OFFICE MEMORANDUM

MICHIGAN
DEPARTMENT OF STATE HIGHWAYS

June 25, 1969

To: Traffic Control Devices Committee

From: A. J. Permoda

Subject: Third Progress Report on Thermoplastic Pavement Markings on W. P. Chrysler Freeway (Projects BI 82111C, C24; BI 82251C, C34): Research Project 47 G-36(17a). Research Report No. R-706.

The first report on these markings, Research Report No. R-481 (November 9, 1964), covered the application of the markings by the Perma-Line Corporation from June 18 to 24, 1964, prior to official opening of the roadway, and their performance during the first few months of service.

The second report, Research Report No. R-560 (November 8, 1965), covered performance of the markings through the first one year and four months of service. The report noted that some lengths of the broken lane lines, confined mostly to the long curve spanning Gratiot Avenue, had lost up to 50 percent of their area via a chipping or fraying mechanism. Remaining markings were better, showing variable deterioration.

This, the third report, covers subsequent actions and performance up to now, the five-year service level. These are reviewed chronologically:

1. On July 6, 1966 (two-year service level) a requested inspection was made by Subcommittee and District personnel who found the previously reported bad area to have deteriorated to the point of providing inadequate delineation, and some progressive deterioration in remaining areas which, however, was considered minor and satisfactory. This was reported orally to management.

2. On July 11, 1966, J. E. Meyer notified the applicating contractor of this condition stating that some "units" (defined as 2000-ft lengths) of the markings were no longer serviceable and gave less than guaranteed service (75 percent minimum at the two-year level per unit), and requested localized corrective maintenance.

3. On August 11, 1966, a joint inspection was made by a representative of the contractor and Department personnel, who confirmed that some lengths of the striping needed replacement, specifically 168 twenty-foot sections (The original installation covered about 40,000 ft of striping). The representative indicated an early replacement.

4. The contractor then tried delaying action hoping to couple the replacement work with a contract for other striping, extracted from the Department. The tactic was unsuccessful in the latter effort.

5. On June 8, 1967 (three-year service level) the contractor replaced the deteriorated striping, actually willingly restriping 284 twenty-foot sections instead of the 168 agreed on a year earlier. This took care of additional deterioration of the striping during the interim. The work was done in one day, covering 9 a.m. to 3 p.m. The applicator and priming equipment were the same as used for original application. The restriping was conducted under traffic, similar to the Department's "Fast-Dry" operation. All lengths within the unsatisfactory Gratiot Avenue area were restriped regardless of condition of residual markings. The new striping was applied over the residual original striping. Materials used were: 3,000 lb of plastic-beads mix, 200 lb of overlay beads and 14 qt of epoxy primer.

6. On September 13, 1968, (four-year service level) Subcommittee members inspected the markings and found general deterioration loss, probably greatest on the restriping. An exception were the shoulder markings on a bituminous base which were in good condition. The lane lines, nevertheless, were considered adequate for service over the coming winter.

7. On June 4, 1969 (five-year service level) Subcommittee and District personnel again inspected the markings and found additional deterioration. The condition was variable, ranging from almost no residual markings in the southern restriped portion (Fig. 1) to spotty adequacy in the northern portion (Fig. 2). Lane markings on the long ramps connecting the Chrysler with I 94 were roughly in the same condition as other northern portion striping. Edge markings as ramp delineation on bituminous shoulders, though cracked (Fig. 3), showed only light loss of material (Figs. 2 and 3).

Recommendations:

Since subject lane markings no longer provide adequate delineation on about half of the test roadway, we recommend that all of it be restriped and this portion of the observations be terminated. An exception would be the ramp edge-markings on bituminous shoulders which are still most adequate: observation of their performance can continue.

Summary

The test experimental thermoplastic markings had a service life of five years as lane striping on the Chrysler Freeway (new concrete). Since it is now beyond the four-year limit of the service guarantee, no further maintenance is forthcoming from the contractor. During the test, markings on a long curve

had to be replaced at the two to three year level by the contractor, under warranty. This same area again rates poorest at the five-year level indicating that these markings are susceptible to attrition by wandering traffic at curves. However, an exception to the latter was shown on long curved rampways connecting to the Ford Freeway where the lane markings gave better performance. In reviewing the above performance it should be noted that during most of the test, the Chrysler Freeway carried much less than its designed traffic load, and that it received minimal snowplowing. The latter is a significant factor in the service life of this type of thick marking (1/8 in.) which has also been affirmed in supplemental Departmental experience and a recent BPR survey.

