

Axial and Flexural Strength of Square RC Columns with No-rounded Corners Wrapped with CFRP under Eccentric Loading

Ade Lisantono^{1,*} and Purwanelson Saputra Pinang¹

¹Department of Civil Engineering, Universitas Atma Jaya Yogyakarta, Yogyakarta, Indonesia.

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Abstract

This paper presents the results of a study on the axial and flexural strength of reinforced concrete (RC) columns with no-rounded corners wrapped with Carbon Fiber Reinforced Polymer (CFRP) under eccentric loading based on an experimental program. The main parameters under investigation are the number of layers of CFRP wrap. Thirty-six concrete cylinders with a standard size of (150×300) mm were cast and tested in this study to get the modulus of elasticity and compressive strength of concrete. Of these 36 concrete cylinders were divided into four groups, unwrapped, wrapped with one layer of CFRP, wrapped with two layers of CFRP, and wrapped with three layers of CFRP. Twelve rectangular reinforced concrete columns were also cast and tested in this study. The column specimens had dimensions (75×75×750) mm with no-rounded corners of the column section. The column specimens were also divided into four groups, unwrapped, wrapped with one layer of CFRP, wrapped with two layers of CFRP, and wrapped with three layers of CFRP. The experiment results showed that the load-carrying capacity of the wrapped column increased with the number of CFRP layers. A comparison between the experimental and theoretical results was also presented.

Keywords: square reinforced concrete column, no-rounded corners, carbon fiber reinforced polymer (CFRP), number of layers, eccentrically load, load-carrying capacity of column.

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* Corresponding author. E-mail address: adelisantono@mail.uajy.ac.id

Tel.: +62-274-487711; Fax: +62-274-487748

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