BEHAVIOR OF CARBONATED AND COROODED REINFORCED CONCREAT FLOOR SLABS STRENGTHENED WITH CFRP

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Abstract

Reinforced concrete floor slabs are susceptible to quality degradation over time due to carbonation and corrosion, especially in open environmental conditions. This study aims to analyze the behavior of carbonated and corroded concrete slabs and evaluate the effectiveness of strengthening using Carbon Fiber Reinforced Polymer (CFRP). The research method involved the fabrication of test specimens in the form of reinforced concrete slabs measuring 650×120×1700 mm, consisting of control slabs, corroded slabs, and corroded slabs strengthened with CFRP. Carbonation tests were conducted by immersing specimens in a 4% carbonate solution for 28 days, while corrosion was induced using a 3% NaCl solution and an electric current of 1.7 A for 15 days. Flexural tests were carried out to determine the maximum load capacity of each slab. The results showed that the control slab sustained an experimental load of 132% compared to theoretical values, the corroded slab reached 119%, while the strengthened slab only achieved 60% due to CFRP debonding. These findings highlight that the success of CFRP strengthening is highly dependent on the bonding quality and implementation process. This study contributes significantly to the development of strengthening methods for deteriorated concrete floor slabs in civil infrastructure applications.

Keywords : Floor Slab, carbonation, corrosion, CFRP reinforcment.