

OFFICE MEMORANDUM



MICHIGAN
DEPARTMENT OF STATE HIGHWAYS

January 10, 1973

TO: Traffic Control Devices Committee:

H. H. Cooper, Chairman
M. N. Clyde
F. W. Gillespie
F. G. Annis
W. A. Sawyer

FROM: A. J. Permoda

SUBJECT: 1972 Performance Tests of "Fast-Dry" White and Yellow Pavement Marking Paints. Research Project 47 G-36 (25a), Research Report No. R-846.

For subject tests, the Department obtained one-drum test quantities of "Fast-Dry" white and yellow pavement marking paints from producers listed in the report, with the paints meeting requirements of applicable specifications dated April 14, 1971. This year's tests differed from previous ones in that they were expanded to include the yellow paints, for the first time. Included in the shipments, as required by specifications, were 1 gal quantities of the test paints shipped to the Research Laboratory for reference purposes regarding next-year purchases of roadway striping requirements.

Traffic Field Services again 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 17, 18, and 19, 1972 on both roadways, which was two months earlier in the season than last year. The yellow test section included field evaluation of several non-standard beads and a bond-improving additive in the yellow paint being purchased for 1972 roadway striping. Each paint in the road performance tests was applied in a set of triplicate or more stripes, as is customary.

The test applicator was the portable Grayco, airless, hot-spray equipment; the same equipment as used last year and described in Research Report No. R-798. An improvement was made in the applications this year since the stripe-width surges experienced last year were significantly decreased.

Inspections of the test lines were made by members of the standard rating team a short time after application, and at about monthly intervals thereafter. The respective ratings are listed in Table 1; the ratings shown are averaged for the three raters and the two locations. The right-hand column of the Table lists the drying time of the white paints as determined in separate tests on longitudinal lanes, by an auto passing over the striping - as per specification requirement: values obtained on the yellow paints were undependable, and are not shown. Producers of the test paints are identified in Appendix A.

The test stripes were rated over a period of 210 days, with the last rating on December 11, 1972 when the rate of deterioration had become high due to winter weather and appearance of studded tires, and the durability ratings averaged about 2 (Figs. 2 and 3). It is interesting to note that in last year's tests, the final durability ratings also made at about the same date in December, also averaged about 2, after only 139 days of field service. This is in line with Laboratory experience that summer weather and traffic deteriorate transverse test lines at a much lower rate than do winter conditions. Of course, there is the outside possibility that the durability level of this year's paints is an improvement over last year's to partially account for the lower over-all deterioration rate. A slower appearance of studded tires is probably another factor.

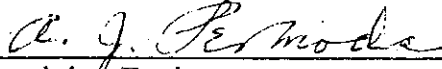
Committee Meeting

To expedite more timely deliveries of paint in 1973, Traffic Division requested an earlier-than-usual meeting of the Department's Traffic Control Devices Committee to select producers for Requests for Bids. The meeting was held on October 31, 1972. The Laboratory submitted then-available performance data. On that basis, the Committee issued bid requests to four producers. Since then, two additional and final ratings have been made which have been incorporated in Table 2 giving the integrated ratings for the paints of the three producers who submitted bids for the December 11, 1972 opening date (one producer did not submit his bids).

Summary

Table 2 also has the integrated Service Factor ratings for what appeared to be the best of the beads and additives in subject tests (see Table 1 for detailed ratings). Table 2 shows that the B-1 beads tested slightly superior to the MDSH beads in the same paint (Yellow No. 1) and that B-8 standard beads with No. 21 paint additive tested significantly better and best in the tests. This is in line with previous evaluations of this additive in regular-dry paints. The Laboratory has enough of the additive for evaluation in a 50 gal drum of paint for longitudinal roadway striping. It was to have been evaluated in Lansing this fall, but was deferred.

TESTING AND RESEARCH DIVISION


Supervising Engineer
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AJP:bf

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Figure 1. Test stripes on WB M 78 (Bituminous) with whites in foreground and yellows in background. Stripes were laid immediately West of last year's. Photo taken 5/23/72, 4 days after application, shows skid-marks of vandal's vehicle. Later, the other area was similarly vandalized, as were previous tests in the St. Johns area.



Figure 2. Appearance of test stripes on EB M 78 (Concrete) at time of last rating. Photo on 12/14/72. Incidentally, snows came earlier this year than last.

