

An Experimental Study on the Influence of Mineral Admixtures on the Fire Resistance of High-Strength Concrete

Authors : Ki-seok Kwon, Dong-woo Ryu, Heung-Youl Kim

Abstract : Although high-strength concrete has many advantages over generic concrete at normal temperatures (around 20°C), it undergoes spalling at high temperatures, which constitutes its structurally fatal drawback. In this study, fire resistance tests were conducted for 3 hours in accordance with ASTM E119 on bearing wall specimens which were 3,000mm x 3,000mm x 300mm in dimensions to investigate the influence the type of admixtures would exert on the fire resistance performance of high-strength concrete. Portland cement, blast furnace slag, fly ash and silica fume were used as admixtures, among which 2 or 3 components were combined to make 7 types of mixtures. In 56MPa specimens, the severity of spalling was in order of SF5 > F25 > S65SF5 > S50. Specimen S50 where an admixture consisting of 2 components was added did not undergo spalling. In 70MPa specimens, the severity of spalling was in order of SF5 > F25SF5 > S45SF5 and the result was similar to that observed in 56MPa specimens. Acknowledgements— This study was conducted by the support of the project, “Development of performance-based fire safety design of the building and improvement of fire safety” (18AUDP-B100356-04) which is under the management of Korea Agency for Infrastructure Technology Advancement as part of the urban architecture research project for the Ministry of Land, Infrastructure and Transport, for which we extend our deep thanks.

Keywords : high strength concrete, mineral admixture, fire resistance, social disaster

Conference Title : ICABTDR 2018 : International Conference on Advanced Building Technologies and Disaster Reduction

Conference Location : Stockholm, Sweden

Conference Dates : July 12-13, 2018