

OFFICE MEMORANDUM



MICHIGAN DEPARTMENT OF STATE HIGHWAYS

February 11, 1974

TO: Traffic Control Devices Committee:

M. N. Clyde, Chairman
K. A. Allemeier
F. G. Annis
F. W. Gillespie
W. A. Sawyer

FROM: A. J. Permoda

SUBJECT: 1973 Performance Tests of "Fast-Dry" White and Yellow
Pavement Marking Paints. Research Project 47 G-36(26a).
Research Report No. R-900.

For the subject tests, the Department obtained one-drum test quantities of "Fast-Dry" pavement marking paint from producers listed in the report, with the paints meeting requirements of applicable specifications dated April 14, 1971. In addition, the Department obtained 5-gal quantities for application as transverse test lines and 1-gal quantities for reference purposes for the Research Laboratory.

As in previous tests, Traffic Field Services applied the test paints for the road performance tests, transversely across two lanes of four-lane divided M 78, east of Lake Lansing Rd (Fig. 1). The applications were made on May 31, and June 1 and 4, 1973 on both the concrete and bituminous test areas. This was two weeks later in the season than last year. Each paint in the road performance test was applied in a set of triplicate or more stripes, as is customary. The tests included some experimental beads, a paint additive and a two-component polyester white paint.

The test applicator was the portable Grayco, airless, hot-spray equipment; the same equipment as used the last few years, and described in an earlier Research Report (R-798). Because this equipment had applied variable width lines on some paints in the past (for unknown reasons), we tried to correct this by using the standard gun. Unfortunately, the standard gun brought to the test area was out of adjustment, so the experimental change had to be postponed until 1974. Consequently, some of the test lines again showed the variable width (Fig. 2).

Inspections of the test lines were made by members of the regular rating team a short time after application, and at periodic intervals thereafter. The respective ratings are listed in Table 1; these ratings are averaged for the three raters and the two locations. The right-hand column of the table lists the drying times of the white paints as determined in separate tests on

longitudinal lane lines, by an auto passing over the striping - as per specification requirements. Values were not obtained on the yellow paints, because 50-gal quantities were not procured. Producers of the test paints are identified in the Appendix.

The test stripes were rated over a period of 219 days, with the last rating on January 7, 1974 when the standard stripes on concrete had an average durability rating of 3.2; this was approaching the end-point durability rating of 2 to 3 when longitudinal roadway striping should be optimally restriped. Incidentally, in the previous 1972 tests, the last rating was made after 210 days of service on December 11, 1972 with the stripes on concrete having an average durability rating of 1.9. The longer serviceability of the stripes into the winter season in the current tests is believed primarily due to fewer studded tires (now being phased out in Michigan) and secondarily, to traffic changes resulting from the energy crisis.

Committee Meeting

As last year, and to expedite timely deliveries of paint in 1974, the Traffic Control Devices Committee met on November 8, 1973 to select producers for bids. The Laboratory submitted then-available performance data. On that basis, the Committee issued bid requests to four producers. Since then, the additional final rating was made which data are incorporated in Table 1.

Summary

As mentioned earlier in the report, the beginning of the phasing-out of studded tires to meet the Michigan ban of April 1, 1975 has produced longer-lived transverse pavement striping in the 1973 performance tests (Fig. 3). This trend is expected to be even more noticeable in the forthcoming 1974 tests. Accordingly, the Committee will have to consider going to a two-year time lag between initiation of tests and purchases of paints for roadway striping (as before studded tires), since meaningful performance data will not be available in May to November, of one year service exposure.

Regarding the current tests: a) The best performing of the standard paints, No. 8 in white and yellow, did not get a bid request because of a somewhat unacceptably long drying time; b) The paint additive (tested last year, also) again yielded an improvement in performance of the same paint, No. 10 vs. No. 9 yellow; c) The two-component polyester paint No. 16 white, applied at about 75 mil thickness, yielded a low rating because of progressive flaking on the concrete pavement though the performance is better in the bituminous area and very good as test lane striping on eastbound Clark Rd (bituminous) in Clinton County; and, d) Test data on Nos. 11 through 15 white experimental, covering a variety of beads, proved erratic probably because

