

Graphene Oxide as a Corrosion Mitigation Agent in Reinforced Concrete: An Evaluation

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Graphene Oxide (GO) stands out among supplementary cementitious materials due to its exceptional strength and nano-scale characteristics. This study focuses on evaluating the corrosion resistance of Reinforced Concrete (RC) structures enhanced with GO-infused concrete. The study assessed corrosion resistance using the Rapid Chloride Ion Permeability Test (RCPT), carbonation depth measurements, and the Accelerated Corrosion Test Method (ACTM). Moreover, the mechanical properties, including compressive, flexural, and tensile strength, were extensively tested. Concrete containing 0.05% GO showed significant enhancements in compressive, tensile, and flexural strengths by about 25%, 40%, and 41% respectively. RCPT results indicated a 70% reduction in chloride ion permeability at a 0.5% GO concentration, reflecting improved corrosion resistance. These results highlight GO's potential to significantly reduce concrete corrosion, suggesting the need for further exploration in this area.

Keywords: *Graphene Oxide (GO), mechanical properties, Accelerated Corrosion Test Method (ACTM), Rapid Chloride Permeability Test (RCPT)*