

## ABSTRACT

The plantation and application of vetiver grass in soil and water conservation and environmental aspects have been extensively promoted to Third World countries by United Nations since 1986. In addition to integrating the relevant applications of vetiver grass on various engineering aspects, this research carried out a series of stability analysis and parametric study on a full scale vegetated slope using vetiver grass. The analysis attempts to quantify the reinforcement effect of root system of vetiver grass on slope with various inclination angles. According to the numerical results, the development of potential sliding surface of vegetated slope is significantly dependent on the penetration depth of root system of vetiver grass. The potential sliding surface frequently slices beneath the reinforced zone of root system and this is due to the high shear resistance of root material of vetiver grass. Meanwhile, the root system is capable of restraining the occurrence of potential sliding surface and which alternately drives the sliding surface to the deeper soil stratum. Moreover, as the time elapsed, the growth of root system of vetiver grass can deeply penetrate the underlain soil layer and effectively increase the stability of hill slope.

**Key words:** Vetiver grass, Root system, Potential sliding surface

## 一、前言

培地茅（又名香根草）自 1980 年起經由美國農業部自然資源保育署(U.S. Department of Agriculture-Natural Resources Conservation Service)透過世界銀行(World Bank)在第三世界國家推行，培地茅以草帶法的施作方式運用於坡地水土保持上。例如培地茅草籬施作之後，除了成長快速之外，同時對於各種環境的適應能力強，其地下部根系糾葛連接生長形成類似連續壁之構造，而地上部堅挺強硬的莖桿密實交錯形成類似籬笆之構造。另外，培地茅生長點一般位於地表下約 1~2 cm 處，當地表覆土加厚時，其生長點亦會隨著上移，且其上方隨時會維持適當之覆土深（王裕文，2000）。

目前國內外培地茅根系對邊坡加勁效果及穩定性效益之量化評估方面的研究仍相當有限。因此，本研究擬採用數值分析之技術來模擬培地茅根系對植生邊坡之力學加勁效果，進而將其所提升之穩定性以相對安全係數值來加以量化呈現。

本研究彙整培地茅根系相關運用之調查成果及力學試驗結果，並採用數值分析方法檢算邊坡之穩定性。分析中，除了對全尺寸培地茅植生邊坡之根系力學補強效果進行探討外，亦同時對培地茅根系之生長情況、邊坡幾何及土層強度進行參數研究。

## 二、試驗材料與方法