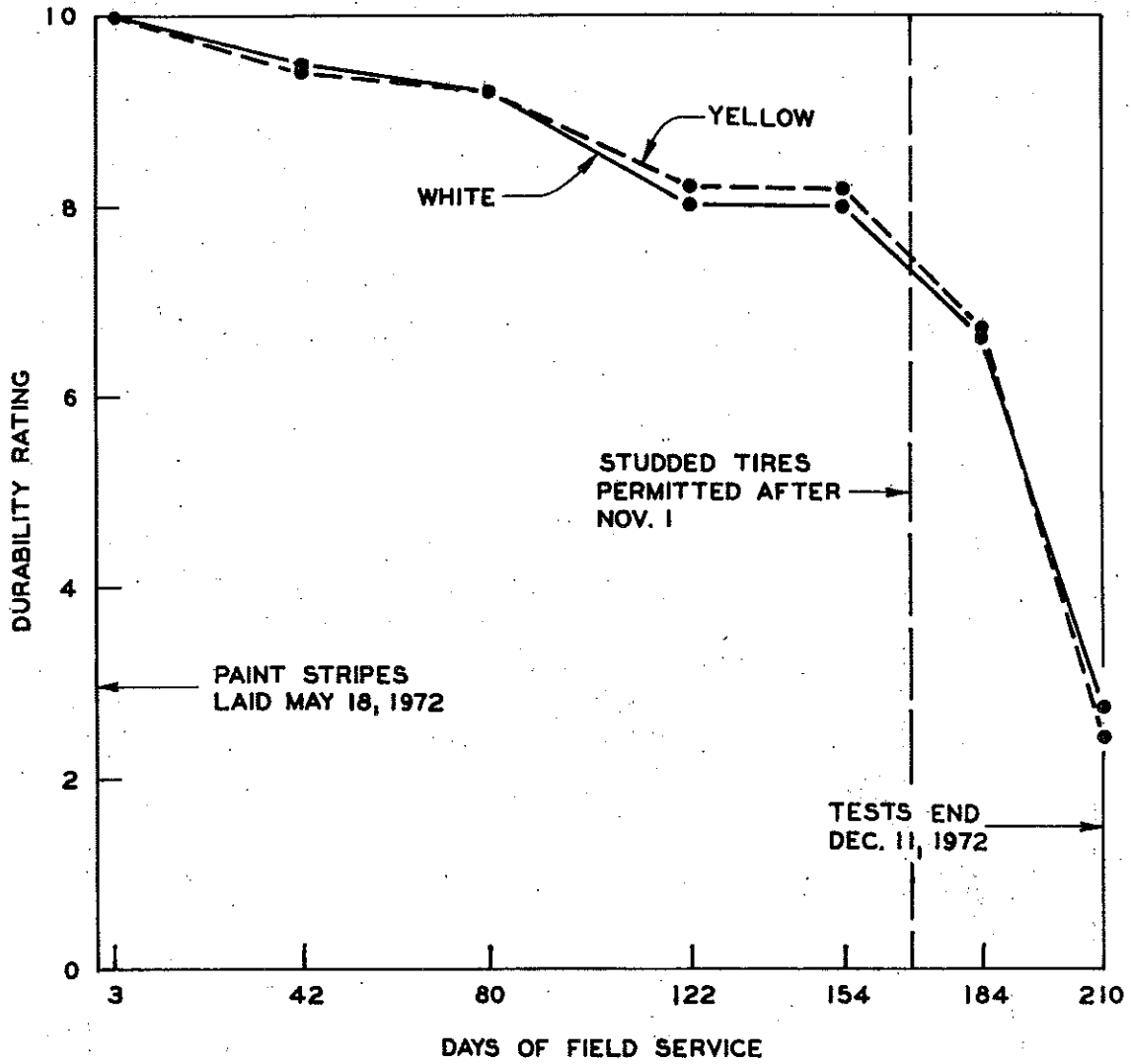


Figure 3. Average durability of all paints in tests vs field service.

