

Acid Attack on Cement Mortars Modified with Rubber Aggregates and EVA Polymer Binder

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Abstract : The acid attack on cement mortars modified with rubber aggregates and EVA polymer binder was studied. Mortar specimens were prepared using a type CEM I 42.5 Portland cement and siliceous sand, as well as by substituting 25% of sand with shredded used automobile tires, and by adding EVA polymer in two percentages (5% and 10% of cement mass). Some specimens were only air cured, at laboratory conditions, and their compressive strength and water absorption were determined. The rest specimens were stored in acid solutions (HCl, H₂SO₄, HNO₃) after 28 days of initial curing, and stored at laboratory temperature. Compressive strength tests, mass measurements and visual inspection took place for 28 days. Compressive strength and water absorption of the air-cured specimens were significantly decreased when rubber aggregates are used. The addition of EVA polymer further reduced water absorption, while had no important impact on strength. Compressive strength values were affected in a greater extent by hydrochloric acid solution, followed by sulfate and nitric acid solutions. The addition of EVA polymer decreased compressive strength loss for the specimens with rubber aggregates stored in hydrochloric and nitric acid solutions. The specimens without polymer binder showed similar mass loss, which was higher in sulfate acid solution followed by hydrochloric and nitric acid solutions. The use of EVA polymer delayed mass loss, while its content did not affect it significantly.

Keywords : acid attack, mortar, EVA polymer, rubber aggregates

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