



Combined Effect of Natural Zeolite and Limestone Powder on the Rheological and Mechanical Behavior Self-Compacting Concrete (SCC) and Mortars (SCM)

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ABSTRACT

New generation concretes have specific properties, often obtained by using additives, and these properties are strongly affected by the rheological characteristics of the fresh cement paste. In this study, the effects of synthetic zeolite, and limestone on the rheological and mechanical properties of fresh concrete and mortars were investigated. Using self-compacting concrete (SCC) which is mainly known by high flow ability, good cohesiveness, and high segregation resistance has been increasing worldwide in concrete structures in recent years. Because of the extensive use of mineral admixtures in SCC the effect of these admixtures on the flow ability of cementitious mixtures should be studied. For this reason, in the preliminary investigation of this study six mortar mixtures with different W/C ratios were prepared and the optimum W/C for self-compacting was reported. Then W/C was selected at 0.45 and the effect of natural zeolite (NZ) and limestone powder (LP) on the fluidity, viscosity and stability of SCCs was investigated. The 28-day compressive and tensile strength of all the mixtures is also determined herein. The results indicate that NZ and LP improve the fluidity of the mixtures. NZ increases the viscosity while LP does not have a significant effect on the viscosity of SCCs. Furthermore, use of LP may improve the compressive strength of cementitious mixtures to some extent.

Keywords:

Self-compacting concrete, Rheology, Compressive strength, Natural zeolite, Limestone powder