

ENGINEERED CEMENTITIOUS COMPOSITE EVALUATION UNDER AGGRESSIVE ACIDIC ENVIRONMENT

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Abstract

The durability of hydraulic structures lined with mortar, especially under acid environment, has become a worldwide problem. Its durability parameters are highly considerable in current ages. The paper probed the feasibility of applying ductile engineered cementations composites (ECC) as substitute to conventional mortar in hydraulic structures to mint its performance that are subjected to acidic environment.

In this research the resistance of control mortar samples (CM) and two different mixes of ECC specimens were scrutinized. The mockups were exposed to 5% HCl solution for period of 90 days. The visual observation, weight loss and compressive strength of the samples were comparatively examined. Microstructure level X-ray diffraction (XRD) and Scanning electron microscopy (SEM) analysis were carried out to investigate the microscopic mechanism of ECC replaced prisms subjected to aggressive acidic environment. The research finding demonstrates that the ECC gives a good resistance to aggressive acidic environment, while visual examination shows that ECC is less affected by the aggressive environment, and the compressive strength of ECC after acid attack is more than the control specimen. From the XRD results the silica compound formation is observed which make ECC as a self-healing material. From SEM analysis the effect of acid on specimens is studied which shows that inner structure of ECC specimen is less affected by acid as compared to control specimen.