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RESEARCH UPDATE

Performance Of Epoxy Bonding Compound In Reducing Perimeter Cracking On Bridge Deck Patches

Reference - July 16, 1986 request by the Structures Engineer for a field evaluation of the value of applying an epoxy bonding compound prior to placing new concrete patches on bridge decks.

Problem - The development of cracks around the perimeter of new concrete patches is a common occurrence on bridge deck rehabilitation projects. There are many factors which can have an effect on the development of the cracks. They include but are not limited to ambient conditions, concrete mix properties, quality of curing and deck flexure and vibration. The application of an epoxy bonding compound was tried in an attempt to reduce or eliminate perimeter cracking.

Field Trial - On July 25, 1986, Rambond 223W, a water base epoxy was applied on the horizontal and vertical surfaces of eight deck patches on Span #9 of U.S. 2, Bridge #55 in Middlesex, Vermont. The epoxy, which has a tac free time of approximately 12 hours was applied with paint brushes on 44 square feet of concrete at a thickness of 15-20 mils. Skies were hazy at the time of application with an ambient temperature of 85°F, a five mile per hour breeze and a concrete surface temperature of 122°F. Double A concrete was placed within 10 to 30 minutes of the epoxy application. All patches were cured with a membrane-forming curing compound. One-way traffic was maintained on the opposite southbound lane while the patches were allowed to cure for seven days.

Performance - Following the curing period, observation revealed the existence of cracking along the perimeter of about 50 percent of the patches. The level of cracking was approximately the same for areas treated with the epoxy and those left untreated. Photos were taken of the perimeter cracks.

Followup - Although this field evaluation suggests an epoxy bonding compound will not prevent the development of perimeter cracking on concrete patches, additional field tests with Rambond 223W or other bonding compounds could be justified to substantiate these findings.

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