



ABOUT THIS PROJECT

PROJECT NAME: [Observation, Documentation, and Performance Evaluation of Bridge Deck Using Multi-Crystalline Intermixed Concrete Enhancer and Surface Sealer](#)

PROJECT NUMBER: SPR-RE25(008)-8H-00

PROJECT FUNDING PROGRAM:
State Planning and Research

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RESEARCH IN PROGRESS

Evaluating materials to limit water intrusion on bridge decks

Bridge decks are particularly susceptible to the negative effects of water intrusion, more so than other concrete bridge components. When water penetrates the concrete, freeze-thaw cycles can cause the deck to crack and deteriorate, damaging the driving surface. Chloride ions can also seep into cracks and degrade the deck's steel reinforcement. Over time, these effects can shorten the service life of the bridge.

A three-year project in Appanoose County, Iowa, will evaluate two materials that can be incorporated in bridge decks: MCE, a multi-crystalline concrete admixture that reduces water penetration by sealing pores in the pavement, and PAVIX, a waterproofing sealer applied to the deck surface. "Field-testing

these innovative materials may help Iowa build longer-lasting bridges," said Michael Nop, bridge project development engineer at Iowa DOT.

Beginning with the test pour of the concrete, researchers documented all construction process steps for the bridge deck placement, detailing any changes to the typical process associated with the inclusion of the MCE admixture. Following bridge deck placement in August 2023, the PAVIX sealer was applied to one-half of the bridge deck. Road surface and environmental conditions were noted. After these applications, research team members shared their observations during an interim presentation.

Inspections have continued since bridge deck construction, starting

at three-month intervals during the first year and at six-month intervals for the remaining two years. These assessments involve visual inspections for cracks or poor condition, and laboratory tests to measure chloride ion penetration. Adjacent concrete slabs not treated with MCE or PAVIX have offered useful comparison data.

The research is expected to conclude in June 2026.

To learn more about this project and subscribe to updates, visit [Idea #3943](#).

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