

以 DCP 與 IST 觀察路基的貫入曲線及估算其承載力

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摘 要 道路之養護上需調查路基之土類、厚度及加州承載比 (*CBR*) 等, 惟因山區道路之養護經費普遍不足, 若依規定於各區段開挖及施行現地試驗, 需龐大經費且費時。為此, 本研究嘗試導入簡易且低價位之動態圓錐貫入儀(DCP)與土壤衝擊測定器(IST), 來調查路基之工程性質。即以 DCP 觀察路基之貫入曲線性質及計算其平均貫入比 *APR*, 藉以判釋路基之土類及深度。以 IST 量測路基之衝擊加速度 I_a , 據以估算其 *CBR* 值。本研究於實驗室以五種土壤為試料, 求其 DCP 貫入曲線及量測其 *APR* 與 I_a 之值域, 將此等結果應用於現地路基上, 藉以驗證其適用性。研究發現, DCP 貫入曲線受試體鬆密狀態之影響較大, 依其轉折點可明顯區分出路基之土層分界。另依文獻所提之經驗式, 可由量測之 I_a 、*APR* 值估算路基之 *CBR*、彈性模數 *E*, 其估算值在合理範圍內。

關鍵詞：路基、貫入曲線、衝擊加速度、承載力。

Using DCP and IST to Observe the Penetration Curves of Subgrades and to Estimate their Bearing Capacity

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ABSTRACT It is necessary that the soil type, thickness, and California Bearing Capacity Ratio (*CBR*) of subgrade should be investigated in advance for road maintenance. However, as for roads in mountainous area, both divided trenching and field test shall not be practical due to the lack of maintenance expense. Tentatively, this study introduced simple and economical Dynamic Cone Penetrometer (DCP) and Impact Soil Tester (IST) for facilitating the investigation of subgrade and upgrading its quality. The DCP was used to obtain the penetration curves and its average penetration ratios (*APR*) of subgrades for identifying their soil type and thickness. The impact accelerations, I_a , of subgrade were measured by using IST in order to estimate their values of *CBR*. The DCP's penetration curves, *APR* and I_a of five soils were measured in the laboratory. The laboratory results were applied in the in-site subgrades for the purpose of validation. According to the results of this study, the DCP's penetration curves vary with the unit weights of specimens. The inflection point of DCP's penetration curve marks apparently soil layers of subgrade. Taking the empirical formula recommended by the references,

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both the *CBR* and the modulus of elasticity, E , of in-site subgrade can be evaluated reasonably according to measured I_a and *APR*.

Key Words: subgrade, penetration curve, impact acceleration, bearing capacity.