

Title: Performance of Supplementary Cementitious Materials in Concrete Resistivity and Corrosion Monitoring Evaluations

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Publication place: ACI Materials Journal, Vol. 101, No. 5, pp 385-390

Publication date: 2004

Abstract: A testing regime was established to optimize the strengths and durability characteristics of a wide range of high-performance concrete mixtures. The intent of the selected designs was to present multiple solutions for creating a highly durable and effective structural material that would be implemented on Pennsylvania bridge decks, with a life expectancy of 75 to 100 years. One of the prime methods for optimizing the mixtures was to implement supplemental cementitious materials, at their most advantageous levels.

Fly ash, slag cement, and microsilica all proved to be highly effective in creating more durable concrete design mixtures. These materials have also shown success in substantially lowering chloride ingress, thus extending the initiation phase of corrosion. An additional benefit studied in this program is the ability of these materials to extend the propagation phase of corrosion due to the high resistivity they impart to the concrete. Ternary mixtures from these materials were particularly effective, showing much higher resistivity values than the materials used separately.