

自充填混凝土以不銹鋼還原渣取代部分水泥之可行性研究

Feasibility Study of Self-Compacting Concrete Containing Stainless Steel Reduced Slag

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摘 要

本研究以不銹鋼還原渣取代部分水泥拌合成自充填混凝土，達到減少水泥用量之節能減碳訴求，降低爐渣事業廢棄物對環境衝擊及節省混凝土成本。本研究採用不銹鋼還原渣依不同比例取代部分水泥，針對自充填混凝土之新拌性質、硬固性質進行比較，探討不銹鋼還原渣取代部分水泥之可行性。結果顯示，不銹鋼還原渣部分取代水泥量 0~30% 之自充填混凝土配比可滿足設計目標。坍流度大於 600mm，V 型漏斗流下時間 7~20sec，箱型填充高度大於 300mm，具良好工作性及自充填能力。抗壓強度於 28 天齡期均大於 420kgf/cm²，超音波波速值超過 4,000 m/s，符合自充填性及高強度性要求。即不銹鋼還原渣可部分取代水泥減少水泥用量，降低自充填混凝土成本，並達到不銹鋼爐渣資源化之目的，減少爐渣事業廢棄物對環境的衝擊。

關鍵詞：自充填混凝土、不銹鋼還原渣、工程性質。

Abstract

In this study, Stainless Steel Reduced Slag (SSRS) to replace part of the cement to mix Self-Compacting Concrete (SCC), reducing the amount of carbon reduction aspirations of the cement, reducing the environmental impact of slag industrial waste and saving concrete cost. In the study, depending on the proportion of SSRS to replace part of the cement, compared for SCC fresh properties and hardened properties, explore the feasibility of SCC using SSRS to replace part of cement. The results show that SSC with the SSRS substitution level of 0~30% are observed to achieve the goal designs. For instance, the slump flow and filling high of box-test are measured to be greater than 600 mm and 300 mm, respectively; V-funnel falling time is ranged from 7-20 sec. It also implies that SCC containing up to 30% SSRS can provide a good workability and self-compactness ability. In addition, the strength and durability of the SCC were further investigated. The cylindrical compressive strength and pulse velocity at 28 days were greater than 420 kgf/cm² and 4,000 m/s, compliance with self-filling and high strength

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