Field Investigation of Iowa DOT Deck Epoxy Injection Process

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Abstract

The methods used for the maintenance and repair of bridge structures are becoming ever more important as the nation’s infrastructure progressively ages. Often, bridges can be rehabilitated or repaired rather than replaced as most of the structure is considered in good condition. In Iowa, bridge decks are commonly the first component of a bridge that requires extensive rehabilitation, mostly because of the use of salts, plows, and overall traffic wearing. Since the 1970’s, the Iowa Department of Transportation (DOT) has used concrete overlays on concrete decks to restore the surface and to lengthen the service life of the bridge deck. This method has proven to be an effective means to inhibit chloride and water intrusion into the bridge deck, thus extending the deck service life.

Many of the overlays, however, are now in need of repairs as they have been subjected to the same elements which caused deterioration to the original deck. Frequently, the overlay delaminates from the original deck creating a plane between the two surfaces where water can intrude and expedite the deterioration of the overlay. It has been observed that the life of the overlay can be extended, and thereby delay more significant repairs, by injecting epoxy into the void caused by the delamination. Currently, although this injection process is performed by all six of the Iowa DOT district bridge crews, the process and procedures used to complete this process varies slightly from one district to another. Therefore, an evaluation of epoxy injection performance in each district and the creation of a more formal procedure which takes from the best practices of the Iowa DOT and others are needed; this will allow the DOT to better predict the longevity of the repair and when other future maintenance activities might be necessary. The three objectives of this project include: 1) to determine the effectiveness, durability, and typical service life of epoxy injection of delaminated decks; 2) to evaluate the current state of the practice of the Iowa DOT and the epoxy injection industry; and 3) to develop procedures and specifications for epoxy injection.

This is a multi-year project due to the nature of the investigation. To this point, numerous bridges have been identified as epoxy injected within the past 10 years and were recently sounded to locate any delaminated portions and to gage the overall performance of the injection over the years. Others that have been recently injected were sounded before the injection process and then again thereafter. Resoundings will occur annually for several years to track the condition of the bridge deck and performance of the injection. To date, some preliminary best practices have been identified and are being conveyed to the bridge crews. This presentation will focus on the injection practices of Iowa DOT crews, the sounding results obtained from previously injected bridges, and the preliminary findings of best practices within the state.

Key Words: Deck Overlay, Deck Delamination, Epoxy Injection
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