TABLE 1
1973 TEST PAINT PERFORMANCE RATINGS

Paint Identification No. 1	2-Day Rating ² 6/4/73			26-Day Rating			81-Day Rating			129-Day Rating			152-Day Rating			219-Day Rating - 1/7/74			Drying Time Min.						
	App	N. V.	W. R.	App	N. V.	W. R.	App	N. V.	W. R.	App	N. V.	W. R.	App	N. V.	W. R.	App	N. V.	W. R.		Service Factor					
	Dur			Dur			Dur			Dur			Dur			Dur									
1 - White	8.8	10	7.8	8.8	8.1	7.8	9.9	5.1	7.3	7.2	9.7	4.7	6.9	7.8	9.2	4.4	6.7	5.2	4.6	2.1	3.4	92.0	2-1/2		
2 - White	9.5	10	6.5	8.2	8.0	8.2	9.5	4.8	7.0	7.1	8.8	4.2	6.3	7.0	7.6	4.2	5.8	2.2	1.4	0.9	1.2	91.8	4-1/2		
3 - White	9.0	10	8.4	9.1	6.8	8.6	9.8	8.0	6.2	7.8	6.1	9.3	5.7	7.2	7.0	9.3	4.7	6.8	4.9	5.4	2.8	4.1	97.4	4	
4 - White	8.9	10	7.5	8.6	7.0	10.0	6.3	7.9	7.7	7.2	9.5	5.7	7.3	7.0	9.3	5.2	7.1	5.8	5.5	2.8	4.2	96.2	4		
5 - White	9.9	10	7.9	8.9	7.8	10.0	6.1	7.8	7.8	9.6	9.6	3.9	6.6	7.6	9.3	3.4	6.2	5.0	4.6	1.7	3.2	96.9	3-1/2		
6 - White	9.1	10	6.9	8.4	7.8	9.9	5.8	7.7	7.8	9.8	4.1	6.8	7.9	6.4	7.6	9.2	3.3	6.1	4.3	4.0	1.5	2.8	84.7	5	
7 - White	9.5	10	6.3	8.1	7.9	10.0	5.8	7.7	8.1	9.8	4.8	7.2	7.6	9.5	5.3	7.2	7.5	4.7	3.6	1.6	2.7	88.8	>6		
8 - White	9.6	10	8.4	9.2	7.6	9.9	7.8	8.6	7.4	9.8	6.7	8.0	7.4	9.5	6.5	7.8	7.2	9.4	5.2	4.6	2.4	3.6	100.0	5	
9 - White, Exp ³	9.6	10	7.7	8.8	7.3	9.8	4.9	7.1	6.5	9.7	2.7	5.8	6.6	9.3	2.7	5.7	7.2	9.3	5.6	4.3	2.1	3.3	78.7	5	
10 - White	9.8	10	7.8	8.8	8.2	10.0	6.5	8.1	7.8	9.8	4.9	7.2	7.7	9.5	4.9	7.0	7.6	9.3	6.4	3.7	2.0	2.9	89.8	1-3/4 ⁴	
11 - White, Exp ³	9.5	10	4.9	7.4	8.4	10.0	3.8	6.8	8.1	9.1	3.4	6.2	7.7	9.2	3.4	6.1	7.9	9.0	2.8	2.4	1.0	1.8	79.0	1-3/4	
12 - White, Exp ³	9.4	10	6.3	8.1	7.8	9.2	4.2	6.6	6.8	9.3	4.6	6.7	6.0	8.9	4.2	6.2	6.6	8.7	3.6	2.5	1.6	2.1	79.1	1-3/4	
