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[\[PDF \(2640K\)\]](#) [\[References\]](#)**STUDY ON TORSION PROPERTIES OF CARBON FIBER SHEET STRENGTHENED PC MEMBER WITH ZEBRA-SHAPED**Haiming HE¹⁾ and Osamu KIYOMIYA¹⁾

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In this research, carbon fiber sheet (CFS) substitute to lateral tie was used for torsional strengthening of PC member. To investigate the mechanical properties of CFS strengthened PC member subjected to torsion and torsional reinforcement effects of CFS, monotonic and cyclic torsional loading tests were carried out with specimens which strengthened by lateral ties and unreinforced specimen for comparison. From both monotonic and cyclic loading test results, it was proved that the CFS can increase the ultimate torsional capacity and cracking torque. And it was also confirmed that the CFS had sufficient reinforcement effect, and for CFS strengthened specimen, the cracks of concrete were dispersed and widths were small. Mechanical properties such as torsional rigidity retention, residual twist, resilience and ductility were excellent. As for three-dimension finite element method analysis, analysis results matched the results of monotonic loading tests well and tracked the cyclic torsional loading tests when both nonlinear properties and hysteresis properties of each material were applied. A calculation concept including torsional effective cross-sectional area and thickness of shearing flow for the torsional capacity of CFS strengthened PC member was proposed.

Key Words: torsion, torsional reinforcement, CFS, loading test, FEM analysis, torsional rigidity

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