COMPARISON OF FLEXURAL STRENGTH CAPACITY OF HYBRID BEAM POST-CORROSION

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ABSTRACT

Reinforced concrete beams are essential structural elements in buildings. However, the embedded steel reinforcement within the concrete is highly susceptible to corrosion, particularly in humid or coastal environments. This study aims to determine the effect of corrosion on the flexural strength of hybrid beams. The objectives include designing a concrete mix suitable for the materials used, simulating artificial corrosion on hybrid beams using an electrochemical method with saltwater (NaCl) immersion and electric current, comparing the flexural strength of the beams before and after corrosion, and analyzing the impact of corrosion on hybrid beam performance. The tested beam dimensions were 200 × 300 × 1700 mm, with the compressive strength of concrete reaching 30.49 MPa. The corrosion process resulted in a 14% damage level, lower than the targeted 20%. After corrosion, the hybrid beam's flexural strength decreased by 5.03%. Nevertheless, the hybrid beams still demonstrated better flexural performance compared to conventional beams. It can be concluded that corrosion reduces the flexural capacity of hybrid beams by 5.03%. However, the combination of concrete and light steel remains reliable as an alternative structural element, especially when protected against corrosion.

Keywords*: Corrosion, Flexural Strength, Hybrid Concrete, Light Steel, Reinforced Beam, Testing.*