TABLE 1
1972 TEST PAINT PERFORMANCE RATINGS

Paint Identification No. (1)	3-Day Ratings (2) 5/22/72			42-Day Ratings			80-Day Ratings			122-Day Ratings			154-Day Ratings			184-Day Ratings			210-Day Ratings 12/11/72			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.	App	N. V.	W. R.								
	Dur			Dur			Dur			Dur			Dur			Dur			Dur										
1 - White	8.1	10	5.2	7.4	7.6	9.8	9.8	9.7	3.1	6.2	7.3	8.6	3.2	5.8	7.5	8.6	2.8	5.5	6.2	5.8	2.8	4.3	1.8	1.3	0.2	0.8	1.5		
2 - White	8.5	9.1	7.3	9.6	6.2	7.7	7.4	9.5	4.9	7.0	7.2	8.4	4.2	6.2	7.7	8.8	3.4	6.0	7.2	7.6	4.7	6.1	4.2	3.7	1.5	2.6	3.5		
3 - White	8.2	10	9.5	9.6	7.5	9.7	7.0	8.1	7.8	9.7	7.6	8.5	4.8	6.5	7.9	8.8	4.4	6.5	7.2	7.5	5.7	6.8	4.6	4.4	2.0	3.2	2.75		
4 - White	8.4	10	5.0	7.3	8.0	9.7	4.4	6.9	8.4	9.6	3.3	6.3	8.2	8.4	2.9	5.6	8.2	8.7	2.9	5.7	7.2	7.2	3.0	3.1	3.4	3.1	1.0	2.1	1.75
5 - White	9.1	10	5.3	7.6	8.1	9.6	5.2	7.2	8.4	9.5	3.9	6.6	8.1	8.4	3.5	5.9	8.3	8.7	3.2	5.9	7.2	6.9	3.3	5.2	2.9	2.4	1.2	1.8	1.3
6 - White	8.8	10	6.7	8.2	7.3	9.6	6.3	7.7	7.8	9.1	5.3	7.1	7.2	8.2	4.4	6.2	7.7	8.4	4.2	6.3	6.4	6.2	4.0	5.1	2.3	2.2	1.5	1.6	1.75
7 - White	8.5	10	5.1	7.4	8.1	9.7	5.1	7.2	8.3	9.6	3.6	6.5	8.0	8.7	3.8	6.1	8.3	8.7	3.1	5.8	7.2	7.3	3.4	5.4	2.8	2.6	1.2	1.9	2.0
8 - White	8.5	10	4.9	7.3	8.2	9.7	4.8	7.1	8.3	9.4	4.0	6.6	7.8	8.2	3.2	5.7	8.0	8.2	2.8	5.5	6.8	6.6	3.1	4.6	3.3	3.3	1.1	2.2	2.75
9 - White	8.5	10	7.2	8.4	7.7	9.4	6.2	7.6	8.2	9.3	4.6	6.8	7.8	7.7	3.5	5.6	7.5	7.6	3.3	5.4	6.6	6.2	3.5	4.9	3.7	3.2	1.2	2.2	3.0
10 - White	8.0	10	7.9	8.8	6.7	9.5	6.8	7.9	7.2	9.0	6.5	7.6	6.5	7.9	5.4	6.5	6.4	7.8	4.7	6.1	6.2	6.9	5.1	5.9	3.6	3.6	2.2	2.9	3.0
11 - White	9.0	10	5.8	7.8	6.3	8.8	5.3	6.6	6.3	8.2	4.7	6.2	6.8	7.2	3.6	5.3	6.5	7.8	3.2	5.4	5.8	6.3	3.8	5.0	2.3	1.9	0.8	1.4	1.75
12 - White	9.2	10	9.5	9.7	7.1	9.4	7.2	8.1	7.2	9.4	6.4	7.7	7.1	8.2	5.3	6.7	7.5	8.0	4.9	6.4	7.1	7.1	5.5	6.3	4.0	2.5	2.4	2.6	2.75
13 - White	8.2	10	9.8	9.7	5.2	8.8	7.2	7.6	6.2	7.6	6.3	6.8	5.5	6.1	4.7	5.3	5.6	5.9	3.9	4.9	4.1	4.7	3.1	3.8	0.9	0.5	0.4	0.5	1.30
C - White	8.8	10	2.9	6.3	7.4	8.1	3.3	5.6	7.5	8.5	3.1	4.9	7.2	5.0	2.2	3.8	5.0	4.6	2.2	3.5	4.1	3.2	2.2	2.6	1.3	1.1	0.7	0.9	<1.0
M - White	8.8	10	3.0	6.4	7.8	9.1	3.4	6.1	8.1	8.1	3.2	5.6	7.2	6.7	2.8	4.8	6.2	5.6	2.8	4.3	5.2	4.4	3.0	3.8	2.5	2.0	1.4	1.8	<1.0
