

## OFFICE MEMORANDUM



MICHIGAN

STATE HIGHWAY DEPARTMENT

JOHN C. MACKIE, COMMISSIONER

September 22, 1964

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

From: O. L. Lindy

Subject: Galvanized (Zinc Alloy) Steel Base Plates for Joints. Research  
Project R-63 NM-98. Research Report No. R-474.

At the request of R. L. Greenman, a study has been made of relative field performance of galvanized (zinc alloy) steel base plates now being used by the Department, for the information of the Committee for Investigation of New Materials. A preliminary report on this study was given in a memorandum dated September 16, 1963, which was discussed by the Committee at its meeting of September 17, 1963.

The study has included observations of base plates under various conditions and in various areas throughout the State. These have included excavation at joint ends on representative projects, observation of plate conditions during joint or shoulder repair, and a survey of photographic performance records in the Laboratory files.

First, random sampling of plate condition by excavation, while allowing examination of only the end portion of the plates, did provide samples with several total periods of service. In the dozen or more projects so studied, all plates were sound but all had some surface corrosion (Figs. 1 and 2). On all these projects, the sealers appeared sound, and the joints appeared to be functioning correctly at the time of inspection.

Second, base plates examined at sites where joint repairs were in progress generally were characterized by deeper corrosion than where joints were sound. In all, eight joints undergoing repair were examined, including five with 4 to 5 years of service, and three with 7 years of service (Figs. 3 and 4). In one joint with 10 years of service, however, where the sealer was still sound and the joint appeared from visual observation to be in fair to good condition at the time of shoulder repairs, the plate was sound with only slight surface corrosion (Fig. 5).

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The third and most extensive source of information was the photographic data from Research Project R-39 F-7(14), covering performance history of all truckline concrete projects constructed since 1946. These records confirm the general observation already stated that corrosion is usually superficial where the joint is sound and has sealant performing reasonably well, but more extensive where the joint has failed.

In summary, from this survey of base plate conditions through random excavation, observations during joint or shoulder repair, and examination of project performance records, involving many trunkline areas and projects, with varying periods of service, corrosion does not appear to present a problem if the installation was correct at the time of construction, if the joint sealant remains sound, and if the joints seem to function correctly. The evidence would indicate that corrosion may accelerate with joint deterioration, but that it remains a minor problem so long as the joint itself is sound.

