

Compatibility of Sulphate Resisting Cement with Super and Hyper-Plasticizer

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Abstract : Use of superplasticity chemical admixtures in concrete production is widespread all over the world and has become almost inevitable. Super-plasticizers (SPA), extend the setting time of concrete by adsorbing onto cement particles and provide concrete to preserve its fresh state workability properties. Hyper-plasticizers (HPA), as a special type of superplasticizer, provide the production of qualified concretes by increasing the workability properties of concrete, effectively. However, compatibility of cement with super and hyper-plasticizers is quite important for achieving efficient workability in order to produce qualified concretes. In 2011, the EN 197-1 standard is edited and cement classifications were updated. In this study, the compatibility of hyper-plasticizer and CEM I SR0 type sulphate resisting cement (SRC) that firstly classified in EN 197-1 is investigated. Within the scope of the experimental studies, a reference cement mortar was designed with a water/cement ratio of 0.50 conforming to EN 196-1. Fresh unit density of mortar was measured and spread diameters (at 0, 60, 120 min after mix preparation) and setting time of reference mortar were determined with flow table and Vicat tests, respectively. Three mortars are being re-prepared with using both super and hyper-plasticizer conforming to ASTM C494 by 0.50, 0.75 and 1.00% of cement weight. Fresh unit densities, spread diameters and setting times of super and hyper plasticizer added mortars (SPM, HPM) will be determined. Theoretical air-entrainment values of both SPMs and HPMs will be calculated by taking the differences between the densities of plasticizer added mortars and reference mortar. The flow table and Vicat tests are going to be repeated to these mortars and results will be compared. In conclusion, compatibility of SRC with SPA and HPA will be investigated. It is expected that optimum dosages of SPA and HPA will be determined for providing the required workability and setting conditions of SRC mortars, and the advantages/disadvantages of both SPA and HPA will be discussed.

Keywords : CEM I SR0, hyper-plasticizer, setting time, sulphate resisting cement, super-plasticizer, workability

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