1 - Yellow	8.8	10	7.6	8.7	7.6	9.7	6.2	7.8	8.0	9.2	4.6	6.8	7.8	8.2	3.9	6.0	7.8	8.5	4.0	6.2	7.1	6.4	4.1	5.3	1.3	1.0	0.6	0.8	0.8
2 - Yellow	7.8	10	8.6	9.1	5.0	9.3	7.0	7.7	5.7	9.4	6.2	7.5	5.7	8.5	5.8	8.9	6.1	8.5	5.3	6.7	6.9	7.2	5.8	6.5	3.4	3.3	2.2	2.8	2.8
3 - Yellow	7.9	10	9.3	9.4	5.2	9.5	7.3	8.0	6.0	9.5	6.4	7.6	6.2	8.7	5.5	6.8	7.0	8.6	4.5	6.4	6.8	7.2	4.9	6.0	2.5	2.2	1.2	1.8	1.8
4 - Yellow	8.0	10	6.2	7.9	7.2	9.6	4.8	7.0	7.9	9.3	3.7	6.4	7.7	8.3	3.3	5.8	7.7	8.6	3.4	5.9	6.8	6.8	3.2	5.0	2.7	2.3	0.6	1.6	1.6
5 - Yellow	8.5	10	6.5	8.1	6.9	9.7	5.4	7.3	7.8	9.7	5.2	7.2	7.9	8.8	4.2	6.4	7.8	8.8	3.8	6.2	7.4	7.7	4.2	5.9	3.6	3.3	1.5	2.6	2.6
6 - Yellow	7.6	10	8.7	9.1	6.1	9.5	6.7	7.7	6.4	9.4	5.8	7.3	6.7	8.2	5.0	6.4	6.8	8.8	4.8	6.6	6.8	7.0	5.5	6.2	2.4	2.2	1.5	1.9	1.9
7 - Yellow	8.1	10	6.2	7.9	7.4	9.7	4.1	6.6	7.9	9.2	3.2	6.1	7.8	8.4	3.1	5.7	7.9	8.5	3.6	6.0	7.2	6.9	3.2	5.1	3.5	3.2	1.0	2.2	2.2
8 - Yellow	8.2	10	8.8	9.2	5.9	9.5	7.1	7.9	7.2	9.8	6.2	7.8	7.2	8.9	5.1	6.8	5.9	8.8	5.1	6.7	7.4	7.8	4.9	6.3	4.2	4.1	2.2	3.1	3.1
9 - Yellow	7.9	10	7.8	8.7	5.4	8.9	5.7	6.9	6.2	9.2	5.3	7.0	6.6	7.8	4.6	8.1	6.8	8.1	4.0	5.9	6.2	6.8	5.3	6.0	2.2	2.2	1.5	1.9	1.9
10 - Yellow	8.5	10	9.4	9.6	5.9	8.1	7.2	7.4	6.9	7.1	5.5	6.3	5.5	5.8	4.2	5.0	5.5	5.7	3.8	4.7	4.2	3.4	2.9	3.2	0.9	0.7	0.6	0.7	0.7
B-1 - Yellow	8.9	10	7.7	8.7	7.4	9.6	7.0	8.1	8.3	9.3	6.0	7.6	7.8	8.6	5.8	7.1	8.1	8.7	5.3	7.0	7.2	7.0	5.7	6.4	1.8	1.7	1.2	1.5	1.5
B-2 - Yellow	9.0	10	5.8	7.8	7.8	9.6	5.2	7.2	8.8	9.4	4.8	7.1	7.2	8.6	4.3	6.3	8.2	8.7	4.2	6.4	7.3	6.5	5.0	5.6	1.7	1.6	0.6	1.1	1.1
B-3 - Yellow	8.9	10	5.4	7.6	8.0	9.7	5.0	7.2	8.8	9.4	4.4	6.8	8.2	8.5	3.9	6.2	8.3	8.8	3.6	6.2	7.0	6.6	4.3	5.5	1.7	1.2	0.5	0.9	0.9
B-4 - Yellow	8.9	10	5.8	7.8	8.2	9.7	5.3	7.4	8.8	9.4	4.7	7.0	8.1	8.5	4.3	6.4	8.5	8.8	4.2	6.5	7.2	6.8	4.5	5.7	1.7	1.7	0.5	1.1	1.1
B-5 - Yellow	8.9	10	7.4	8.6	8.0	9.6	6.2	7.8	8.8	9.3	5.6	7.4	8.1	8.5	5.0	6.7	8.5	8.5	4.4	6.5	7.2	6.7	3.9	5.3	1.3	1.6	0.7	1.1	1.1
B-6 - Yellow	8.9	10	6.0	7.9	8.2	9.7	4.8	7.1	8.8	9.5	3.8	6.6	8.1	8.5	3.6	6.0	8.5	8.5	3.0	5.8	7.2	6.7	3.4	5.1	1.8	1.9	0.4	1.1	1.1
B-7 - Yellow	8.8	10	7.6	8.7	8.1	9.6	4.8	7.1	8.8	9.4	4.2	6.8	8.0	8.4	3.8	6.1	8.3	8.5	3.1	5.8	7.2	6.8	3.9	5.4	2.0	2.1	0.2	1.4	1.4
B-8 - Yellow	8.5	10	8.2	9.0	7.5	9.7	8.0	8.6	8.6	9.7	7.8	8.6	8.0	8.8	6.9	7.8	8.6	8.6	6.5	7.5	7.7	7.8	6.2	7.0	4.4	4.2	3.2	3.7	3.7

