

剩餘土石方產製預拌土壤材料可行性研究

The Feasibility Study of Ready Mixed Soil Materials Using Residual Soil

沈永年¹ 鄭力豪²

Yeong-Nain Sheen¹, Li-Hao Cheng²

摘 要

本研究以現場開挖之剩餘土石方與河川淤砂產製預拌土壤材料，採用水膠比 3.4，膠結料（水泥+爐石）用量為 95 kg/m^3 ，其中爐石含量為 0、10、20、30%。試驗齡期為 1、7、28、56 及 91 天進行抗壓強度試驗、模擬平鈹載重試驗及非破壞檢測等工程性質試驗，並藉由非破壞檢測以超音波試驗建立發展趨勢及抗壓強度之關係性，以探討添加爐石與應用剩餘土石方對預拌土壤材料工程性質之影響。研究結果顯示，齡期 28 天之抗壓強度小於 30 kgf/cm^2 符合管溝回填材料之再開挖性之需求。模擬平鈹載重試驗結果顯示，爐石含量 20%，可提供 21 噸車輛通行之道路承载力。利用超音波波速與抗壓強度分別建立其相關模式，可得到高度相關性。

關鍵詞：預拌土壤材料、剩餘土石方、回填材料。

Abstract

The combination use of excavated remaining earth and gravel and river silt to produce ready mixed soil materials. Set $W/B=3.4$, Cement with amount 95 kg/m^3 was replaced by slag powder with ratio for 0, 10, 20, 30%. The compressive strength tests, modify field loading tests and NDT tests were carried out on specimen at the age 1, 7, 28, 56 and 91 days. The relationship on compressive strength the NDT method and compressive test were established. Engineering properties of ready mixed soil materials were investigate with containing slag and residual soil. The results showed that the compressive strength that less than 30 kgf/cm^2 meet demand of re-excavation of trench backfill materials in 28 days. Through the modified field loading tests, with the slag used to replace cement in less than 20% can provide enough strength for the 21-ton truck passage. Another results showed that the model established by NDT using ultrasonic pulse velocity and compressive strength, has high degree of relevancy.

Key words: Ready-Mixed Soil Materials, Residual Soil, Backfill Materials.

一、前 言

隨著臺灣經濟發展迅速，政府與民間長期推動各項重大工程建設，耗用大量的砂石材料，陸地砂石開採對環境生態與水土保持皆有負面影響，導致生態環境的受創也使得國內面臨資源嚴重

102 年 1 月 11 日收件 102 年 5 月 17 日受理

國立高雄應用科技大學土木工程系¹副教授²碩士生¹Associate Professor, ²Graduate Student, Department of Civil Engineering, National Kaohsiung University of Applied Sciences)。