OFFICE MEMORANDUM

MICHIGAN
STATE HIGHWAY DEPARTMENT
JOHN C. MACKIE, COMMISSIONER

September 22, 1964

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

From: R. H. Merrill
F. J. Bashore

Subject: Application and First Inspection of "Epoxeal" Penetrating Sealer on Lansing Area Bridge Decks. Research Project 63 NM-83. Research Report No. R-476.

At its meeting of April 23, 1963, the Committee for Investigation of New Materials requested that the Research Laboratory Division test a penetrating epoxy material called "Epoxeal," formulated by the Protective Products Corp. of Gulfport, Miss. Two bridge decks selected initially for experimental application of the material were the west half of westbound I 96 over Canal Road, southwest of Lansing (S07 of 23152) and the north third of northbound I 496 the GTW RR between Kalamazoo St. and Mt. Hope Ave. (X06 of 33045).

The I 96 bridge had been in service for one winter, and exhibited some cracking and light scaling. Its deck, as well as curb faces and walks, were sealed October 22, 1963, by A. Johnson and R. Demert of Protective Products, using garden sprayers of 3-gal capacity (Fig. 1). The two-component Epoxeal was premixed 1:1 by volume before spraying. R. Merrill and F. Bashore observed the operations for the Department.

The I 496 bridge deck, which had been poured August 27-28, 1963, was sealed November 16 by J. Kovarik and D. Maxwell of Protective Products, with F. Bashore as observer. A gasoline-powered centrifugal pump with four spray nozzles were used (Fig. 2), with a hose and hand gun attached in place of one nozzle for curb face spraying. The sealer was premixed at the same ratio as in October.

Sealing of decks and curbs faces on six more I 496 bridges was authorized verbally by J. E. Meyer in a telephone conversation with R. L. Greenman on November 7, 1963. This was done to give added protection against salts during the first and subsequent winters. They were sealed by J. Kovarik and D. Maxwell from November 15 to 17, 1963, with F. Bashore observing. The gasoline-powered sprayer broke down several times, and much more time was required to finish the job than should have been necessary.

Application rates and weather conditions for eight bridges have been summarized as follows:

Date	Structure	Application Rate, sq ft/gal	Weather Conditions
10-22-63	S07 of 23152 WB	172	Sunny 80 F
11-15-63	B01 of 33171 SB	265	Cloudy 50 F
11-15-63	B02 of 33171 NB	238	Cloudy 50 F
11-16-63 and 11-17-63	X03 of 33045 SB	194	Sunny 60 F
11-16-63	X04 of 33045 NB	200	Sunny 60 F
11-16-63 and 11-17-63	X05 of 33045 SB	194	Sunny 60 F
11-16-63	X06 of 33045 NB	200	Sunny 60 F
11-16-63	X07 of 33045 NB	200	Sunny 60 F

Laboratory tests on samples of Epoxeal components Parts A and B indicate that:

1. Epoxeal Part A contains a solid epoxy, with a small amount of relatively non-volatile diluent, in methyl ethyl ketone and toluene, and is 36.8-percent solids by weight.
2. Epoxeal Part B contains a Versamid type curing agent in toluene and a glycol ether, and is 19.5-percent solids.
3. When Epoxeal Parts A and B are mixed 1:1 volume, the resulting solution is 28.5-percent solids.

The bridge decks were inspected by the writers on June 30, 1964, with the following results:

I 96 westbound over Canal Road. The surface coating appears to be nearly worn off in the traffic lane, but is still in evidence in the passing lane, on curbs, and on walks (Fig. 3). From inspection of upper and lower surfaces of the deck, it appears that all cracks are sealed (Fig. 4). Light localized scaling has progressed along the south gutter, probably due to standing water. A few scattered popouts have occurred since the coating was applied. The uncoated section shows continued leakage through cracks.

I 496 over GTW RR. The coating appeared to be in very good condition, except for some scaling along the east gutter (Fig. 5) due to a heavy coating of laitence. This scaling will probably continue. The uncoated control section (middle span) looks good although some pitting has occurred in the east gutter.

The other six I 496 bridges, sealed with penetrating epoxy without control areas for comparison, were inspected and found to be in good condition.

