

Study of Debonding of Composite Material from a Deforming Concrete Beam Using Infrared Thermography

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Abstract : This article focuses on the cycle of experimental studies of the formation of cracks and debondings in the concrete reinforced with carbon fiber. This research was carried out in Perm National Research Polytechnic University. A series of CFRP-strengthened RC beams was tested to investigate the influence of preload and crack repairing factors on CFRP debonding. IRT was applied to detect the early stage of IC debonding during the laboratory bending tests. It was found that for the beams strengthened under load after crack injecting, CFRP debonding strain is 4-65% lower than for the preliminary strengthened beams. The beams strengthened under the load had a relative area of debonding of 2 times higher than preliminary strengthened beams. The CFRP debonding strain is weakly dependent on the strength of the concrete substrate. For beams with a transverse wrapping anchorage in support sections FRP debonding is not a failure mode.

Keywords : IC debonding, infrared thermography, non-destructive testing methods, quality control, strengthening

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