

عنوان مقاله:

Effect of Surface Defects on FRP-Concrete Interface Bond Strength

محل انتشار:

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خلاصه مقاله:

Carbon Fiber Reinforced Polymer (CFRP) laminates have been successfully used as externally bonded reinforcements for retrofitting, strengthening and confinement of concrete structures. The adequacy of the CFRP-concrete bonding largely depends on the bond quality and integrity. The bond quality may be compromised during the CFRP installation process due to various factors. In this study, the effect of four such construction-related factors were assessed through various laboratory destructive testing methods, and quantification of any detrimental effects was achieved. The factors were: surface voids, surface wetness, upward vs. downward CFRP application, and surface cleanliness. A common unidirectional CFRP was applied to small scale flexural concrete samples with induced surface defects. Schmidt Hammer, pull-off testing and flexural testing were employed to determine possible detrimental effect of the induced parameters on the bond quality and flexural failure load. The Schmidt Hammer approach was found to be inconsistent for application on the CFRP surface. Pull-off and flexural testing showed that surface wetness, cleanliness and upward CFRP application cause minor reduction in the bond tensile and bending strengths, in the range of ۳ - ۹%. This is possibly due to premature CFRP debonding failure at the epoxy interface. Small surface air voids below the CFRP (less than around ۲% pf the CFRP area) cause minor bond strength reduction and may be neglected. Carbon Fiber Reinforced Polymer (CFRP) laminates have been successfully used as externally bonded reinforcements for retrofitting, strengthening and confinement of concrete structures. The adequacy of the CFRP-concrete bonding largely depends on the bond quality and integrity. The bond quality may be compromised during the CFRP installation process due to various factors. In this study, the effect of four such construction-related factors were assessed through various laboratory destructive testing methods, and quantification of any detrimental effects was achieved. The factors were: surface voids, surface wetness, upward vs. downward CFRP application, and surface cleanliness. A common unidirectional CFRP was applied to small scale flexural concrete samples with induced surface defects. Schmidt Hammer, pull-off testing and flexural testing were employed to determine possible detrimental effect of the induced parameters on the bond quality and flexural failure load. The Schmidt Hammer approach was found to be inconsistent for application on the CFRP surface. Pull-off and ... flexural testing showed that surfac

کلمات کلیدی:

CFRP laminate, CFRP-concrete bond, Concrete surface defects, CFRP debonding, Flexural capacity

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