

**Fatigue behavior of reinforced concrete beams strengthened with CFRP strips**  
Al-Gadhib, A.H., Khan, A.R., Baluch, M.H.  
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**Abstract:** Recent increases in bridge design loading requirements and material deterioration have highlighted the need for fast, efficient, and durable repair and strengthening techniques. Use of carbon fiber reinforced plastic (CFRP) sheets, as externally bonded reinforcement, is a practically efficient and technically sound method of repair and retrofitting of structurally inadequate or deteriorating reinforced concrete members. Long-term performance of this technique needs to be assessed before the method can gain full acceptance. This paper investigates the fatigue behavior of strengthened RC beams with externally bonded CFRP strips. Ten 1400 mm RC beams are tested in static and fatigue loading using four-point load setup. Beams are tested to failure under cyclic loading to determine the fatigue life and mode of failure. An analytical model based on the theory of continuum damage mechanics is presented for prediction of failure, ultimate load carrying capacities and fatigue life. Model predictions follow the experimental results closely.