

Effect of Permeability Reducing Admixture Utilization on Sulfate Resistance of Self-Consolidating Concrete Mixture

Authors : Ali Mardani-Aghabaglou, Zia Ahmad Faqiri, Semsi Yazici

Abstract : In this study, the effect of permeability reducing admixture (PRA) utilization on fresh properties, compressive strength and sulfate resistance of self-consolidating concrete (SCC) were investigated. For this aim, two different commercial PRA were used at two utilization ratios as %0.1 and %0.2 wt. CEM I 42.5 R type cement and crushed limestone aggregate having Dmax of 15 mm were used for preparing of SCC mixtures. In all mixtures, cement content, water/cement ratio, and flow value were kept constant as 450 kg, 0.40 and 65 ± 2 cm, respectively. In order to obtain desired flow value, a polycarboxylate ether-based high range water reducing admixture was used at different content. T50 flow time, flow value, L-box, and U-funnel of SCC mixture were measured as fresh properties. 1, 3, 7 and 28-day compressive strength of SCC mixture were obtained on 150 mm cubic specimens. To investigate the sulfate resistance of SCC mixture 75x75x285 mm prismatic specimens were produced. After 28-day water curing, specimens were immersed in %5 sodium sulfate solution during 210 days. The length change of specimens was measured at 5-day time intervals up to 210 days. According to the test results, all fresh properties of SCC mixtures were in accordance with the European federation of specialist construction chemicals and concrete systems (EFNARC) criteria for SCC mixtures. The utilization of PRA had no significant effect on compressive strength and fresh properties of SCC mixtures. Regardless of PRA type, sulfate resistance of SCC mixture increased by adding of PRA into the SCC mixtures. The length changes of the SCC mixtures containing %1 and %2 PRA were measured as %8 and %14 less than that of control mixture containing no PRA, respectively.

Keywords : permeability reducing admixture, self-consolidating concrete, fresh properties, sulfate resistance

Conference Title : ICBMCCS 2019 : International Conference on Building Materials, Construction and Composite Structures

Conference Location : Miami, United States

Conference Dates : March 11-12, 2019