

FISHERINSIGHT

Bridge Decks: How can you make the most of what you have?

Extending the life of your bridge deck is where the rubber truly meets the road in minimizing your long-term bridge costs. A cracked or delaminated deck and leaking, failed joint systems will soon lead to deterioration of support beams, bearings and foundations. Whether it is a simple joint replacement, crack sealing, or wearing surface reconstruction, staying ahead of deck deterioration with preventive maintenance is the most economical way to protect your entire bridge investment. So how will you discern what maintenance tasks should be performed, and when will they be most effective?

A thorough assessment of the deck is key to evaluating the extent of deterioration, which can

include physical (cracks, spalls, corrosion), chemical (chloride contamination, alkali-silica reaction (ASR), and efflorescence), and/or electrical (stray current electrolysis corrosion). A testing program using one or more non-destructive tests with core sampling and testing, coordinated with a focused special inspection will help determine the proper level of rehabilitation needed to get the most out of your bridge deck.

Along with regular maintenance of joints during the life of the bridge deck, maintaining the integrity of the wearing surface is the first line of defense in protecting your deck and superstructure. Cracks in decks give paths for moisture and chlorides to reach the top reinforcing mat which leads to corrosion. Once corrosion starts, delamination of the wearing surface will propagate, accelerating deterioration of the deck. Sealing the surface cracks within 5 years of formation will arrest chloride and moisture infiltration. You have several options for protecting your deck. Repairing spalls and delaminations then applying a waterproof membrane with an asphalt overlay has been a common approach. However, this adds dead load to the bridge, raises the road profile and reduces bridge rail height and effectiveness, and adds the cost of wearing course removal to future rehabilitation projects. Two solutions that eliminate these challenges, effectively fill and repair cracks, rejuvenate the riding surface friction and maintain the existing profile are the use of a healer-sealer with a broadcast stone surface friction treatment and the application of a Polyester Polymer Concrete overlay, or PPC.



The healer-sealer uses a high-molecular weight ultra-low viscosity acrylic polymer (methyl methacrylate) spread on the cleaned deck surface manually and topped with a broadcast stone grit. The ultra-low viscosity polymer penetrates thoroughly into cracks and provides a high-strength repair and surface sealant. The polymer also bonds the broadcast grit to the deck surface, providing an effective high-friction riding surface and sealer. The second option, PPC, is a mixture of polyester resin and aggregate. The PPC has a rapid cure time (2-4 hours) and can attain over 4000 psi in compressive strength within 24 hours. It also has greater flexural strength than conventional concrete, 1,500 to 2,000 psi, as compared to 650 to 800 psi for typical mix designs. It can be used to fill in spalls and voids up to 12 in. deep and is placed with a mobile mixer similar to a paving machine. Both of these processes can be prepared and placed rapidly for minimal impact to traffic, so are quick and effective ways to extend the life of your decks.

Fisher Associates has utilized the healer/sealer technology recently on two projects in the City of Elmira: the East Water Street Bridge over Newcomb Creek and the Washington Avenue Bridge over Norfolk-Southern Railroad. Both bridge decks were experiencing cracking and minor spot delamination, and were successfully and rapidly rehabilitated using this approach.

If you would like more information, or have any questions, please feel free to contact us.

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