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Article

Mechanical and durability performance of sustainable bacteria blended fly ash concrete: an experimental study

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ABSTRACT

This study investigates the effects of various dosages of bacteria on the properties of sustainable bacteria blended fly ash (FA) concrete. Different series of concrete mixtures were designed, with Series C being the plain concrete mix (no FA and bacteria). Series CF contained FA concrete mixes that had 10%, 20% and 30% FA content. Series CB and CBF were prepared with bacteria with varying dosages. Surface deposition of calcium carbonate crystals was found to improve strength and decreased sorptivity by 30–60%, depending on the type of bacteria and FA proportion. The best results in comparison with normal and FA concrete for compressive strength (CS) were obtained to be 31.76 MPa. The bacteria solution to water ratio had a positive effect on strength and sorptivity property but with increasing ratio. This study also applies multiple regression analysisin estimating the CS of concrete that contains FA at a fixed value of bacterial dosage at different