OFFICE OF TESTING AND RESEARCH

O. L. Lindy, Supervisor  
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OLL:nl

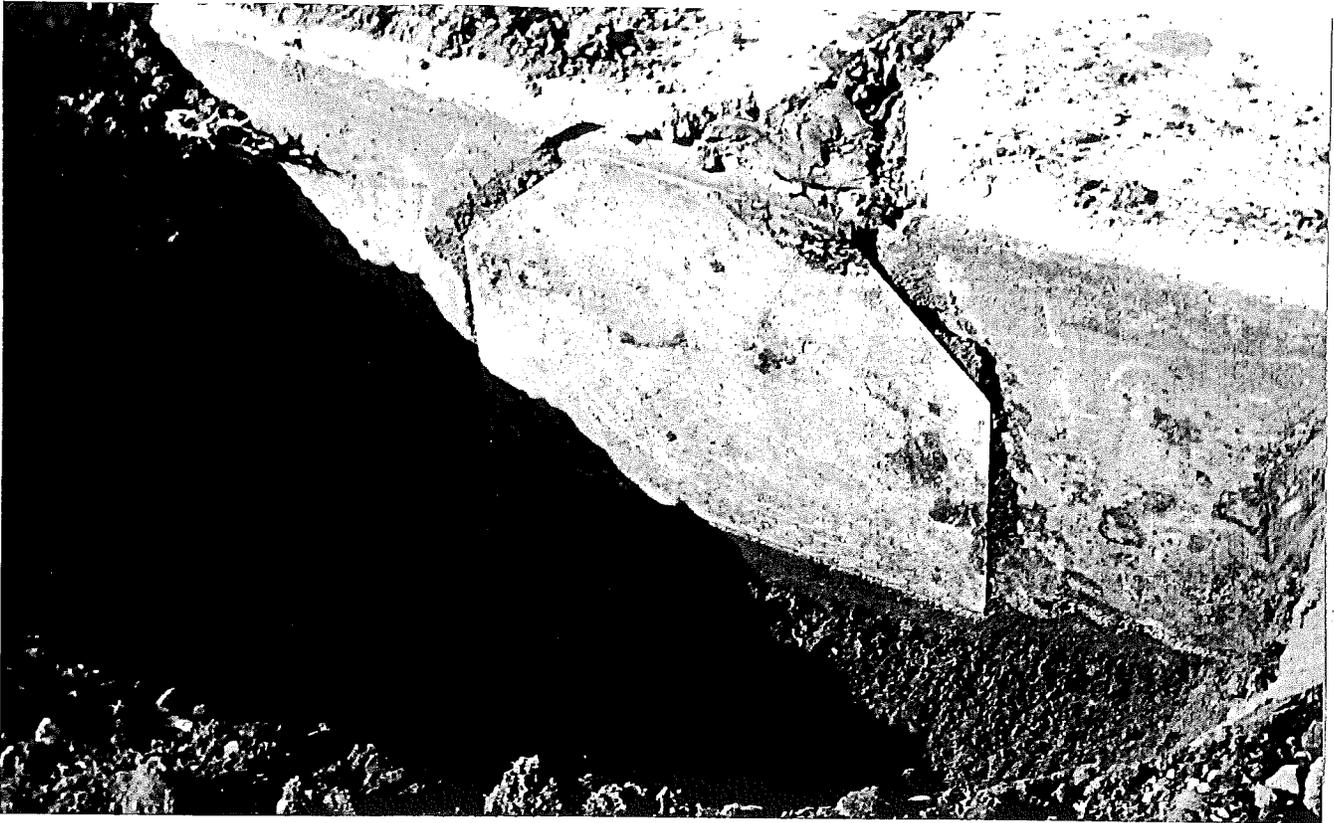


Figure 1. Three-year old base plate in place (top) and opened to expose joint end (Project 39-40, C4).

