

Effect of metakaolin and silica fume on the rheology of self-consolidating concrete

Assem Hassan and Mohamed Lachemi

ABSTRACT

The rheological properties of self-consolidating concrete (SCC) containing metakaolin (MK) were investigated and compared with those of SCC containing silica fume (SF). 48 mixtures containing various percentages of both MK and SF as a partial replacement of cement were investigated. Plastic viscosity and yield stress were evaluated at different slump flow values using a concrete viscometer. The effect of high range water reducing admixture dosage and the total time for flow, the time to reach 500mm diameter, and the final diameter of the slump flow test were also investigated and studied in this research program.

The results showed that the plastic viscosity and the yield stress increased with the increase percentage of MK. On the other hand, the addition of SF did not affect the viscosity of the SCC mixture but a sharp increase in the yield value was detected as the percentage of SF was increased. The results also demonstrated a correlation between the slump flow diameter and the yield stress as well as a correlation between the viscosity and the slump flow time.

Author's information

Dr. Assem Hassan PhD, MASC, MSc, P.Eng. Assistant Professor Faculty of Engineering and Applied Science Memorial University of Newfoundland St. John's, Newfoundland, A1B 3X5 Tel: 709-864 7473 Fax: 709-737 4042 Email: ahasan@mun.ca	Dr. Mohamed Lachemi, P.Eng., FCSCE Professor and Dean Faculty of Engineering, Architecture and Science Ryerson University 350 Victoria Street Toronto, Ontario, Canada, M5B 2K3 Tel: 416-979-5140 Fax: 416-979-5322 Email: mlachemi@ryerson.ca
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