九份地滑地在降雨條件下之穩定性評估

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摘　要　為探討地下排水工法對邊坡穩定性之影響，本研究蒐集九份地滑地監測、鑽探及岩土力學試驗資料，並採用 A1 邊坡剖面進行地下排水工法之施作前、後降雨入滲及穩定數值分析。分析結果顯示施作工法後，A1 邊坡剖面之 *FS* 值較不受降雨影響。由此可確認地下排水工法具有加速排除入滲雨水之功能。另外，本研究採用氣象站之降雨資料，來決定 25、50 及 100 年不同重現期距之設計雨型，並用以進行地滑地降雨滲流分析。分析結果可發現潛在滑動面之 *FS* 值不隨降雨延時之增長而下降，且 *FS* 值皆維持在大於 1.0 (*FS*>1.0)，此意謂著地下排水工法在正常運作之情況下，足以排除長延時、高強度降雨之入滲雨水，並使邊坡之穩定度維持在相當之水準而不致於惡化。

關鍵詞：地滑地、地下排水、降雨入滲、安全係數。

Evaluation of Slope Stability of Chiu-Fen Landslide under Rainfall Conditions

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ABSTRACT To investigate the effect of subsurface drainage on the slope stability, this study collects the monitoring data, boring logs, soil and rock laboratory experiments and field tests of Chiu-Fen landslide for a comprehensive stability analyses. The A1-Profile was selected for a series of rainfall seepage and stability analyses. In the case of the A1-Profile with subsurface drainages, the slope stability analyses of the three potential sliding surfaces within the Chiu-Fen landslides stabilized by subsurface drainages merely shows a negligible decrease of the factor of safety *FS* during torrential rainfall. As a consequence, these demonstrate the subsurface drainages are capable of accelerating the drainage of groundwater off the soil strata. In addition, the rainfall records of the meteorological station were adopted to determine the design rainfall pattern of return periods 25, 50 and 100 years. The design rainfall patterns were eventually used for a series of rainfall seepage and slope stability analyses to obtain the time-dependent factor of safety of potential sliding surface of the landslide during rainfall. According to the numerical results, the factor of safety *FS* of the three potential sliding surfaces shows that the *FS* values are constantly keeping greater than one (*FS* >1.0) and without decreasing with the elapsed time during rainfall. As a result, this reasonably implies that the subsurface drainages can drain off the infiltrated rainwater from rainfall with high intensity and long duration and preserve the slope stability of landslide from deterioration.

Key Words: Landslide, subsurface drainages, rainfall seepage, factor of safety.

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