

GRAPHENE OXIDE INCORPORATED SMART CONCRETE: ITS PERFORMANCE AND APPLICABILITY IN CONCRETE APPLICATIONS

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significantly enhance the mechanical and durability properties of concrete. Therefore, it demonstrates promising outcomes of utilizing GO in different concrete applications due to its superior performance.

Abstract: Graphene Oxide (GO) has emerged as one of the most trending graphene derivative nanomaterials in the construction industry. Because of the presence of oxygenated functionalities attached to the aromatic structure, GO can be easily dispersed under an aqueous solution compared to another graphene-based derivatives. GO has the ability to transform conventional construction materials into smarter concrete composites since it can enhance the mechanical and durability properties of concrete. In this study, a powder form of GO was added to the concrete mixes at dosages of 0.02, 0.04, 0.06 and 0.08% by weight of cement. A polycarboxylate (PCE) based superplasticiser was used to improve the dispersion of GO in the concrete mix. Abrasion resistance of GO reinforced concrete was tested to investigate its possible use in rigid pavement applications. The mechanical performance of GO concrete was evaluated in terms of compressive, flexural and split tensile strengths. Strength test results of GO concrete with 0.08% have shown better performance than the rest of the mixes. The abrasion resistance of concrete with the addition of GO was observed to have reduced with increasing GO content in the concrete mix compared to the control mix. Results reveal that the addition of GO can