

Critical Review on the Rehabilitation Technique of Corrosion-Damaged Reinforced Concrete (RC) Beams Using Composites

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ABSTRACT

Premature deterioration of materials in reinforced concrete (RC) structures is one of the major problems caused because of the polluted environment and the use of poor-quality materials. Deterioration of (RC) structural members such as beams, slabs, and columns due to corrosion attack in the polluted environment affects the safety, serviceability, and durability of RC structures. The corrosion level and degradation of physical properties of the concrete structure have to be assessed using Non-destructive Testings (NDTs) including half-cell potentiometer, concrete resistivity, Carbonation, Ultrasonic Pulse Velocity (UPV), and Rebound Hammer. Appropriate retrofitting and rehabilitation techniques have to be adopted based on the deterioration level to enhance their lifespans. There are many techniques available for retrofitting of corrosion damaged structures, which includes the application of external wrapping of FRP composites, fabric-reinforced cementitious matrix (FRCM), fiber-reinforced geopolymer concrete (FRGC), combined impressed current cathodic protection and structural strengthening (ICCP-SS), ferrocement with stainless steel mesh, etc. This article presents an overview of the NDTs on the corrosion damage structure and rehabilitation techniques. The influence of various strengthening techniques on the performance of RC beams has been critically analyzed and discussed. The durability property of rehabilitated structures has also been discussed.

Keywords: RC beams, Corrosion, Rehabilitation, Durability, FRP-Strengthening.