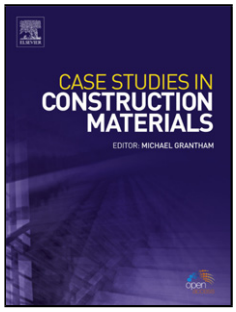

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Potential Use of Jordanian Volcanic Tuffs as Supplementary Cementitious Materials

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ABSTRACT

Ten Volcanic tuffs collected from several locations in the northern region of Jordan were investigated for potential use as supplementary cementitious materials. The volcanic tuffs were subjected to screening tests which evaluated their chemical composition, morphology and pozzolanic activity. The more promising tuffs were evaluated further as partial (10 to 40 wt.%) replacement for Portland cement. Their effects on the fresh mix workability, and hardened material strength and susceptibility to alkali-silica reactions were examined. Volcanic tuffs with higher SiO_2 content produced higher early-age compressive strengths, and those with higher CaO contents produced improved long-term strength development qualities. Partial replacement of Portland cement with the selected volcanic tuffs reduced the susceptibility to deleterious alkali-silica reactions.

Keywords: Natural pozzolans; Jordanian volcanic Tuffs; Pozzolanic Activity Index; Alkali Silica Reaction; Zeolite; Calcium silicate hydrate