No statement concerning the value of the subject material seems justified at this time. Inspections after two or three winters of exposure should provide more meaningful information.

OFFICE OF TESTING AND RESEARCH

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RHM:FJB:jlk

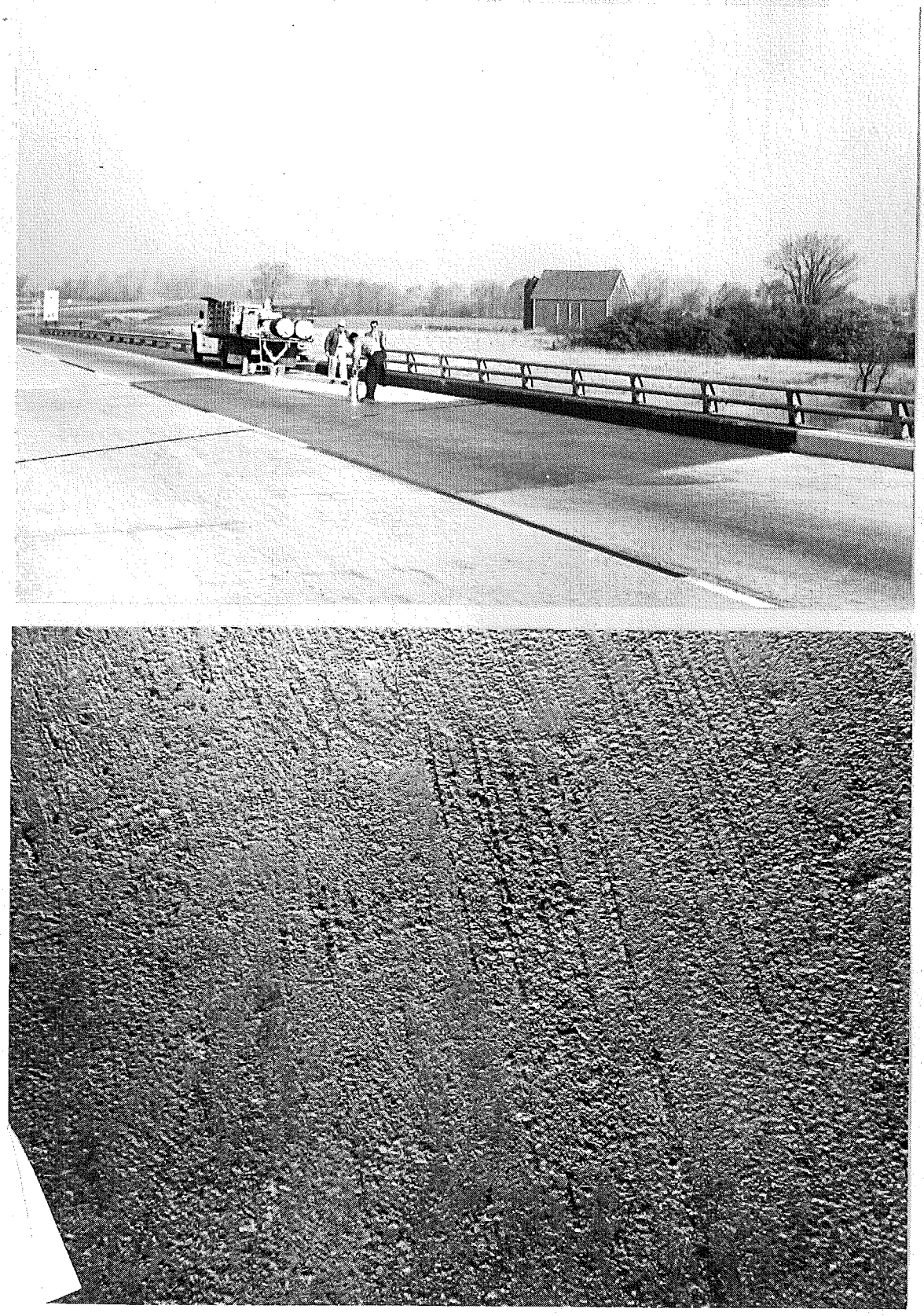

Figure 1. Application of epoxeal penetrating seal using a garden sprayer (westbound I 96 over Canal Road); appearance soon after application is shown at bottom (photo: 10-22-63).

