摘要

本研究利用食水坑地滑區之地下水位變動、潛在滑動面監測資料以及TALREN-4 數值分析工具，來建立完整之地滑地數值模型，並進行各種穩定方案施作後之穩定性分析。由分析結果瞭解坡地滑動破壞機制後，隨之進行各項工法(包括：排樁、地錨)設計參數之參數研究，以檢核各設計參數對潛在滑動面穩定性可能造成之影響。藉由分析結果可推知，對於改善規模較大之地滑地災害，採用抑止力效果較佳之擋土排樁，地滑地之穩定性有較明顯的提升。

由排樁設計參數研究結果得知，排樁打設於滑動面上打設位置參數 R_x=0.5 處，對於坡地穩定性之提升最為有效。另外，由地錨設計參數研究結果顯示，當打設角度 α_{anchor} 為定值時，穩定性安全係數 *FS*(以下簡稱 *FS* 值)將隨著打設間距 S_{ac} 之增加而逐漸降低。又當打設間距 S_{ac} 為較小之定值時(S_{ac}=1.5 m)，*FS* 值將隨著打設角度 α_{anchor} 之增加而逐漸降低。反之，當打設間距 S_{ac} 為較大之定值時(S_{ac}=4.5 m)， *FS* 值受打設角度 α_{anchor} 之影響則變得不明顯。

關鍵詞：地滑地、穩定性分析、整治工法、TALREN 4

Abstract

This study established the numerical model of Shi-Shui-Keng landslides (S-S-K landslides) using TALREN-4 numerical tool according to the field investigations and the in-situ monitoring such as the geological boring data, the instrumentations of inclinometer and the records of groundwater level. In addition, a series of stability analyses were carried out on the S-S-K landslides remedied by various construction plans. Based on the numerical results of stability analyses, the failure mechanism of sliding surface can be captured. Subsequently, a systematic parametric study was performed on the design variables of two stabilization methods, namely, pile wall and anchor to examine the possible influence of the design variables on the potential sliding surface. It was found that to stabilize a large scale of landslides the slope stability can be significantly enhanced if the rigid-type of pile wall is adopted as the stabilization method.

According to the numerical results of parametric study on the design variables of stabilization methods, the following conclusions can be drawn. The installation parameter R_x=0.5 can give the optimum location for pile wall to penetrate the sliding surface and obtain the most effective enhancement to the slope stability. On the other hand, for a specific installation angle of anchor α_{anchor}, the factor of safety *FS* (or the slope stability) descends with the increasing installation spacing S_{ac}. In addition, the *FS* value also descends with the increasing installation angle α_{anchor} when the installation spacing S_{ac} equals to a smaller value (S_{ac}=1.5 m). However, it should be pointed out that the *FS* value becomes insensitive to the installation angle α_{anchor} when the installation spacing S_{ac} equals to a larger value (S_{ac}=4.5 m).

Keywords: landslides, stability analyses, stabilization methods, TALREN 4