عنوان مقاله:

SEISMIC STRENGTHENING OF SMALLSCALE PLAIN CONCRETE COLUMNSWITH NEW HYBRID STEEL-FRP JACKETS

محل انتشار:

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خلاصه مقاله:

In present study, a novel hybrid retrofitting device including inner steel strips and outer peripheral FRP wraps proposed and investigated experimentally for strengthening of concrete cylinders specimens. A total of 4concrete cylinderswhich had an inner diameter of 84.1 mm and a height of 345.0 mmillustrating slenderness ratio of 4, were prepared. For comparison purpose, one specimen was strengthened using only CFRP confinement with four layers, whereas the other was reinforced using proposed hybrid steel-FRP. Four steel strips (two percent of concrete specimen volume) attached using two part SIKA resin epoxy binder while one, two and three layer CFRP confined aforementioned steel. The retrofitting design philosophy of proposed scheme explained briefly based on some common codes. Axial compression tests were conductedusing the universal structural testing machine with maximum capacity of 2000 KN. Particle image velociemetery (PIV) method was used for calculating the stress-strain curves of specimens accomplished using a digital image correlation code, GeoPIV.Due to the lower cost, potential of obtaining the whole displacement field on common structural tests and applicability for data recording of explosive testssuch as FRP collapse at high level loading conditions, PIV method can be widely used as asuitablealternative toconventional measurement techniques. The PIV dataverified toward the strain gauges data. The role of some parameters was examined by comparing axial load-versus-axial (peak force, drift ratios and energy dissipation). The results demonstrate that steel-FRP hybrid confinement method is a viable solution toward enhancing the flexural strength and ductility of plain concrete columns under seismic loads.

کلمات کلیدی:

Seismic Retrofitting,Hybrid Steel-FRP Confinement, Particle Image Velocimetry (PIV), Flexural Strength, Energy Dissipation