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CEMENTITIOUS COATINGS FOR IMPROVED CORROSION RESISTANCE OF STEEL REINFORCEMENT

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ABSTRACT

The viability of cementitious capillary crystalline waterproofing materials for corrosion protection of steel reinforcing bars for civil engineering infrastructure was evaluated using the half-cell potential method according to ASTM C876. The coatings were characterized by a novel eka-molecular sieve type structure which is breathable yet highly impermeable to water and possesses self-healing characteristics. The test program monitored the corrosion activity of 102 reinforcing bar samples embedded in mortar and immersed in a 3.5% concentration sodium chloride solution for one year. For some samples, the coating was applied directly on the embedded reinforcing bar while for other samples the outside surface of the mortar was coated. Three different types and combinations of coatings were applied. It was found that, in general, the coatings significantly delayed the onset of corrosion compared to the uncoated control samples. Samples that underwent mortar surface coating demonstrated no signs of corrosion after one year of exposure to the chloride solution.

Keywords: Corrosion; concrete; steel; half-cell potential; coating;

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