

Influence of Metakaolin and Cements Types on Compressive Strength and Transport Properties of Self-Consolidating Concrete

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Abstract : The self-consolidating concrete (SCC) performance over ordinary concrete is generally related to the ingredients used. The metakaolin can modify various properties of concrete, due to high pozzolanic reactions and also makes a denser microstructure. The objective of this paper is to examine the influence of three types of Portland cement and metakaolin on compressive strength and transport properties of SCC at early ages and up to 90 days. Six concrete mixtures were prepared with three types of different cements and substitution of 15% metakaolin. The results show that the highest value of compressive strength was achieved for Portland Slag Cement (PSC) and without any metakaolin at age of 90 days. Conversely, the lowest level of compressive strength at all ages of conservation was obtained for Pozzolanic Portland Cement (PPC) and containing 15% metakaolin. As can be seen in the results, compressive strength in SCC containing Portland cement type II with metakaolin is higher compared to that relative to SCC without metakaolin from 28 days of age. On the other hand, the samples containing PSC and PPC with metakaolin had a lower compressive strength than the plain samples. Therefore, it can be concluded that metakaolin has a negative effect on the compressive strength of SCC containing PSC and PPC. In addition, results show that metakaolin has enhanced chloride durability of SCCs and reduced capillary water absorption at 28, 90 days.

Keywords : SCC, metakaolin, cement type, compressive strength, chloride diffusion

Conference Title : ICCET 2018 : International Conference on Concrete Engineering and Technology

Conference Location : London, United Kingdom

Conference Dates : March 15-16, 2018