A minor fraction of the test thermoplastic striping is still in acceptably good condition, at the five-year service level, where applied as ramp edge-striping on bituminous shoulders.

Other information gleaned from the tests:

1. These markings had poorer night visibility than Departmental paint stripes.

2. These markings had no better, or just marginally better, visibility when wet than Departmental paint stripes.

3. At 32 cents a lineal foot of 4-in. stripe, these markings cost at least ten times that of Departmental paint striping.

TESTING AND RESEARCH DIVISION

A. J. Permoda

A. J. Permoda, Chairman
Traffic Paint Subcommittee

AJP:sjt

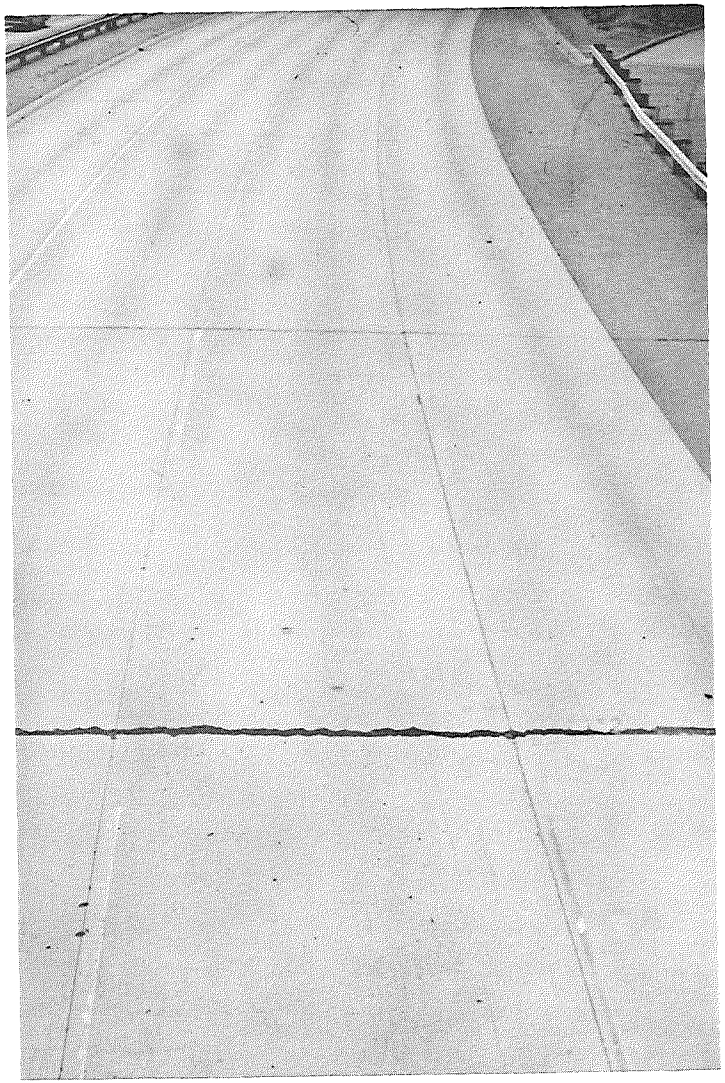

Figure 1. Appearance of test markings after a total of 5 years of service--but 2 years after restriping--showing inadequate delineation. Photo shows curved SB Chrysler from pedestrian overpass at Division St.

