

Effect of Silica Fume and Super-Plasticizer on Mechanical Properties of Self-Compacting Concrete: A Review

Waseem Khairi Mosleh, Badorul Hisham Abu Bakar, Nahla Hilal, Abdulkader Ismail Al-Hadithi

Abstract

Self-compacting concrete (SCC) is among the high-performance and modern concretes in the concrete industry. The inclusion of chemical and mineral admixtures and other aggregates causes better workability, flow ability, better compressive strength and high resistance to segregation. Silica fume (SF) is a mineral admixture which improves mechanical properties and reduced permeability. Secondly, the super-plasticizer (SP) is a chemical admixture and used for water-reducing, increase cohesiveness, improve passing and filling ability of SCC. However, SF affecting the physical properties of SCC if added in excess quantity in cement. Furthermore, the substitution of SP causes to deliver a negative surface charge on the concrete particles which in turns to result in electrostatic repulsion. Moreover, the higher quantity addition of both SF and SP will badly affect the fresh and hardened properties of SCC. Thus, an ample review was conducted to study the influence of SF and SP on the fresh and hardened properties of SCC. More than 50-previous research articles have been reviewed systematically to argue on the fresh ad hardened properties of SCC. Based on the reviewed literature, the conclusion has been drawn some future recommendations have been achieved related to the title of the research.

Keywords

SCC; silica fume; super-plasticizer