

Mechanical properties and durability characteristics of polymer- and cement-based repair materials

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Abstract: This study was conducted to evaluate the mechanical properties and durability characteristics of nine polymer- and cement-based repair mortars. Mechanical properties, such as compressive, tensile and flexural strength, elastic modulus, shrinkage and thermal expansion were studied. The durability characteristics of the repair materials were evaluated by measuring: (i) chloride permeability, (ii) electrical resistivity and (iii) carbonation depth. The mechanical properties of the selected repair mortars did not vary very significantly from each other. The elastic modulus of the polymer-based repair mortars was less than that of the cement-based repair mortars. This will lead to a reduced drying shrinkage cracking in the former repair mortars compared to the latter. The electrical resistivity of polymer-based repair mortars was more than that of cement-based repair mortars. Such a trend was not noted in the chloride permeability data. The chloride permeability in all the repair materials was very low according to ASTM C 1202 criteria. Enhanced carbonation was noted in some of the polymer-based repair mortars.