

Behavior of a concrete bridge cantilevered slab reinforced using NSM CFRP strips

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Abstract

Concrete beam strengthening using near surface mounting (NSM) carbon fiber reinforced polymers (CFRP) have shown excellent performance. However, the behavior of these elements in real structures has not yet been deeply studied. This paper presents results, taken over a 2-year period, of a field investigation of the behavior of NSM CFRP reinforcement in a concrete bridge under service conditions. Also, four RC beams were tested in the laboratory under monotonic load to study behavior under ultimate conditions. In service conditions, strains in concrete and CFRP were 42% and 6% of the ultimate capacity, and the concrete slab developed 8% of its ultimate strength, confirming that CFRP improved bridge performance. The results from laboratory tests of CFRP reinforced beams, and the measurements of concrete and CFRP deformations taken at the concrete bridge suggest that the NSM CFRP reinforcement used is effective, and that the strength of the reinforced bridge is adequate..

Keywords

Near surface mounting, Carbon fiber reinforced polymer, Concrete bridge, Reinforcement, Flexural strengthening.