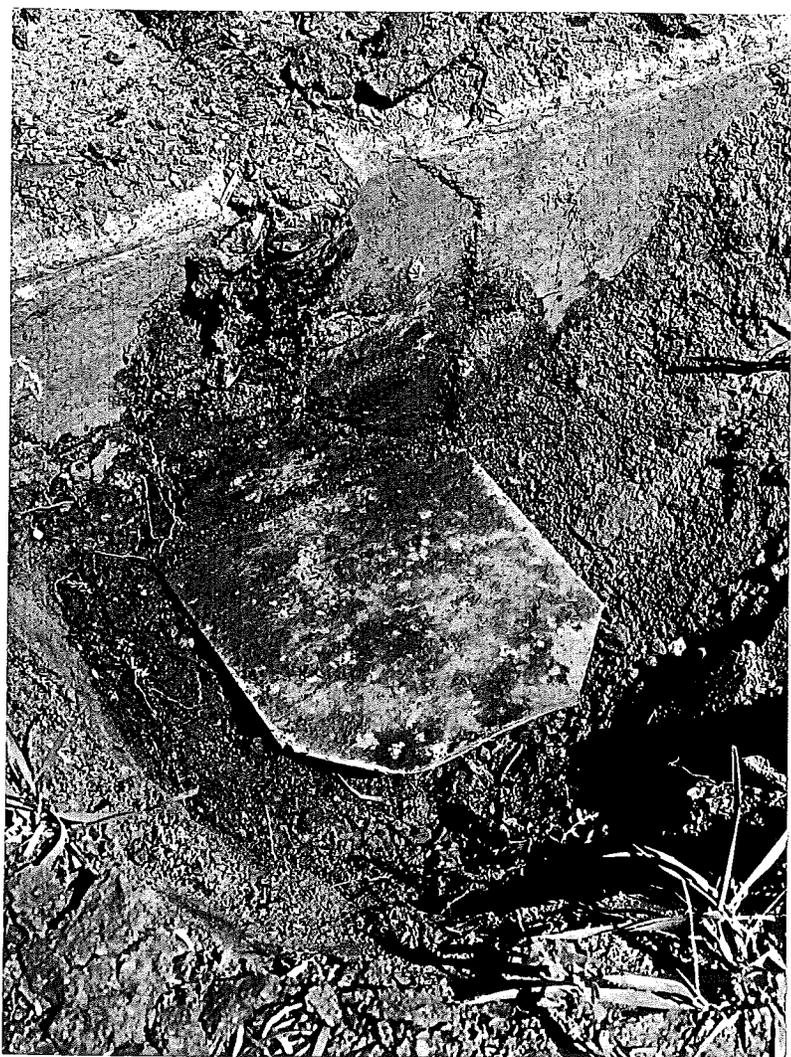


Figure 2. Six-year-old joint showing surface and base plate conditions (Project 23-17, C14).



Figure 3. Seven-year old base plate, during joint repair (Project 23-17, C4).

