Experimental Study for Strengthening of RC Rectangular Columns with Anchored CFRP Sheets

Nada Mohamed Abd El Hamid Ali Mohamed,Ahmed M. Ebid , Mahmoud El-kateb, Amr Zaher

Abstract

Debonding between CFRP sheets and concrete surface is one of the most important modes of failure. The common solution to prevent this mode of failure is to extend the CFRP sheets by enough length to avoid debonding. A more advanced technique is to anchor the CFRP sheets to the concrete element using either steel or CFRP anchors. The aim of this research is to study the effect of using CFRP anchors on the capacity of concentric and eccentric RC columns. In order to achieve that goal, ten specimens of RC columns divided into two sets were tested. The first set was tested under concentric load, while the other set was tested under eccentric load. Each set had one control sample, while the other four samples were wrapped with CFRP bands. Two of the wrapped samples were anchored and the others were not. The spacing between CFRP wraps was varied between 80 and 200 mm. The results showed that the concentric and eccentric capacity of the sample increased with decreasing the spacing between CFRP bands as long as the eccentricity is small enough to cause compression failure mode. But for samples with tension failure caused by large eccentricity, the CFRP bands have no effect on the capacity. It was also noted that anchors have no significant effect on the axial capacity of the samples.

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