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降雨入滲對坡地穩定影響之研究

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摘　　要　本研究主要目的爲應用集水區水平衡之概念，探討降雨入滲補注對坡地崩塌之影響性。首先，利用兩種水平衡方法來推估其降雨時可能產生之地下水的入滲補注量。另外，亦使用海生法之機率點繪法來推估研究區域降雨頻率。其中，應用 STEDWIN 邊坡穩定軟體進行邊坡穩定敏感度分析，分別以不同邊坡坡度來探討降雨量對邊坡穩定之影響性，進而由降雨頻率機率圖探討其發生臨界崩塌之機率。最後，本研究採用兩種水平衡模式所推估之降雨補注係數平均值，利用 STEDWIN 邊坡穩定軟體進行邊坡穩定性分析，推估研究地區降雨量與安全係數關係圖，得知當坡度提昇至 35 度時，利用 Janbu 簡化法分析發現降雨量在 400 至 500 公厘時其安全係數即達到 1.0 而有達到臨界崩塌之虞。

關鍵詞：坡地穩定、水平衡模式、基流模式、安全係數。

The Influence of Rainfall Infiltration on Slope Stability

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ABSTRACT　The main purpose of this paper is to apply a water-balance conceptual model of the Ching-Shui watershed to describe the effect of groundwater recharge on the slope stability. Firstly, the groundwater recharge is estimated by two models, a base-flow model and a soil moisture budget model. Furthermore, the Hazen method with a probability plotting position formula is applied to describe the distribution of rainfall. The STEDWIN program is then to simulate the effect of various slope angles and precipitation on slope stability. Meanwhile, the STEDWIN program is used to estimate the relation between rainfall and safety factor. The results show that the coefficient of groundwater recharges by precipitation in the study area can be estimated from the soil moisture model and the base-flow model with these values being 8.70% and 7.95%, respectively. This simulation revealed that when the slope angle increases to 35° and rainfall is over 400 mm, the slope failure will occur.

Key Words:　slope stability, water budget model, base-flow model, safety factor.

一、前言及文獻回顧

台灣地區位於歐亞板塊及菲律賓板塊交界處，且其地形屬狹長型，高山多平原少且山地坡度陡峭，加上台灣地區位於環太平洋地震帶上，地震頻繁，因此地質狀況相當複雜。另外，台灣地區全島雨量豐沛，年平均降雨量約爲 2500 公厘，約爲全世界年平均值 970 公厘之 2.6 倍。且降雨集中在每年 5 月至 9 月，

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