

## Corrosion Resistance Evaluation of Reinforcing Bars: A Comparative Study of Fusion Bonded Epoxy Coated, Cement Polymer Composite Coated and Dual Zinc Epoxy Coated Rebar for Application in Reinforced Concrete Structures

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**Abstract :** Degradation to reinforced concrete (RC), primarily due to corrosion of embedded reinforcement, has been a major cause of concern worldwide. Among several ways to control corrosion, the use of coated reinforcement has gained significant interest in field applications. However, the choice of proper coating material and the effect of damage over coating are yet to be addressed for effective application of coated reinforcements. The present study aims to investigate and compare the performance of three different types of coated reinforcements —Fusion-Bonded Epoxy Coating (FBEC), Cement Polymer Composite Coating (CPCC), and Dual Zinc-Epoxy Coating (DZEC) —in concrete structures. The aim is to assess their corrosion resistance, durability, and overall effectiveness as coated reinforcement materials both in undamaged and simulated damaged conditions. Through accelerated corrosion tests, electrochemical analysis, and exposure to aggressive marine environments, the study evaluates the long-term performance of each coating system. This research serves as a crucial guide for engineers and construction professionals in selecting the most suitable corrosion protection for reinforced concrete, thereby enhancing the durability and sustainability of infrastructure.

**Keywords :** corrosion, reinforced concrete, coated reinforcement, seawater exposure, electrochemical analysis, service life, corrosion prevention

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