

Review of Affected Parameters on Flexural Behavior of Hollow Concrete Beams Reinforced by Steel/GFRP Rebars

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Abstract : Nowadays, the main efforts of the researchers aim to constantly evolve new, optimized and efficient construction materials and methods related to reinforced concrete beams. Due to the fewer applied materials and offering a higher structural efficiency compared to solid concrete beams with the same concrete area, hollow reinforced concrete beams (HRCB) internally reinforced with steel rebars have been employed extensively for bridge structural members and high-rise buildings. Many experimental studies have been conducted to investigate the behavior of hollow beams subjected to bending loading and found that the structural performance of HRCBs is critically affected by many design parameters. While the proper design of the HRCBs demonstrated comparable behavior to solid sections, inappropriate design leads beams to be extremely prone to brittle failure. Another potential issue that needs to be further investigated is the replacement of steel bars with suitable materials due to their susceptibility to corrosion. Hence, to develop a reliable construction system, the application of GFRP bars as a non-corroding material has been utilized. Furthermore, this study aims to critically review the different design parameters that affect the flexural performance of the HRCBs and recognize the gaps of knowledge in the better design and more effective use of this construction system.

Keywords : design parameters, experimental investigations, hollow reinforced concrete beams, steel, GFRP, flexural strength

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