13 - White, Exp ³	9.6	10	3.5	6.7	8.2	9.8	3.2	6.4	8.0	9.8	2.8	6.2	7.6	9.2	3.0	5.9	7.7	9.1	2.8	2.0	1.1	1.7	74.5	1-3/4	
14 - White, Exp ³	9.9	10	5.2	7.6	8.4	9.8	3.5	6.5	8.1	9.8	2.7	6.1	7.6	9.3	2.8	5.9	7.7	8.9	2.4	2.2	0.7	1.5	73.8	1-3/4	
15 - White, Exp ³	10.0	10	5.4	7.7	8.3	9.8	4.2	6.9	8.9	9.5	2.2	5.8	8.3	9.4	2.8	6.0	7.7	9.3	2.5	3.2	1.3	2.3	76.7	1-3/4	
16 - White, Exp ³	7.8	10	3.6	6.6	7.2	9.6	3.3	6.2	5.8	8.1	2.2	4.9	4.2	4.5	1.1	2.8	3.8	4.1	1.1	2.5	2.5	0.9	1.7	53.5	>3<10
1 - Yellow	9.9	10	5.2	7.6	8.5	10.0	4.8	7.3	8.7	9.9	3.7	6.7	8.2	9.8	3.2	6.3	8.5	9.1	2.9	5.9	6.3	5.8	1.4	3.6	85.8
2 - Yellow	9.0	10	7.7	8.7	7.7	9.7	6.3	7.8	7.8	9.1	5.2	7.0	5.9	7.6	5.1	6.2	6.7	7.2	4.1	5.6	1.9	1.1	0.2	0.8	81.8
3 - Yellow	9.2	10	8.3	9.1	6.8	9.9	7.8	8.6	8.1	6.8	9.8	4.8	7.0	7.2	9.2	3.8	6.3	6.4	5.5	2.1	3.9	5.5	2.1	98.3	
4 - Yellow	9.1	10	5.3	7.6	7.9	9.8	4.8	7.2	8.2	9.9	4.3	7.0	7.6	9.8	3.5	6.4	8.3	9.3	3.2	6.2	6.2	5.3	1.9	3.7	87.9
5 - Yellow	9.9	10	5.2	7.6	8.8	10.0	4.2	7.0	8.3	9.9	2.9	6.3	7.5	9.7	2.5	5.9	8.2	8.8	2.5	5.6	2.7	2.0	0.6	1.4	77.1
6 - Yellow	9.2	10	6.0	7.9	8.0	10.0	5.4	7.5	8.6	9.7	4.2	6.8	8.0	9.4	3.6	6.4	8.2	9.1	3.2	6.1	3.9	3.5	1.2	2.4	84.9
7 - Yellow	9.2	10	5.8	7.8	7.7	10.0	5.4	7.5	8.0	9.9	4.6	7.1	7.3	9.8	4.0	6.6	7.8	9.3	3.3	6.2	4.8	4.1	1.5	2.9	87.6
8 - Yellow	8.9	10	8.2	9.0	7.2	9.9	7.8	8.6	8.1	6.4	9.8	6.2	7.6	7.6	9.2	4.1	6.5	5.3	5.1	2.5	3.8	5.1	2.5	3.8	100.0
9 - Yellow	9.6	10	5.5	7.7	8.4	9.9	4.2	6.9	8.3	9.8	3.6	6.6	8.3	9.8	3.2	6.4	8.3	9.4	2.8	6.0	6.5	6.2	2.2	4.2	86.4
10 - Yellow, Exp ³	9.1	10	8.0	8.9	7.1	10.0	7.1	8.2	7.5	9.9	7.4	8.4	8.1	9.8	7.2	8.1	6.6	9.3	6.8	7.8	6.3	7.2	3.6	5.3	107.9

