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On the Slenderness and FRP Confinement of Eccentrically-Loaded Circular RC Columns

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Abstract: This article examines the effects of column slenderness and internal confinement on the behavior of eccentrically-loaded circular RC columns strengthened with fiber reinforced polymer (FRP) sheets. Test parameters included column height, level of transverse reinforcing steel, absence/presence of FRP jackets, fiber orientation and stiffness of the jacket. Tests proved that FRP wraps can be effectively used to enhance the strength, toughness, ductility and deformation capacities of eccentrically loaded- columns and that their efficiency decreases with increased slenderness. Tests showed that variations in internal confinement have a lower impact on column behaviour compared to the external FRP confinement. Negligible improvements in load-carrying capacities of columns confined with one hoop FRP sheet were encountered upon adding a longitudinal sheet . Conventional section analysis using material properties based on the stress-strain model adopted by the American Concrete Institute for FRP-confined concrete under combined axial compression and bending resulted in over estimation of axial column strengths.