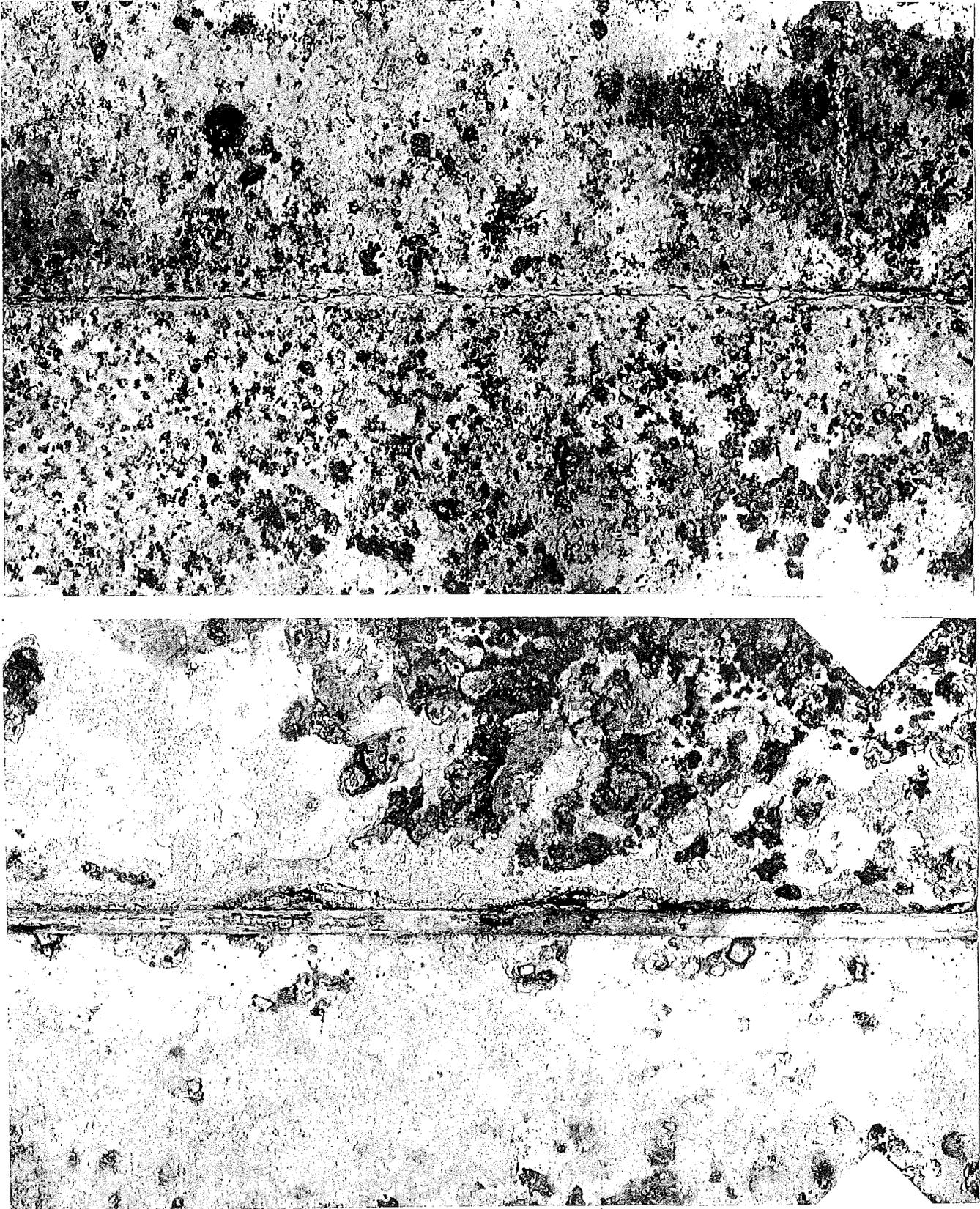


Figure 4. I 94 base plates after four and one-half years of service (Project 13081, C2).

