

PERFORMANCE OF DIFFERENT TYPES OF CEMENTS IN MARINE ENVIRONMENT

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ABSTRACT

Cement based materials when exposed to aggressive environments like the one near shore deteriorate due to ingress of moisture and other harmful chemicals. This study presents the performance of different kinds of cements in extreme marine environment. An experimental study was conducted for this purpose in which mortar cubes of different cements including OPC, Slag cement and Blended cements (varying percentages of 10%, 20%, 30% Fly Ash and 10%, 20%, 30% Silica Fume) were cast. Compressive strength of each was measured in at 7 days and 28 days initially. Samples were then immersed in sea water for 180 days to observe the impact of marine environment. Testing was done to determine the strength of the immersed samples after 90 days and 180 days. OPC samples showed the highest compressive strength initially but when exposed to extreme environment, strength degradation was observed and reduction was more as compared to slag cement and 10% Silica Fume samples. The increased percentages of Fly Ash and Silica Fume resulted in significant decrease of strength in mortar samples at both initial and final stages. Slag Cement samples showed the least change in strength of mortar after 180 days exposure to sea water. In addition to that concrete cylinders and cubes were also prepared from all the cement types mentioned above to compare the properties of each. Compressive strength and permeability of these concrete samples were measured to evaluate the performance of each cement type. The results of OPC and Slag cement samples were not found significantly different in terms of strength. Increased percentages of Silica Fume and Fly ash again resulted in reduction in concrete strength. When permeability was compared, Slag cement samples showed better resistance as compared to rest of the cements.