

Lightweight Concrete Fracture Energy Derived by Inverse Analysis

Authors : Minho Kwon, Seonghyeok Lee, Wooyoung Jung

Abstract : In recent years, with increase of construction of skyscraper structures, the study of concrete materials to improve their weight and performance has been emerging as a key of research area. Typically, the concrete structures has disadvantage of increasing the weight due to its mass in comparison to the strength of the materials. Therefore, in order to improve such problems, the light-weight aggregate concrete and high strength concrete materials have been studied during the past decades. On the other hand, the study of light-weight aggregate concrete materials has lack of data in comparison to the concrete structure using high strength materials, relatively. Consequently, this study presents the performance characteristics of light-weight aggregate concrete materials due to the material properties and strength. Also, this study conducted the experimental tests with respect to normal and lightweight aggregate materials, in order to indentify the tensile crack failure of the concrete structures. As a result, the Crack Mouth Opening Displacement (CMOD) from the experimental tests was constructed and the fracture energy using inverse problem analysis was developed from the force-CMOD relationship in this study, respectively.

Keywords : lightweight aggregate concrete, crack mouth opening displacement, inverse analysis, fracture energy

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