

CORROSION BEHAVIOR OF REINFORCING STEEL IN CEMENT PARTIALLY REPLACED WITH METAKAOLIN IN 3.5% NaCl AND 5% MgSO₄ SOLUTIONS

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ABSTRACT

The effect of different percentages of metakaolin cement replacement on the corrosion behavior of embedded reinforcing steel bars was studied in the presence of 3.5% NaCl and 5% MgSO₄ solutions. A poor Greek kaolin with a low kaolinite content was thermally treated and the produced Metakaolin (MK) was ground to the appropriate fineness. Different electrochemical techniques namely; open circuit potential, linear polarization and electrochemical impedance spectroscopy measurements were used to investigate the corrosion behavior of the embedded reinforcing steel bars. It is found that the use of Metakaolin as a cement replacement, 20% w/w, improves the corrosion behavior of reinforcing steel in cement in 3.5 % NaCl solution. While in 5% MgSO₄ solution, the 5 % MK replacement is the ratio to reduce corrosion rate.

KEYWORDS: Corrosion Behavior, Reinforcement, Metakaolin, Electrochemical Techniques