1958 PERFORMANCE TESTS ON WHITE AND YELLOW TRAFFIC PAINTS

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The twelve companies submitting traffic paints, both white and yellow, for the 1958 performance tests are listed below. The list includes an entry from the Research Laboratory Division which submitted one yellow paint for evaluatory purposes.

1. Acme Quality Paints, Inc., Detroit.
2. Baltimore Paint and Chemical Corp., Baltimore.
3. Berry Brothers Company, Detroit.
4. Boydell Brothers Company, Detroit.
5. Cook Paint and Varnish Co., Detroit.
6. Franklin Paint Company, Franklin, Mass.
7. Glidden Company, Cleveland.
8. Jaegle Paint and Varnish Co., Philadelphia.
9. Patterson-Sargent Company, Detroit.
10. Prismo Safety Corporation, Huntingdon, Pa.
11. Silver Lead Paint Company, Lansing.
12. Truscon Laboratories, Detroit.
13. Michigan State Highway Department (yellow only).

Five paints from the above sources were not included in the field tests because of failure to meet certain screening "Specific Requirements" of the Department's specifications. Deposition particulars covering the remainder of the above white and yellow traffic paints, applied August 13-19, 1958, were presented in Research Laboratory Report 301, the first progress report on this project.

QUALIFICATION TESTS

All paints submitted for the tests were evaluated for conformance with specification requirements on color, reflectivity, consistency, drying

time, bleeding and settling with results presented in Table 1. A review of the results shows that the following paints failed to meet the noted specification requirements and therefore are subject to disapproval for bid requests:

White Paints

No. 116	Fast surface drying gave poor bead embedment.
No. 120	High consistency; not field tested.
No. 126	Excessive bleeding on tar base; not field tested.
No. 128	Fast surface drying gave poor bead embedment. Crew operating roadway striping equipment complained about fast surface drying of paint.
No. 130	Excessive field drying time.
No. 132	Excessive field drying time and low reflectivity.
No. 134	High consistency and excessive bleeding on tar base; not field tested; striping crew complained about its applicability.
No. 136	Excessive field drying time.
No. 138	Excessive bleeding on tar base.

Yellow Paints

No. 119	Excessive field drying time; striping crew complained about its applicability.
No. 121	Not matching color standard; not field tested.
No. 127	Excessive bleeding on tar base; not field tested.
No. 131	Excessive field drying time.
No. 133	Excessive field drying time.
No. 135	Excessive field drying time; striping crew complained about its applicability.
No. 137	Excessive field drying time.
No. 139	Excessive bleeding on asphalt base.

An interim letter report dated March 26, 1959 summarizing the above qualification test results was issued to the Committee prior to its Spring meeting. Manufacturers of paints not meeting specification requirements

TABLE I
QUALIFICATION TEST RESULTS
1958 Performance Paints

Paint No.	Color	Reflectivity Percent	Consistency K.U. - 77F	Drying Time Field - Avg. Minutes	Bleeding Index		Settling Index
					Asphalt	Tar	
116	White	87.6	69	27	7.0	4.1	8
118		82.6	78	44	7.0	5.0	7
120		81.0	86		6.0	4.5	9
122		84.9	69	29	6.5	4.0	6
124		84.3	70	45	4.5	5.0	8
126		86.4	76		5.5	3.3	8
128		89.8	71	30	7.0	4.5	9
130		82.6	76	56	6.0	4.0	8
132		79.8	74	64	5.5	4.5	8
134		86.9	84		6.5	3.9	9
136		89.1	71	57	6.7	5.0	8
138		81.9	73	34	5.3	3.7	8
	Yellow						
117	Pg*	58.8	69	30	8.7	5.0	8
119	Po	58.6	69	80	6.0	6.3	7
121	Pg	48.5	79		7.0	8.7	8
123	Pr	56.2	69	32	6.3	7.0	6
125	Pg	55.5	72	45	5.0	8.0	9
127	NPg	60.1	75		6.7	3.7	8
129	Pg	60.2	70	44	8.7	6.7	8
131	Pr	52.9	74	57	6.0	5.7	8
133	Pg	53.2	74	62	6.0	6.3	8
135	Pg	53.7	69	69	9.0	6.7	8
137	Pg	58.1	72	63	8.3	5.7	9
139	Po	59.4	71	31	3.3	5.7	8
140	Po	58.5	72	41	8.8	4.3	9

*P = passing; NP = not passing
o = exact color match with standard
g = green side of standard
r = red side of standard

were to be notified of their respective paints' shortcomings when requisitions were submitted to them for 1959 performance paints.