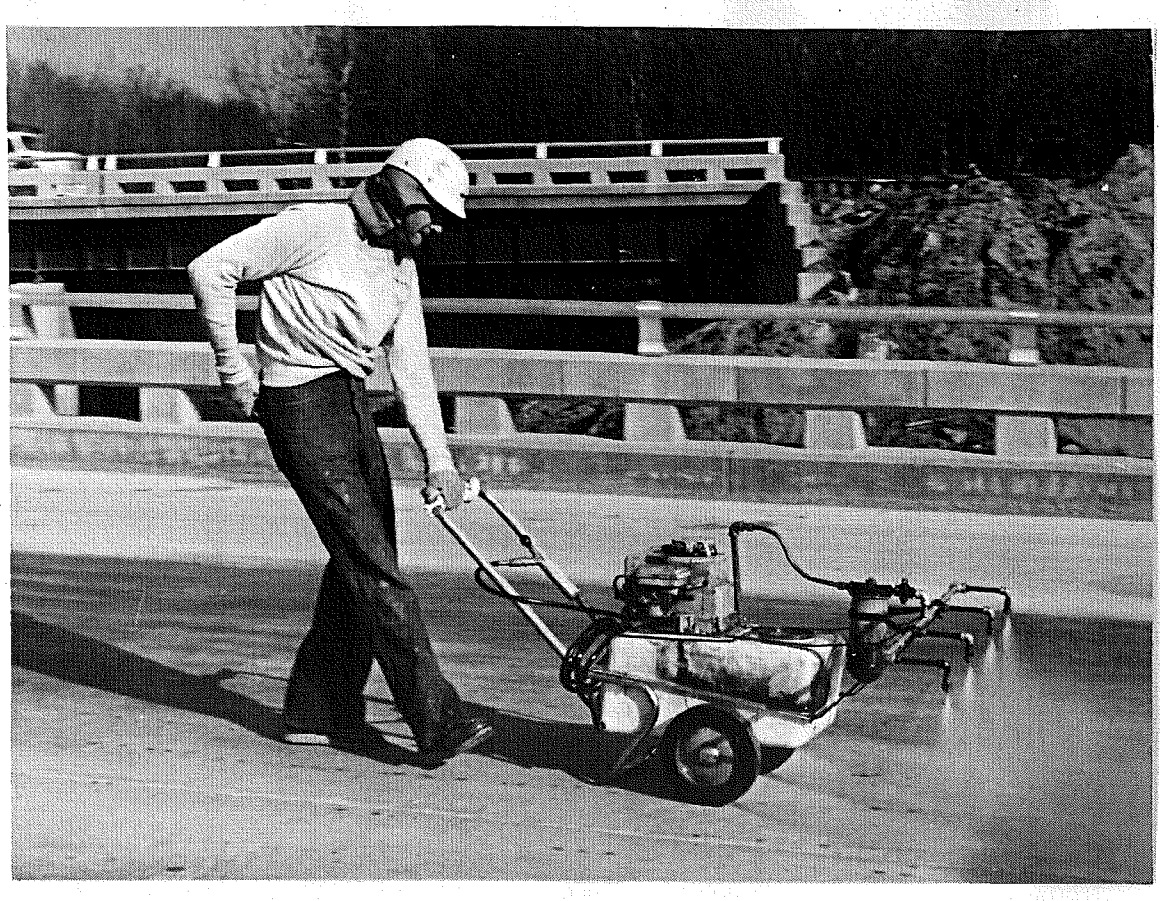

Figure 2. Epoxeal application with power sprayer on I 496 railroad overpass (photo: 11-15-63).

