

Overview Studies of High Strength Self-Consolidating Concrete

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Abstract : Self-Consolidating Concrete (SCC) is considered as a relatively new technology created as an effective solution to problems associated with low quality consolidation. A SCC mix is defined as successful if it flows freely and cohesively without the intervention of mechanical compaction. The construction industry is showing high tendency to use SCC in many contemporary projects to benefit from the various advantages offered by this technology. At this point, a main question is raised regarding the effect of enhanced fluidity of SCC on the structural behavior of high strength self-consolidating reinforced concrete. A three phase research program was conducted at the American University of Beirut (AUB) to address this concern. The first two phases consisted of comparative studies conducted on concrete and mortar mixes prepared with second generation Sulphonated Naphtalene-based superplasticizer (SNF) or third generation Polycarboxylate Ethers-based superplasticizer (PCE). The third phase of the research program investigates and compares the structural performance of high strength reinforced concrete beam specimens prepared with two different generations of superplasticizers that formed the unique variable between the concrete mixes. The beams were designed to test and exhibit flexure, shear, or bond splitting failure. The outcomes of the experimental work revealed comparable resistance of beam specimens cast using self-compacting concrete and conventional vibrated concrete. The dissimilarities in the experimental values between the SCC and the control VC beams were minimal, leading to a conclusion, that the high consistency of SCC has little effect on the flexural, shear and bond strengths of concrete members.

Keywords : self-consolidating concrete (SCC), high-strength concrete, concrete admixtures, mechanical properties of hardened SCC, structural behavior of reinforced concrete beams

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