

ABSTRACT

This study aims at summarizing the state-of-the-art on types and use of coated reinforcing steel with special focus on fusion bonded epoxy coatings. It provides INDOT with an overview of the current research and practice on durability and performance of epoxy-coated and stainless-steel cladding reinforcement. It also provides a summary of USDOT practices related to corrosion protection systems. This information is compiled to assist INDOT in the evaluation of epoxy-coated reinforcement against the use of other alternatives for use to protect concrete bridge decks against corrosion of reinforcement under the current practice of deicing salts in Indiana.

The most recent investigations on durability and performance of epoxy-coated reinforcement and stainless-steel clad rebar, including lifecycle assessments and construction guidelines were reviewed. The literature review spans from the 1980s Florida Keys experience to recent studies on various coated reinforcements. The literature review was supplemented with a survey of US DOTs designed to elucidate use of epoxy-coated reinforcement in concrete bridge decks and the lessons learned in research, field implementations, durability, and corrosion methods.

The findings indicate that the most reliable and widely used epoxy-coated reinforcement is the fusion bonded epoxy coating meeting ASTM A775/A775M and manufactured in plants that participate in the CRSI voluntary epoxy coating plant certification program. Moreover, maintaining the integrity of the coating during construction is a key factor in the performance of this reinforcement. Stainless steel clad to be a promising method for corrosion protection of reinforcement and is expected to compete with the costs of galvanized steel (Mcalpine, 2023). However, there is no evidence that this product will be available for DOTs to implement in their practice in the short term. It is recommended that INDOT continues using FBE 413 (green coating) with good quality concrete and adequate cover and attention to handling during construction.