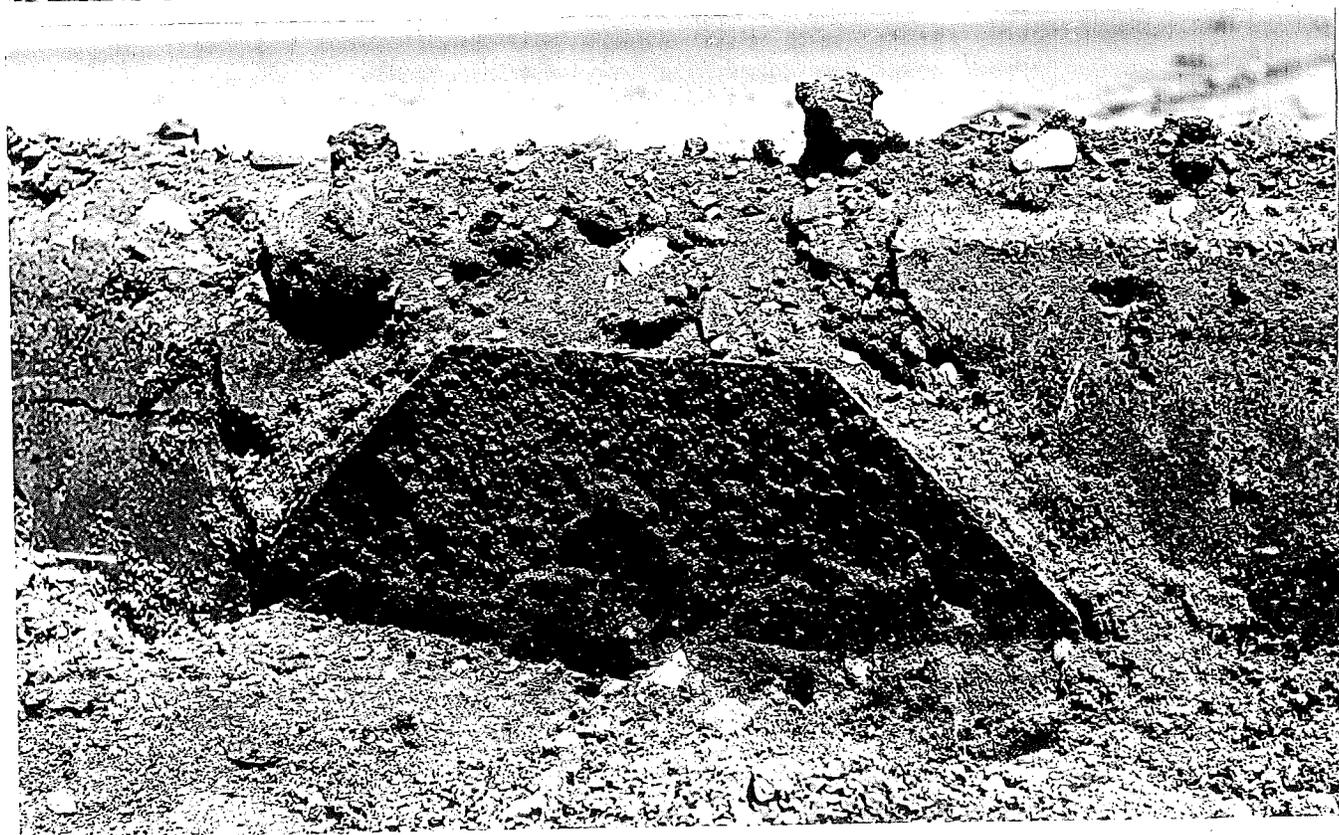
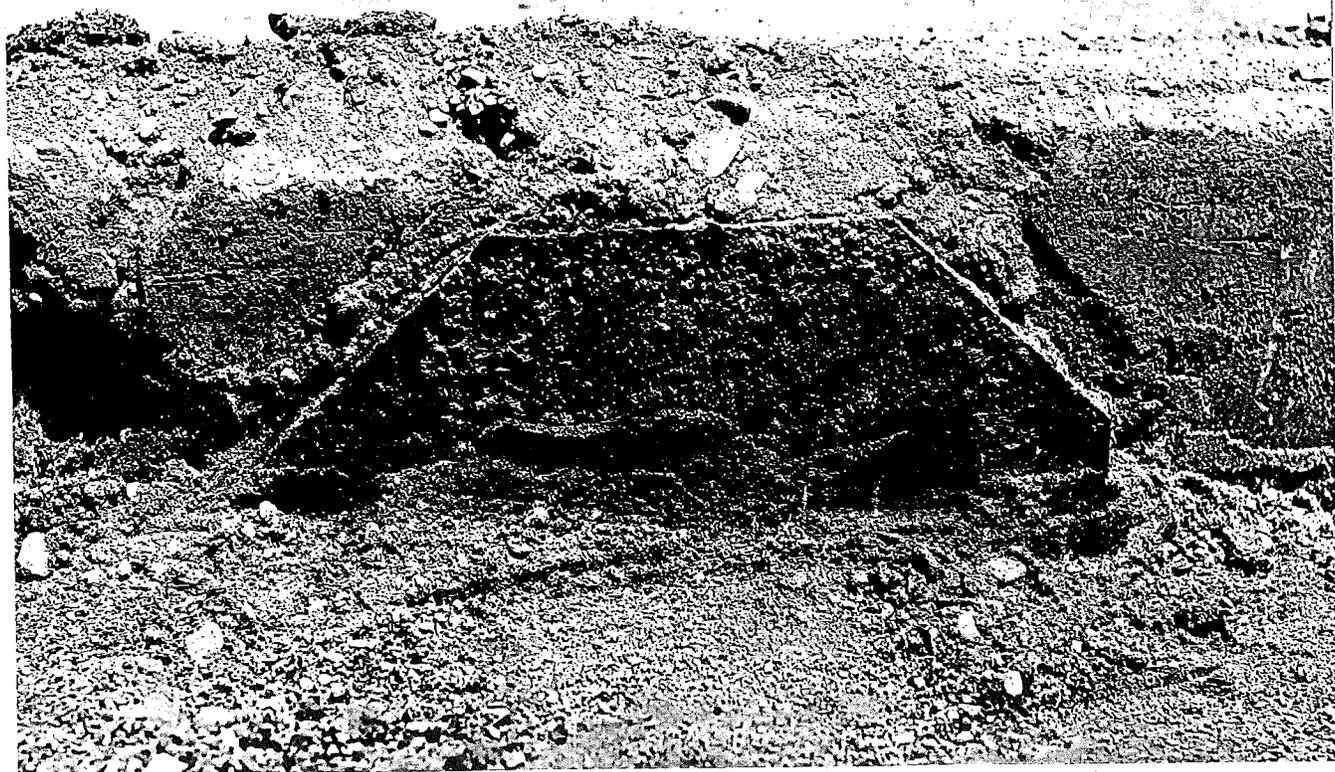


Figure 5. Base plates at two joints, after ten years service (Project 38-48, C9).