

Experimental Investigation on Flexural Strengthened RC Beams using FRP Bonding System - A Review

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ABSTRACT

In the past decades, widespread experimental research had conducted to understand the structural strengthening performance of carbon and glass fibre reinforced polymer (FRP) laminated / bonded reinforced concrete (RC) beams under static loading. Various studies include bond, flexural and shear strengths, debonding, durability properties like resistance to chloride ion penetration, the behaviour of FRP lamination at an elevated temperature and freeze-thaw exposure, corrosion resistance, and seismic behaviour, have been carried out. This paper reviews 415 beam specimens from the existing studies, especially on flexural strengthened RC beams using externally bonded FRP laminates. Critical observations were made, on the various aspects, like beam dimension, concrete strength, area of tensile steel reinforcement, FRP type, load-carrying capacity, and failure mode. The paper also suggests a proficient method for the externally FRP strengthening RC beams by incorporating different volume fractions of randomly oriented discrete short-fibres into the fresh-state of a concrete matrix to sort out the common (i.e., ductility depletion, debonding) issues.

Keywords: CFRP, GFRP, Strength, Ductility, Debonding