

Durability of Slurry Infiltrated Fiber Concrete to Corrosion in Chloride Environment: An Experimental Study, Part I

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Abstract : Slurry infiltrated fiber concrete (SIFCON) is considered as a special type of high strength high-performance fiber reinforced concrete, extremely strong, and ductile. The objective of this study is to investigate the durability of SIFCON to corrosion in chloride environments. Six different SIFCON mixes were made in addition to two reference mixes with 0% and 1.5% steel fiber content. All mixes were exposed to 10% chloride solution for 180 days. Half of the specimens were partially immersed in chloride solution, and the others were exposed to weekly cycles of wetting and drying in 10% chloride solution. The effectiveness of using corrosion inhibitors, mineral admixture, and epoxy protective coating were also evaluated as protective measures to reduce the effect of chloride attack and to improve the corrosion resistance of SIFCON mixes. Corrosion rates, half-cell potential, electrical resistivity, total permeability tests had been monitored monthly. The results indicated a significant improvement in performance for SIFCON mixes exposed to chloride environment, when using corrosion inhibitor or epoxy protective coating, whereas SIFCON mix contained mineral admixture (metakaolin) did not improve the corrosion resistance at the same level. The cyclic wetting and drying exposure were more aggressive to the specimens than the partial immersion in chloride solution although the observed surface corrosion for the later was clearer.

Keywords : chloride attack, chloride environments, corrosion inhibitor, corrosion resistance, durability, SIFCON, slurry infiltrated fiber concrete

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