應用地電阻剖面法於土壤地層水份變化與 SPT-N 值比對

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摘　要　本研究在彰化縣灣雅水保持教室，於三個不同時間點施作地電阻試驗，並採用不同電極排列方式探討地表下電阻值之變化。結果發現地表下電阻率分佈與鑽探結果接近，且對於地層水份變化有良好推測結果。本研究亦探討經由鑽探後所得到之 N 值與電阻率分布之關係，其方法採用文獻中提出之轉換公式，主要是將電阻率轉換為橫截電阻率 (transverse resistivity) 後，再比對 N 值之相關性。本研究結果顯示灣雅試區之土層，其土層特性對於橫截電阻率與 N 值之關係有較大的影響。

關鍵詞：不飽和土層，地電阻，SPT，N-value。

An Application of Electrical Resistivity Tomography on Water Changes and Correlation with SPT N-Values of the Strata

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ABSTRACT　The tests were performed using various electrical resistivity tomography (ERT) electrode arrangements to discuss the variation of electrical resistivity of the ground at three different periods in Wan-ya, Zhanghua County. The results of ERT measurements are consistent with the drilling data; the changes of water in strata are also well estimated. In addition, the relationships between ERT measurements and SPT N-values are obtained by using an equation proposed in literature. Based on the equation, the resistivity obtained from ERT measurements is converted into transverse resistivity for correlating with the N-values. The results indicate that the characteristic of the strata in Wan-ya has an important influence on the correlation between transverse resistivity and N-value.

Key Words:　electrical resistivity tomography, SPT, N-value.

一、前　言

地電阻影像剖面法 (Electrical Resistivity Tomography) 簡稱 ERT 法，自 1912 年 Schlumberger 首先應用此法做電阻率量測迄今，無論理論或解釋技巧均頗為成熟。地電阻剖面影像探測法為非破壞式探測，主要應用在大地、地質、環境汙染等領域範圍，其特點為可快速獲得大量地層資訊，分析地下構造的變化。有許多學者研究地電阻剖面影像探測法應用在地層特性、含水量變化上皆有不錯的結果，洪瑛鈞等 (2006) 應用地電阻剖面探測法於新竹斷層之調查，其結果顯示地電阻剖面影像探測法可有效輔助斷層調查工作；李維峰等 (2006) 利用改良土壤之高電阻率特性，以及高含水軟弱土壤之低電阻

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