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Extended Abstract (no paper submission)

Design and Construction of UHPC Link Slabs

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Link Slabs
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Extended Abstract

The installation of UHPC link slabs provides a highly durable, minimally intrusive retrofitting technique that eliminates problematic deck joints from non-continuous bridge superstructures. UHPC link slabs can also be used on new bridges to eliminate deck joints where superstructure continuity is not desirable for structural reasons.

The New York State Department of Transportation has developed an innovative UHPC link slab design methodology. The governing design parameter is that the link slab must provide continuity of the deck slab yet offer negligible resistance against the girder's end rotation in order to retain the bridges simple span structural behavior. This is accomplished by using a partial depth UHPC slab between spans with the center portion debonded as a means to limit strains, induced by girder end rotation, to a manageable level. Our design utilizes a strain based analysis where the extreme fiber tensile strain in the UHPC is determined by the amount of girder end rotation under the assumption of linearly elastic flexural behavior. Using stress-strain relationships, the location of the neutral axis is found through an iterative algorithm. Upon convergence of the assumed and calculated neutral axis location, the tensile strain and compressive stress in the UHPC, along with the stress in the longitudinal steel reinforcement, is computed and compared to allowable values.

New York State has constructed numerous UHPC link slabs on a wide range of bridge types and configurations. This presentation will cover the design methodology of UHPC link slabs, and construction details and procedures. Our construction procedures include surface preparation, form work, casting, curing, maturity testing, and final surface treatments.