Abstract

The steel reinforcement imposes limitation to concrete structural members, which creates a need for finding a suitable alternatives. These limitations of steel are evident in it susceptibility to corrosion. Various recent researches in this field have indicated the suitability of utilizing the high tensile strength of composite materials bonded with a polymer. The most common of these materials are glass and carbon fibers reinforced polymer FRP. In this project, the focus was on the possibility of utilizing glass fiber reinforced polymer in concrete members that are designed to withstand compressive forces. The parameters investigated in this project are the FRP contribution in reinforced concrete columns compared to steel reinforcement, the effect of the stirrups spacing on the axial load capacity and the effect of reinforcement ratio on the mode of failure, axial load capacity compressive and tensile strains, and vertical deflection of the columns. The results of the tests indicated that the use of GFRP instead of steel as a reinforcement material resulted in reducing the axial load capacity of the column compared with both column reinforced with steel and column with no reinforcement. Also, increasing the stirrups spacing did not affect the column load capacity but did reduce the columns ductility post peak load. Finally, increasing the reinforcement ratio resulted in columns with negligible increase in load capacity.