

Properties of Preplaced Aggregate Concrete with Modified Binder

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Abstract : Preplaced Aggregate Concrete (PAC) is produced by first placing the coarse aggregate into the formwork, followed by injection of grout to fill in the voids in between the coarse aggregates. In this study, tests were carried out to determine the effects of supplementary cementitious materials on the properties of PAC. Cement was partially replaced by ground granulated blast furnace slag (GGBS) and silica fume (SF) at different proportions. Grout properties were determined by the flow cone test and compressive strength test. Grout proportion was optimized statistically. It was applied to form PAC. Hardened properties of PAC, comprising compressive strength, splitting tensile strength, chloride-ion penetration and drying shrinkage, were evaluated. GGBS enhanced the flowability of the grout, whereas SF enhanced the strength of PAC. Both GGBS and SF improved the resistance to chloride-ion penetration with the drawback of increased drying shrinkage. Nevertheless, drying shrinkage was within the range to be classified as low shrinkage concrete.

Keywords : factorial design, ground granulated blast furnace slag, preplaced aggregate concrete, silica fume

Conference Title : ICMCE 2020 : International Conference on Mechanical and Civil Engineering

Conference Location : Sydney, Australia

Conference Dates : May 18-19, 2020