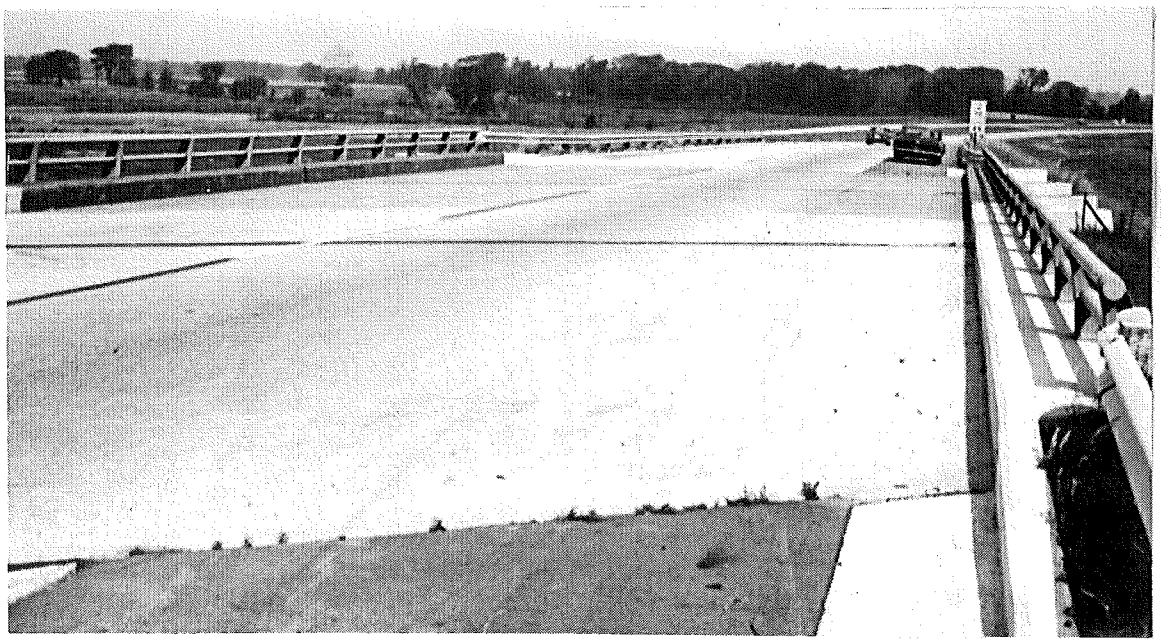

Figure 3. Canal Rd. bridge deck eight months after epoxeal application; control area in foreground and darker, sealed deck and curbs in background.

