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Strengthening RC Columns Using Carbon Fiber Reinforced Epoxy Composites Modified with Carbon Nanotubes

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Abstract : This paper investigates the viability of using carbon fiber reinforced epoxy composites modified with carbon nano tubes to strengthening reinforced concrete (RC) columns. Six RC columns was designed and constructed according to ASCE standards. The columns were wrapped using carbon fiber sheets impregnated with either neat epoxy or CNTs modified epoxy. These columns were then tested under concentric axial loading. Test results show that; compared to the unwrapped specimens; wrapping concrete columns with carbon fiber sheet embedded in CNTs modified epoxy resulted in an increase in its axial load resistance, maximum displacement, and toughness values by 24%, 109% and 232%, respectively. These results reveal that adding CNTs into epoxy resin enhanced the confinement effect, specifically, increased the axial load resistance, maximum displacement, and toughness values by 11%, 6%, and 19%, respectively compared with columns strengthening with carbon fiber sheet embedded in neat epoxy.

Keywords : CNT, epoxy, carbon fiber, RC columns
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