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Influence of polymer type on bond and durability of polymer-based cement mortars

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The repair of a Reinforced Concrete (RC) member is involving the remove of the damaged section and applying new overlay or surface treatment to prevent further corrosion of embedded steel. The one of the most common repair techniques is to remove the deteriorated concrete and to replace it with repair mortar (call concrete patch repair). The selection of polymer type should be careful because it can influence on both mechanical properties and durability of cementitious repair mortars applied. In this study, total four different types of polymers that include Styrene Butadiene Rubber (SBR), Ethylene Vinyl Acetate (EVA) and acrylics were selected and the effects of each polymer on bond property and durability were investigated. Test variables selected in this study are four different types of polymers and three different water retention rates (high, medium and low). All tests such as mortar flow test, accelerated neutralization test and strength tests were conducted according to ASTM or Japanese standards. To be more specific, mortar density, bond, compressive, flexural strengths and length change were measured and comparisons were made. Experimental study confirmed that mechanical properties of polymer-based mortars can be variable even though same type of polymer and mix proportion. In addition, pre-surface treatment showed the strong influence on the measured bond and this might due to the reduced substrate water absorption. As expected, polymer-based mortars with high water retention exhibited high bond strengths compared to that of control specimen. It was also confirmed that higher initial bond can show the higher resistance against same freezing and thawing cycles. In the presentation, detailed experimental setup and test results will be reported.

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