(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 = complete failure.

TABLE 2
1972 PERFORMANCE RATINGS OF BID PAINTS AND SOME BEADS

Ratings	Service Days	White Paints			Yellow Paints				Beads in Yellow Paint			
		No. 4	No. 5	No. 7	No. 5	No. 7	No. 8	No. 1	No. B-1	No. B-4	No. B-8	
Weighted Rating	3	7.3	7.6	7.4	8.1	7.9	9.2	8.7	8.7	7.8	9.0	
Weighted Rating	42	6.9	7.2	7.2	7.3	6.6	7.9	7.8	8.1	7.4	8.6	
Service Factor		71.1	74.0	73.2	76.8	73.0	85.6	82.0	84.0	75.6	88.0	
Weighted Rating	80	6.3	6.6	6.5	7.2	6.1	7.8	6.8	7.6	7.0	8.6	
Service Factor		68.7	71.7	70.9	74.7	68.5	82.3	77.5	81.2	73.7	87.1	
Weighted Rating	122	5.6	5.9	6.1	6.4	5.7	6.8	6.0	7.1	6.4	7.8	
Service Factor		65.7	68.6	68.2	72.5	65.2	79.1	72.8	78.5	71.3	85.3	
Weighted Rating	154	5.7	5.9	5.8	6.2	6.0	6.7	6.2	7.0	6.5	7.5	
Service Factor		63.9	66.6	66.5	70.5	63.8	76.6	70.4	76.8	69.8	83.4	
Weighted Rating	184	5.1	5.2	5.4	5.9	5.1	6.3	5.3	6.4	5.7	7.0	
Service Factor		62.3	64.8	64.8	68.9	62.4	74.7	68.3	75.1	68.4	81.7	
Weighted Rating	210	2.1	1.8	1.9	2.6	2.2	3.1	0.8	1.5	1.1	3.7	
Service Factor		59.0	61.1	61.2	65.6	59.1	71.3	63.6	70.7	64.1	78.2	
SF - % of Best		96.3	99.8	100.0	92.0	82.9	100.0	81.3	90.3	82.0	100.0	

APPENDIX A
1972 Fast-Dry Traffic Paint Tests

Paint Identifications

White:

- 1. 1972 Roadway Paint
(Baltimore 6 D2)
- 2. DeSantis C-1
- 3. DeSantis B-1
- 4. Forman Ford 4299
- 5. Baltimore 1D2
- 6. Perry Derrick 72130
- 7. W. A. Smith 56928
- 8. Devoe SX 2096
- 9. Std. Detroit TP 284
- 10. Prismo 4651
- 11. DeSantis L 91 X
- 12. DeSantis A-1
- 13. Glidden
- C. Cata-Quick powder
- M. Green-Lite powder

Yellow:

- 1. 1972 Roadway Paint
(Baltimore 2 C2)
- 2. Prismo 6811
- 3. Std. Detroit TP 286
- 4. Devoe SX 2097
- 5. W. A. Smith 56824
- 6. Perry Derrick 72131
- 7. Forman Ford 4300
- 8. Baltimore 1D2
- 9. DeSantis L 92 X
- 10. Glidden

Bead Test Stripes: All in No. 1 Yellow Paint (a Control Paint)

- B1. 3M's A1 Bisymmetric
- B2. Potter's Flotation
- B3. Potter's Penn Trn.
- B4. F-O-L S2272
- B5. F-O-L Saf Ray
- B6. Kopper's Polyester UV stabilized
- B7. Kopper's Polyester unstabilized
- B8. DC's Paint Additive 21