

Comparative Investigation of Ordinary Concrete Structure and Carbon Laminated Concrete Structure

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Abstract: Carbon laminates, which consist of carbon fibers embedded in a polymer matrix, offer a high strength-to-weight ratio and excellent corrosion resistance when applied to concrete. This project investigates the mechanical performance of carbon-laminated beams in comparison to non-carbon-laminated beams. Carbon-laminated beams, made by embedding layers of carbon fiber in a resin matrix, are recognized for their superior strength-to-weight ratio, high stiffness, and fatigue resistance. The study explores how the inclusion of carbon fibers enhances the structural properties of the beams, such as load-bearing capacity, deflection, and overall durability, compared to traditional non-carbon-laminated beams made from materials like wood, fiberglass, or standard polymers. Experimental testing and analysis are performed to evaluate the bending strength, stiffness, and failure modes of both types of beams under various loading conditions.

Keywords: Carbon laminate beams, non-carbon laminated beams, Mechanical performance, Bending strength, Deflection, Corrosion resistance

