

## OFFICE MEMORANDUM



MICHIGAN

STATE HIGHWAY DEPARTMENT

JOHN C. MACKIE, COMMISSIONER

September 11, 1964

To: E. A. Finney, Director  
Research Laboratory Division

From: A. J. Permoda

Subject: Second Annual Inspection of Epoxy Sealer between the Concrete and Bituminous Wearing Surface of the Approach Deck Spans of the International Bridge at Sault Ste. Marie (B01 of 17034). Research Project R-59 F-53(2). Research Report No. R-472.

In accordance with W. W. McLaughlin's memorandum of August 30, 1963 confirming J. E. Meyer's letter to N. E. McDougall of August 22, 1963, the second annual inspection of the subject bridge was conducted on May 23, 1964 by R. LaPonsie and R. H. Merrill of the Michigan State Highway Department, with D. Dell, Engineer for the International Bridge Authority. Details of the application and first annual inspection of the epoxy sealers were given in Research Report No. R-446 dated December 23, 1963.

For evaluation purposes and as described in Report 446, the deck of the 28-ft wide approach spans was divided into three areas. The north portion of about 985 lin ft (Piers 18R to 12) was coated with a polysulfide epoxy sealer conforming to Departmental Supplemental Specifications for Epoxy Seal Coat and Emulsified Asphalt Tack Coat. This was identical to the sealer used on the American portion of the bridge deck and similar to that used on the Canadian portion. About 1000 lin ft (Piers 12 to 2) adjoining those spans on the south were coated with a coal-tar-modified epoxy conforming to the Department's Proposed Specifications for Resinous Bridge Deck Waterproofing Membranes. About 96 lin ft adjoining these spans still farther south (Pier 2 to abutment) were left uncoated for purposes of control, or comparison.

The second inspection, as reported by R. H. Merrill, consisted of a general, overall deck inspection both from the top and underside to detect any signs of cracking and leaking, and also a spot inspection of the epoxy seals beneath the bituminous cap. The underside inspection showed no leakage through the stay-in-place forms in any of the three test sections. Some evidence of leakage was noted at nearly all of the transverse joints and at many of the drain castings. The leakage stains appear at the same locations as noted in the 1963 inspection.

E. A. Finney

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The deck upper surface was generally in good condition. A few cracks present in the bituminous cap on Spans 14 and 15 were the same ones reported in the first annual inspection report; they have not become noticeably worse since then. Some show signs of bulging around the crack (as they did in November), which is probably due to water trapped under the bituminous cap causing adhesion failure. One additional fairly bad transverse crack has developed between the wheel tracks in the southbound lane of Span 5 (Fig. 1). Lesser cracks were found in a small area surrounding this crack indicating a slight movement in this area of the cap. These areas will be examined closely in future inspections to determine if progressive failure is taking place.

The condition of the two epoxy seal coats and the concrete surface of the uncoated control area were inspected by chipping out 6-in. square sections of the bituminous cap and observing the surface below (Fig. 2). In all cases where the two epoxies were uncovered, the sealers were found to be in excellent condition as were the surfaces of the uncoated control sections. The polysulfide epoxy was found to be much more brittle than the coal tar-modified epoxy and could be scraped off the concrete with little effort. This material would probably not span a crack in the concrete if one developed. The coal tar-modified epoxy could not be scraped from the concrete and has remained fairly plastic. A small amount of moisture, in a dew-like deposit, was found beneath the bituminous cap when it was removed, presumably as a result of water filtering through the cap.

## OFFICE OF TESTING AND RESEARCH

A. J. Permoda, Supervisor  
Materials Research Section  
Research Laboratory Division

AJP:nl

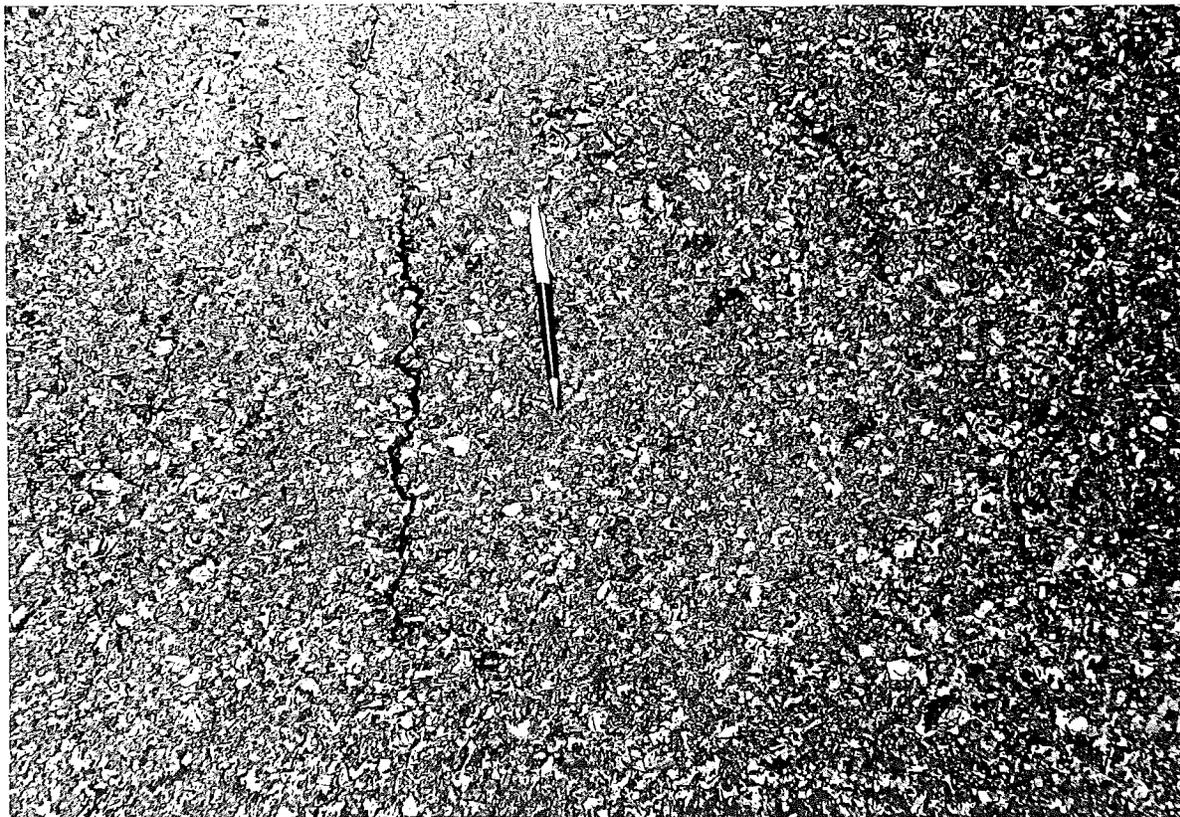


Figure 1. New crack appearing in the bituminous cap on southbound span 5 between the wheel tracks.



Figure 2. Examination of the sealer by removal of the bituminous cap (black square), revealed a dew-like deposit of moisture (photo taken at Pier 10 west gutter).