

A narrative review on strengthening of reinforced concrete beams using carbon fibre reinforced polymer composite material through experimental investigation and numerical modelling

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ABSTRACT

Carbon fibre reinforced polymer (CFRP) composite material has many benefits. The reinforced concrete beams (RCB) structural behaviour is improved due to the usage of CFRP composite material as external reinforcement. The effects of CFRP on various features are also essential to be summarised. This review paper concisely summarises the strengthening of RCB using CFRP. The flexure, stiffness, young modulus, load–deflection, ultimate load capacity, load-axial, fracture pattern, stress–strain distribution, and failure mechanism of RCB made with CFRP were significantly improved based on previous relevant experimental investigation and numerical modelling results. This CFRP composite material can be used as external reinforcement for RCB because of its overqualified strength capability, force, load, corrosion resistance, adhesive, and anchoring properties. Using CFRP composite material in civil and structural engineering can improve the RCB's structural behaviour and performance, particularly in the construction industry.

KEYWORDS

Carbon fibre reinforced polymer; Composite structure; Experimental investigation; Finite element analysis; Numerical modelling; Reinforced concrete beams; Structural behaviour; Structural performance

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