The effect of styrene acrylate on the mechanical properties of repair mortars and comparison of curing conditions

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Abstract

In order to achieve an effective and efficient repair, it is necessary to have appropriate information on the repair materials. Therefore, the repair materials must be selected in a manner that repair mortar's properties such as modulus of elasticity and thermal expansion coefficient consistent with substrate concrete. Styrene Acrylate (SA) in a cement-based repair mortar is a latex which has an appropriate thermal compatibility with substrate concrete. In this study, the physical and mechanical properties including density, consistency and compressive, flexural and tensile strength of repair mortars with the Latex to Cement (L/C) ratios of 5, 10, 15 and 20 % were investigated under two curing conditions. In the first curing condition, after 24 hours immersion in water, the specimens were cured under specified room temperature and moisture condition. In the second curing condition, the specimens were immerged in water until mechanical tests were performed.The test results of all ages showed that the mechanical properties of the specimens under first curing condition were better that the second curing condition, because of cement hydration at early ages and polymeric film formation. Moreover, using SA latex in the repair mortar with L/C of 20%, the 28 days compressive strength decreased 49% under the second curing condition; however, SA latex in the repair mortar with L/C of 10% increased the 28 days flexural and tensile strength by 21% and 19% respectively under the second curing condition.

Key words: repair mortar؛ Latex؛ styrene acrylate؛ Curing

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