

# Behaviour of retrofitted reinforced concrete beams under combined bending and torsion : A numerical study

**R.Santhakumar**

*National Institute of Technical Teachers Training and Research, Chennai, India*

**R.Dhanaraj**

*Madras Institute of Technology, Chennai, India*

**E.Chandrasekaran**

*Crescent Engineering College, Chennai, India*

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## ABSTRACT

*This paper presents the numerical study on unretrofitted and retrofitted reinforced concrete beams subjected to combined bending and torsion. Different ratios between twisting moment and bending moment are considered. The finite elements adopted by ANSYS are used for this study. For the purpose of validation of the finite element model developed, the numerical study is first carried out on the unretrofitted reinforced concrete beams that were experimentally tested and reported in the literature. Then the study has been extended for the same reinforced concrete beams retrofitted with carbon fiber reinforced plastic composites with  $\pm 45$  degree and  $0/90$  degree fiber orientations. The present study reveals that the CFRP composites with  $\pm 45$  fiber orientations are more effective in retrofitting the RC beams subjected to combined bending and torsion for higher torque to moment ratios.*

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