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Investigation and analysis of a landslide area subjected to faults and fracture materials- the Tsuiluan area in Central Taiwan

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Landslide is one of the common natural hazards in Taiwan, especially in central Taiwan with high elevation and steep terrain. The study area, Tsuiluan, locates in central Taiwan with elevation ranges from 1250m to 2000m above sea level, and average slope of about 30∼40 degree. The main geological formation in this area is Lushan formation, which is highly fractured slate with dip angle ranged from 0∼25 degree. The Mayshi fault passes trough toe area of the slope and induces more complicated conditions for slope. Interpretations of temporal series of aerial photographs suggested no obvious large landslide but there appeared to be several small-scale landslides. In order to evaluate the landslide potential, the Resistivity Image Profiling (RIP) and boring holes with maximum 100m deep were conducted. Combining the results of the RIP, and boring logs data, an 82m thick shear zone with fractured rock and clay seam was discovered. Along with the small faults documented from field investigation data, a fault zone was identified. field geological survey. The strength and sliding test were adopted for the study of the material in this area and provided information for sliding. The stability analysis was performed accordingly. It was found that the fault zone has a dominating effect on the stability of the slope of both the overall stability and local stability. The critical shear surface locates within the shear zone and some local small landslide could be more critical than overall landslide. The slope is on the verge of sliding, and small amount of precipitation leading to increase in ground water table could be significant enough to trigger landslide.