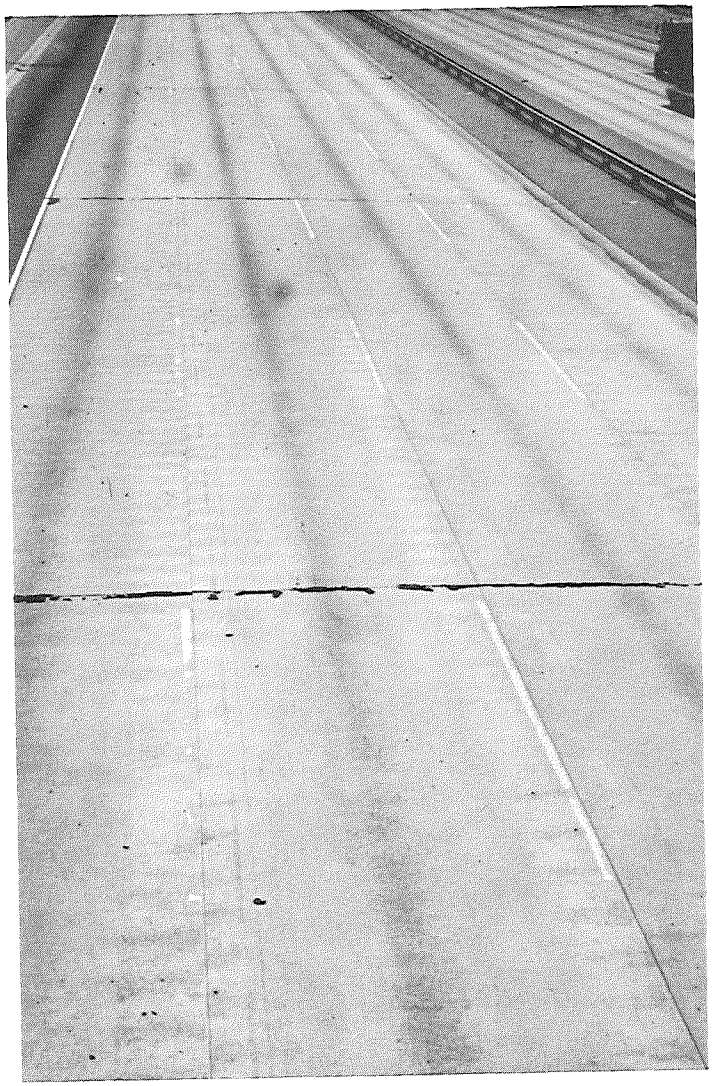

Figure 2. Appearance of test markings after 5 years of service on straight section of Chrysler N of Canfield overpass. Edge line (upper left) is in very good condition on bituminous shoulder.

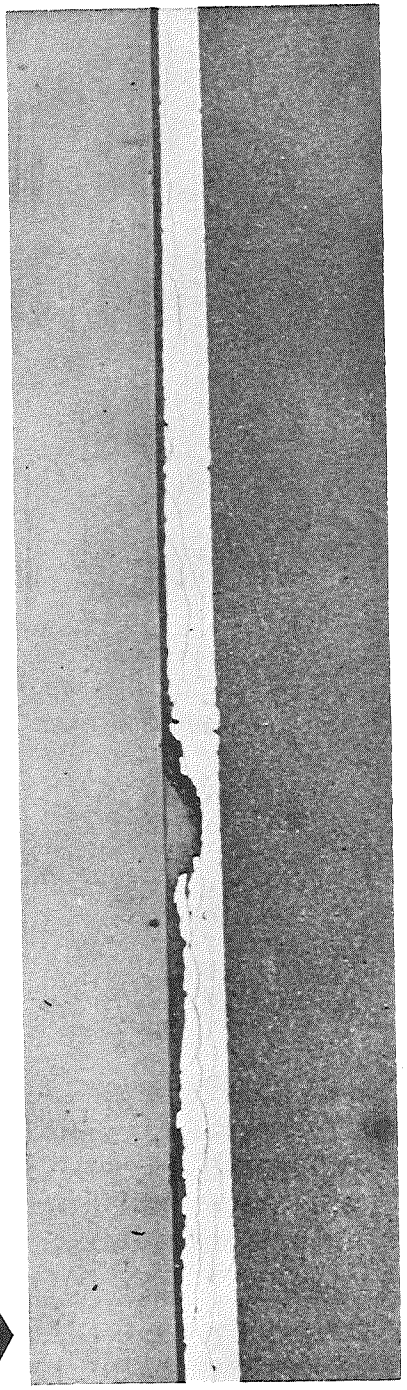

Figure 3. Appearance of test markings (edge ramp line on bituminous shoulder) shows very good delineation after 5 years of service. Shrinkage cracking is evident, and loss where base had raveled. Photo shows SB Chrysler from pedestrian overpass N of Gratiot.