

Behavior of R.C. Deep Beam with Web Openings Strengthened

With Ferrocement Overlays

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Abstract:

The main purpose of this study is to investigate the behavior of R.C deep beam with web openings retrofitted by ferrocement laminates. In order to achieve this objective, a total of fifteen simply-supported deep beams were tested under central point load. Three of them kept as reference specimens (un-strengthened specimens) and the remaining twelve beams were externally strengthened by ferrocement overlays with different strengthening schemes such as all sides of the beam and around the opening. The essential parameters that were considered include the number and the type of steel wire meshes, thicknesses of plastering mortar, mortar strength and the opening location (bending and shear zone). The experimental work confirmed that the behavior of R.C. deep beams with openings has been evidently improved by using ferrocement layer as a strengthening technique. It was observed that the ultimate load carrying capacity was reduced by 31% and 16% due to the existence of opening placed at the shear and flexural span respectively. The experimental results indicated that the ultimate failure load, ductility ratio and uncracked stiffness of strengthened specimens with openings in the shear zone were increased by about 85%, 19%, and 65% of the un-retrofitted deep beam with holes.

Keywords: Deep Beam, Ferrocement, Strengthening, Openings.