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14. Supplementary Notes

15. Abstract

Purpose and Need

When moisture and the chloride ions penetrate deep enough, the reinforcing steel starts to corrode. This corrosion causes extreme pressure in the concrete due to the volume change in the steel. This volume change starts to slowly break the concrete apart. With the intrusion of water into the concrete, small voids are filled with water and become susceptible to freeze thaw cycles causing internal expansion within the concrete resulting in deterioration.

When a bridge deck is 20% delaminated, a bridge deck overlay is usually the rehabilitation option chosen, provided the structure is not deficient or in need of replacement. However, for the bridge decks that have delamination of less than 20%, the NDDOT does not currently have another rehabilitation or maintenance option available for use.

Objective

For bridge decks with very little delamination, another alternative needs to be available to protect the concrete so the bridge can remain in service for a longer time before the public is inconvenienced by rehabilitation of the bridge deck. One method is to apply a concrete surface and crack sealer to the existing concrete bridge deck. If the delamination is from corroding reinforcing steel, the sealer may create a barrier that will stop the intrusion of water and deicing chemicals; thereby slowing the further corrosion of the steel. Further deterioration caused by the expansion of freezing water in small voids may be stopped if the intrusion of water can be halted.

This study proposes to compare the performance of several different products used to seal the concrete surface and cracks.

Scope

A literature search was performed and several products were chosen.

The three products selected are: Radcon Formula #7, Degusa Degadeck Crack Sealer, and Tamms Dural 335. Each product will be applied according to the manufacturer's recommendations. There is a total of four bridge decks in this research project.

The total deck surface area for all decks combined is 2,414 SY. Each product will be applied to approximately 25% of the total surface area of the decks with 25% of the total surface area left for control sections.

Summary

The Tamms and Degusa product have areas where excess material has been applied to the deck surfaces. This is most noticeable in the deeper tined concrete. Cracks are visibly sealed with these sealers. The Radcon product is unnoticeable as to the amount of sealer applied when dry. The depth of tining remains unchanged when Radcon is applied. It is unclear if the cracks in the Radcon section are sealed as the sealer is intended to penetrate the surface and form a gel in the cracks. The chloride sampling and chain dragging results are summarized in Tables 6 and 7. From the results of these tests it is difficult to draw conclusions to whether or not the products are meeting the manufacturer's performance characteristics.

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