

Design, Construction and Evaluation of Ultra-High-Performance Concrete (UHPC) Bridge Deck Overlays

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Abstract : The New Jersey Department of Transportation (NJDOT) initiated a research project to install and evaluate Ultra-High-Performance Concrete (UHPC) as an overlay on existing bridges. The project aims to implement UHPC overlays in NJDOT bridge deck strategies for preservation and repair. During design, four bridges were selected for construction. The construction involved the removal of the existing bridge asphalt overlays, partially removing the existing concrete deck surface, and resurfacing the deck with a UHPC overlay. In some cases, a new asphalt riding surface was placed. Additionally, existing headers were replaced with full-depth UHPC. The UHPC overlay is monitored through coring and Non-destructive testing (NDT) to ensure that the interfacial bond is intact and that the desired conditions are maintained. The NDT results show no evidence that the bond between the new UHPC overlay and the existing concrete deck is compromised. Bond strength test data demonstrates that, in general, the desired bond was achieved between UHPC and the substrate concrete, although the results were lower than anticipated. Chloride content is also within expectations except for one anomaly. The baseline testing was successful, and no significant defects were encountered.

Keywords : ultra-high performance concrete, rehabilitation, non-destructive testing

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