Post-Installed Reinforcing Bar Splices in Concrete Beams

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Abstract

In this research the current status of the available anchorage systems and the influence of the important parameters on the splice lengths of reinforced concrete beam are presented. In particular, the behavior of post-installed rebar connections is explained in detail. This research studies the lap lengths with pre-qualified mortars. It is based on chapter 12 of the American "Building Code Requirements for reinforced concrete" (ACI 318). This code defines the lap length of reinforcement bars as a function of concrete strength, cover distance, anchor diameter, amount of reinforcement in concrete (main and transverse) and size of concrete specimen. This research studies the most important parameters including splice length, main bar diameter and the ratio of transverse reinforcements (stirrups) on the lap behaviour in reinforced concrete beams. Twelve specimens were experimentally tested with static load applied at the two third-points of the beam until failure. Loads and displacements were recorded together with monitoring cracks development. The outputs of strain gauges in the steel and concrete were also recorded. The results are compared with ACI 318-02 requirements. No bond failure was observed in the post-installed bars. Failures in the lap length area were either brittle bond failure in the cast-in bars or ductile flexural failure. It is concluded that the ACI equations for lapped bars in tension are also valid when post-installed bars are lapped to cast-in bars.