

## A Rapid Reinforcement Technique for Columns by Carbon Fiber/Epoxy Composite Materials

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**Abstract :** There are lots of concrete columns and beams around in our living cities. Those columns are mostly open to aggressive environmental conditions and earthquakes. Mostly, they are deteriorated by sand, wind, humidity and other external applications at times. After a while, these beams and columns need to be repaired. Within the scope of this study, for reinforcement of concrete columns, samples were designed and fabricated to be strengthened with carbon fiber reinforced composite materials and conventional concrete encapsulation and followed by, and they were put into the axial compression test to determine load-carrying performance before column failure. In the first stage of this study, concrete column design and mold designs were completed for a certain load-carrying capacity. Later, the columns were exposed to environmental deterioration in order to reduce load-carrying capacity. To reinforce these damaged columns, two methods were applied, "concrete encapsulation" and the other one "wrapping with carbon fiber /epoxy" material. In the second stage of the study, the reinforced columns were applied to the axial compression test and the results obtained were analyzed. Cost and load-carrying performance comparisons were made and it was found that even though the carbon fiber/epoxy reinforced method is more expensive, this method enhances higher load-carrying capacity and reduces the reinforcement processing period.

**Keywords :** column reinforcement, composite, earth quake, carbon fiber reinforced

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