interbeds of dark-gray compact sandstone and disseminated marly nodules (Yuan et al., 1983). According to available records from Directorate General of Highways (DGH), the Lushan landslide has been active since 1994. The ground ruptures can be founded at various locations inside the landslide area. In order to define the landslide area, remote sensing techniques such as stereo aero photos, close range photogrammetry and ground based lidar are adopted in this research. Four different temporal stereo aero photo pairs are selected for documented events, and landslide scars are identified accordingly.

Close range photogrammetry is used for measurements of local failure scars, such as the displacement of retaining wall, road pavement subsidence, and rupture of rock surface, etc. Two ground based lidar equipments, Trimble Mensi GS-200 and Dibit 3D Laser Geoscanner, are used to establish high resolution digital surface model.

According to the investigation results, the Lushan deep seated rock slide is moving slowly toward the toe. Several minor scars are moving toward different direction but mainly toward the down slope direction. The largest rupture is found in 2006 after a storm with a total accumulated rainfall of 820 mm in three days, as a result the retaining wall was torn apart with a distance of 1.5m.

The investigation method used in this study can establish a wide range quantified

measurements, which provide important information for analysis and mitigation of the repeat occurring slides.

Keywords: landslide, remote sensing, aero photo, close range photogrammetry, lidar