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Rheological and Mechanical properties of Self-Compacting Concrete with Glass and Polyvinyl Alcohol Fibres

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Abstract

The objective of this experimental work was to study the effect of glass and polyvinyl alcohol (PVA) fibres on fresh and hardened properties of SCC. For this purpose seven mixes; SCC, SCC with 0.1%, 0.2% and 0.3% of glass and PVA fibres by volume of SCC were prepared with a water-powder ratio of 0.35. Fresh properties were assessed using Slump flow, T_{500} time, L-box and V-funnel tests. Hardened properties assessed for all the four mixes were compressive strength, flexural strength, splitting tensile strength, modulus of elasticity and ultrasonic pulse velocity. Experiments revealed that after the addition of fibres workability properties (i.e. flow-ability, passing ability and resistance to segregation) were reduced slightly. Hardened properties were improved after the addition of fibres and this improvement was observed to be more in SCC mixtures with glass fibres.

Keywords: Self-compacting concrete, Mechanical properties, Glass fibre, Polyvinyl alcohol fibre, Ultrasonic pulse velocity

1. Introduction

The concrete that is able to consolidate under its own weight while maintaining its homogeneity and completely filling the form work even in the presence of congested reinforcement is known as self-compacting concrete. Reduction in time required for placing, environmental friendly, better durability, improved aesthetics are the advantages which are making SCC highly acceptable throughout the world. The commonly used argument for not using SCC is that it is expensive than conventional concrete. Despite the high expenses of SCC compared to conventional concrete, it is probably more economical in use by reducing the expenses of labour, vibrating equipment and by quicker casting [1-3]

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