

未飽和及飽和土體崩塌特性之探討

游繁結^[1] 吳仁明^[2] 翁緯明^[3]

摘 要 土體在不同含水量及逕流水深條件下，沿坡面會產生不同的崩坍、流動與堆積型態，並影響其流動範圍。本文藉室內崩塌試驗，模擬邊坡土體在不同水體深度下，沿斜面產生之崩塌、流動與堆積現象，藉邊坡穩定分析，以探討邊坡土體在水中崩坍與流動之機制。

由試驗觀測結果顯示，在不同含水量條件下，土體流動堆積長度以飽和狀態為最高，不加水次之，未飽和時再次之。邊坡土體之流動與堆積區域隨逕流水深而改變，依水面上與下大致可分為三區，水面上之邊坡土體為崩落區，受水的凝聚力影響坡度可維持近於 90°；水面附近受水波上下變動影響，土體表面變動劇烈，為邊坡土體崩滑或流動之區域；水面下邊坡土體多為流動狀態並迅速於底床附近停積，並形成坡度約 35°，其值與飽和土體之內摩擦角相當。

關鍵詞：凝聚力、內摩擦角、邊坡穩定分析。

A Study on the Characteristics of Landslide in Non-Saturation and Saturation State

Fan-Chieh Yu^[1] Jen-Ming Wu^[2] Wei-Ming Wong^[3]

ABSTRACT The earth has the different slope failure, flowing and deposition types along the slope, and has varied scale of flowing under the different water content and the depth of run off. This research according to laboratory experiments of landslide, simulated the earth behaviors of slope failure, flowing and deposition under the different runoff depth, by means of the analysis of slope stability, discusses the mechanism of slope failure and flowing.

The characteristics of landslide were shown as follows by the experimental observation. For the different water content, the longest length of flowing and disposition occurred to the saturated condition, the middle length occurred to dry condition, and the shortest length occurred to un-saturated condition. The region of flowing and disposition was related with runoff depth, approximately may divide into three areas according to water surface: the earth was falling downstream above the water surface, while the cohesion of water can maintain the slope angle 90° in unsaturated state; the earth was either sliding or flowing on the neighbor of water surface, while the vibration of wave can lead to dramatic change the surface of earth; the earth was flowing under the water surface, and soon the earth was disposed on the channel bed, and the slope angle was about 35° which the value like as internal friction angle of saturation.

[1] 國立中興大學水土保持學系教授

Professor, Department of Soil and Water Conservation, National Chung-Hsing University, Taichung 402.

[2] 國立中興大學水土保持學系博士班研究生(通訊作者)

Doctoral student, Department of Soil and Water Conservation, National Chung-Hsing University, Taichung 402.
(Corresponding Author)

E-mail:d89142002@mail.nchu.edu.tw

[3] 國立中興大學水土保持學系碩士

Master, Department of Soil and Water Conservation, National Chung-Hsing University, Taichung 402.