

EXPERIMENTAL STUDY ON THE BEHAVIOR OF RC T BEAMS STRENGTHENED WITH EXTERNALLY BONDED CFRP

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ABSTRACT

Fiber-reinforced polymer (FRP) application is a very effective way to repair and strengthen structures that have become structurally weak over their life span. In this study experimental investigation on the behavior of RC T-beams strengthened using carbon fiber reinforced polymer (CFRP) sheets are carried out. Reinforced concrete T beams externally bonded with CFRP sheets were tested to failure using a symmetrical two point static loading system. Six RC T-beams were casted for this experimental test. All of them were having same cross section, total length of 1800 mm and same reinforcement detailing. Beam 1 was used as a control beam and other five beams were strengthened using different configurations of carbon fiber reinforced polymer (CFRP) sheets. Beam 2 is strengthened only at the bottom face from end to end. Beam 3 is also strengthened only at the bottom face but for the length $L/3$ to $2L/3$. Beam 4 is strengthened only at the bottom face for the length $L/3$ to $2L/3$ but using double layer of CFRP. In Beam 5 the web part is strengthened for the length $L/3$ to $2L/3$ with U-Jacketed single layered CFRP. In Beam 6 the web part is strengthened throughout its length with U-Jacketed single layered CFRP. Experimental data on load – deflection curve, load failure and failure modes of each beams were obtained. The experimental results show that externally bonded CFRP can increase the load failure and improvement in stiffness for beams.

KEYWORDS: Fiber Reinforced Polymers, CFRP, Reinforced Concrete T Beams, Deflection, Load Failure, Strengthening, Epoxy