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Effect of granite industry waste addition on durability properties of fly ash blended self-compacting concrete

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Highlights

- Compressive strength and durability properties of fly ash blended self compacting concrete (SCC) incorporating granite powder (GP) was evaluated.
- Resistance against chloride, drying shrinkage, carbonation and corrosion improved on incorporating of GP in blended SCC.
- GP could be positively used up to 50% as a fine aggregate substitution in eco-friendly production of blended SCC.

Abstract

The continuous production of granite powder (GP) waste causes a deadly impact on environment and human life. This present study thus examines the impact of granite powder (GP) as substitute to natural fine aggregate (up to 60%) on compressive strength and durability properties of eco-friendly fly ash blended self-compacting concrete (SCC). Results revealed that strength enhanced on incorporation of up to 40% GP in concrete mixture than fly ash blended control mixture. Resistance against chloride, carbonation and corrosion improved for incorporation of up to 50% GP in concrete mixture than fly ash blended control mixture. Moreover, all the blended SCC mixtures, except SCC mixture containing 50% and 60% GP, showed higher compressive strength than ordinary Portland cement (OPC) based control SCC mixture at higher days of curing. Besides, all the blended SCC mixtures, except mixture containing 60% GP, showed better resistance against chloride, carbonation, drying shrinkage and corrosion than OPC based control SCC mixture. It was hence concluded that GP up to 50% as an alternative of fine aggregate could be positively incorporated in the production of eco-friendly fly ash blended SCC for the improvement of aforesaid durability properties (with little higher precaution against drying shrinkage).