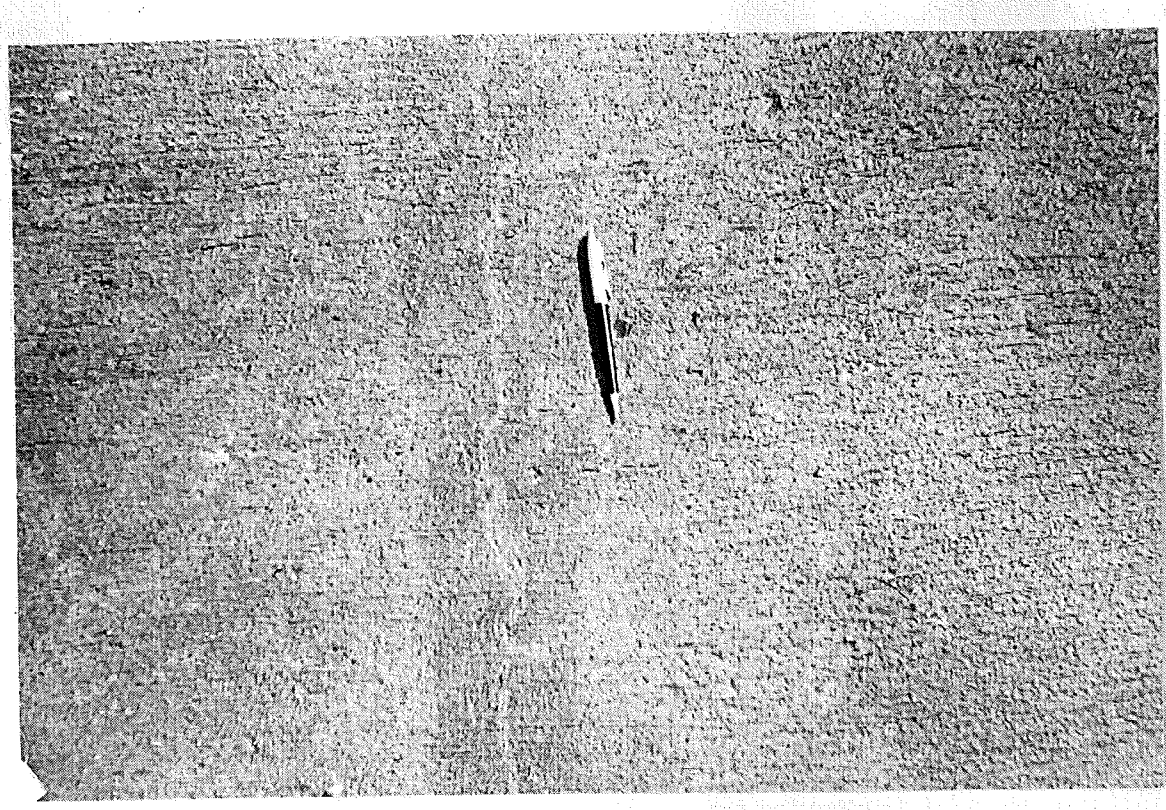

Figure 4. Appearance of Canal Rd. bridge deck surface eight months after epoxeal application; crack appears to be scaled.

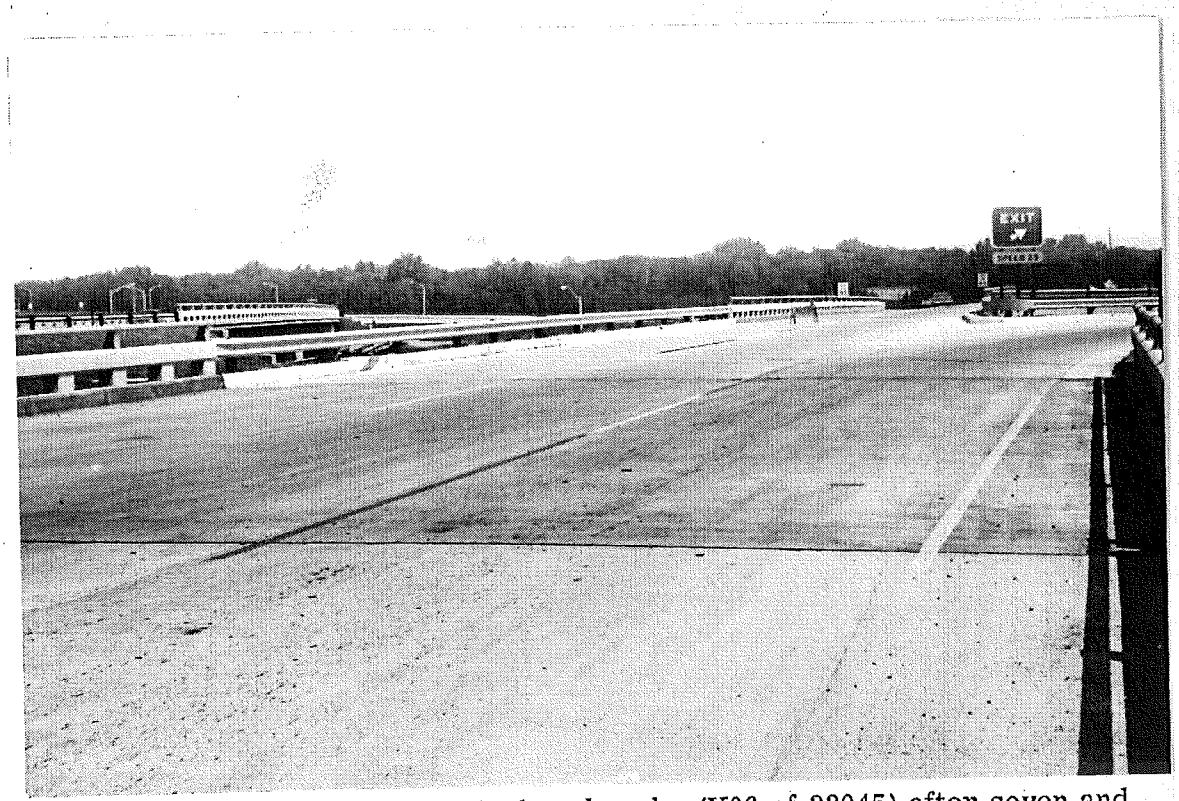

Figure 5. I 496 test bridge deck and curbs (X06 of 33045) after seven and one-half months of service; control area in foreground and darker, sealed area in background.