1 Identifications listed in Appendix A

2 Ratings: App - appearance, Dur - durability, N. V. = night visibility, W. R. = weighted rating

Numerical Basis: 10 = perfect rating, while 0 = total failure.

3 Exp = experimental

4 1972 Test Data



Figure 1. Initial appearance of test stripes on eastbound M 78 (concrete). Yellows in foreground, whites in background. Vandal's skid marks appear on stripes laid May 31, but not on background experimentals laid June 1. Stripes are east of 1972 test stripes (6/4/73).

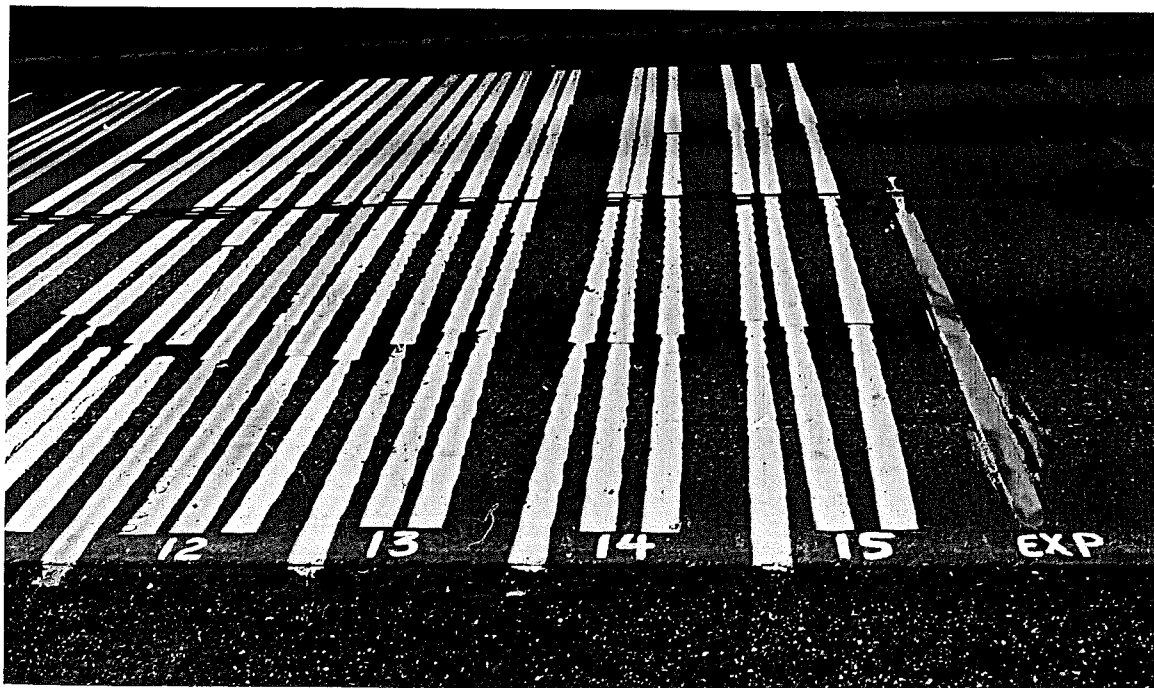


Figure 2. Initial appearance of test stripes on eastbound M 78 (concrete). Stripes show the varying widths. "Exp" marked stripe is the two-component polyester deposited by doctor-blade (6/4/73).

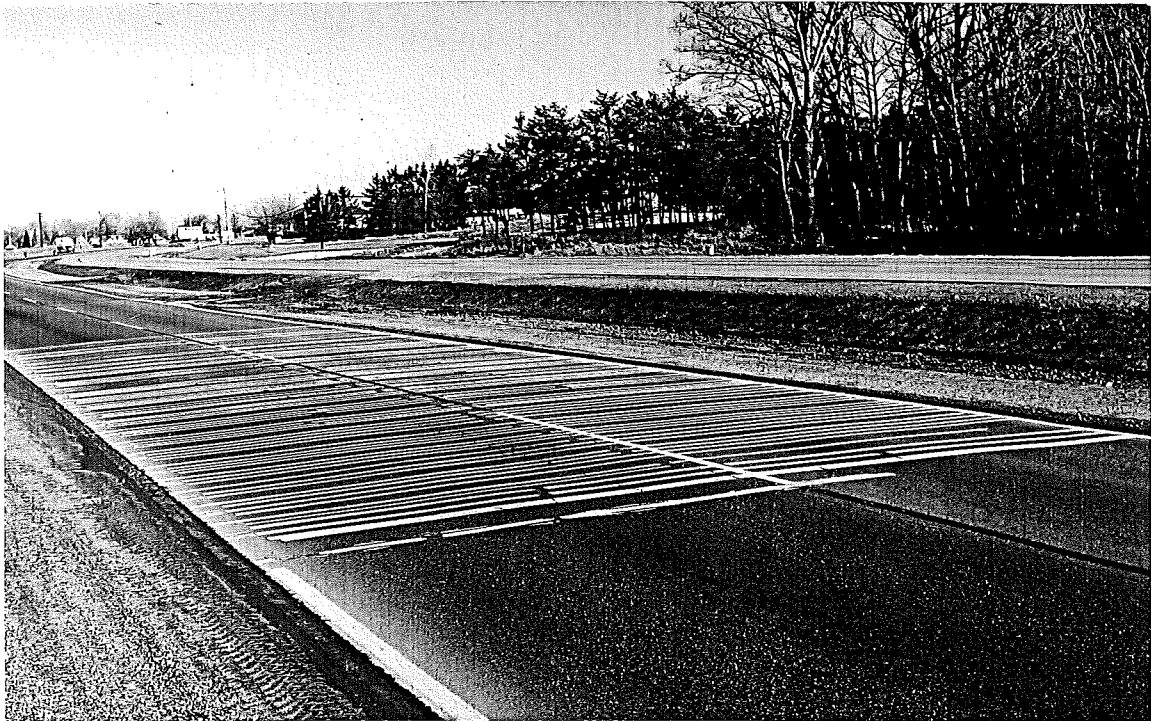


Figure 3. Final appearance of test stripes on westbound M 78 (bituminous). Whites in foreground, yellows in background. Worn grooves in tire-tracks in traffic lane are not yet apparent after 219 days service, when ratings were discontinued. For information, snows came in December, heavier than normal.