

Advance Upcycling of By-Products in Binder and Binder-Based Materials

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16 - Self-compacting concrete blended with fly ash and ground granulated blast furnace slag

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Abstract

This research study was performed on the self-compacting concrete (SCC) mixture blended with 5%, 10%, 15%, and 20% of fly ash (FA) and 5%, 10%, 15%, and 20% of ground granulated blast furnace slag (GGBFS) individually and with a combination of FA and GGBFS, that is, 5% (2.5% FA and 2.5% GGBFS), 10% (5% FA and 5% GGBFS), 15% (7.5% FA and 7.5% GGBFS), and 20% (10% FA and 10% GGBFS) by the weight of Portland cement. The main theme of this research work is to determine the fresh properties in terms of filling ability (slump flow, V-Funnel and T50 flow), passing ability (J-Ring and L-box), and sieve segregation test of SCC mixture and hardened properties in terms of compressive, split tensile, and flexural strengths and permeability of SCC mixture. However, the concrete specimens were prepared at 0.40 water-cement ratio, and these specimens were tested at 28 and 90 days. The results showed that the fresh properties of SCC mixture blended with FA and GGBFS provide better results with addition of a superplasticizer and hardened properties of SCC mixture are enhanced while utilizing 5% of GGBFS and 5% of FA by the weight of PC at 28 and 90 days, respectively.

Keywords

FA GGBFS cementitious material SCC fresh and hardened properties