FIELD-PERFORMANCE RATINGS

Test stripes deposited in the four test areas were rated 10 days after application, and at three-month intervals thereafter over a period of one year.

Quality ratings from the four test areas, averaged from the findings of the four observers, are tabulated for the field-tested paints in Table 3. These averaged quality values for the individual paints were then used to calculate the respective weighted ratings, also recorded in Table 3.

As in previous years there was considerable variation in the durability ratings of different paints in the same test section, and also of the same paints in the four different sections. As previously, test paints deteriorated considerable faster in test sections on US-127 than in the two other sections, this year located on M-78, which had about half of the traffic density of the former. The terminal condition of some test stripes on US-127 is shown in photographs of Figure 1.

FIELD TEST RESULTS

Table 2 contains a summary of evaluation values for all 1958 test paints, listed in descending order of terminal "Percent of Best" values. Half-year and one-year service factor values for all test paints are

tabulated in Table 2, which also contains a column summarizing results of the previously mentioned qualification tests.

The "Qualification Tests" column in Table 2 shows that seven of 12 white paints failed to meet all specification requirements while two additional paints had questionable application characteristics. The column also shows that eight of 13 yellow paints failed to meet all specification requirements. The high percentage of paints subject to disapproval for bid requests because of their failure to meet all specification requirements was due partially to the fact that eight of the submitted paints failed to meet the 45 minute field drying-time requirement. In turn the longer field drying-times exhibited by some of the 1958 performance paints may have contributed to the poorer than usual initial night visibility ratings of the stripes by allowing a longer time for the liquid paint film to creep up the bead surface thereby minimizing its effectiveness as a retro-reflector.

A control paint was included in the 1958 performance tests to show how the current ratings would compare with those obtained two years previously on the same paint. That comparison is given under the last white paint listed in Table 2 and shows that the 1958 acceptance paint (Prismo white) compiled a slightly higher rating in 1958 than in 1956 tests. This difference of about 4 points can mostly be accounted for by the fact that type III beads were used in 1958 in its reflectorization while

the larger Prismo beads were used in 1956. After taking the difference of reflectorization into account, the comparison shows a good constancy in rating values over the indicated two year interval.

The left hand column of Table 2, listing the terminal service factor values of paints submitted for 1957 tests by same producers supplying paints for the 1958 tests, is given topermit an evaluation of comparative performance.

No recommendation is being made concerning paints to be selected for bids.

TABLE 2
SERVICE FACTORS AND TERMINAL RATINGS
1958 Performance Paints*

	1957 Service Factor 374 days (a)	Paint Number	1958 Service Factors		Percent of Best	Qualification Tests (b)
			198 days	374 days		
WHITE PAINTS	53.3	128	78.2	59.8	100.0	(P)
	48.1	136 (c)	69.6	59.1	98.8	NP
	53.3	130	67.6	58.8	98.3	NP
	----	122	57.4	54.4	91.0	P
	----	116	67.1	50.6	84.6	(P)
	----	138	59.1	47.9	80.1	NP
	62.7	124	60.5	47.2	78.9	P
	63.2	118	56.2	46.3	77.4	P
	46.4	132	58.3	39.5	66.1	NP
	54.3	120				NP
	36.2	126				NP
	57.5	134				NP
	57.6 (d)	1958 Acceptance	76.1	61.4	102.7	--
YELLOW PAINTS	66.5	125	69.2	62.7	100.0	P
	56.1	129	75.6	58.3	93.0	P
	56.6	137 (c)	66.8	57.8	92.2	NP
	----	117	65.7	57.1	91.1	P
	----	135	67.1	56.9	90.7	NP
	----	123	61.3	56.1	89.5	P
	58.2	131	64.7	52.4	83.6	NP
	56.8	140 Exp.	59.7	50.6	80.7	P
	----	139	58.8	47.2	75.3	NP
	53.6	119	57.3	42.4	67.6	NP
	37.4	133	59.8	41.9	66.8	NP
	59.3	121				NP
	42.0	127				NP

*All paints applied at rate of 16.5 gal per mile of 4 inch stripe with 6 lb of MSHD type III beads dropped-on per gallon.

a) Two test areas same as in 1958, two were different.
b) P = passing; NP = not passing; (P) = questionable.
c) Paints were supplied with beads, conforming to MSHD III type.
d) 1956 rating obtained with larger beads, 1958 ratings with type III beads.

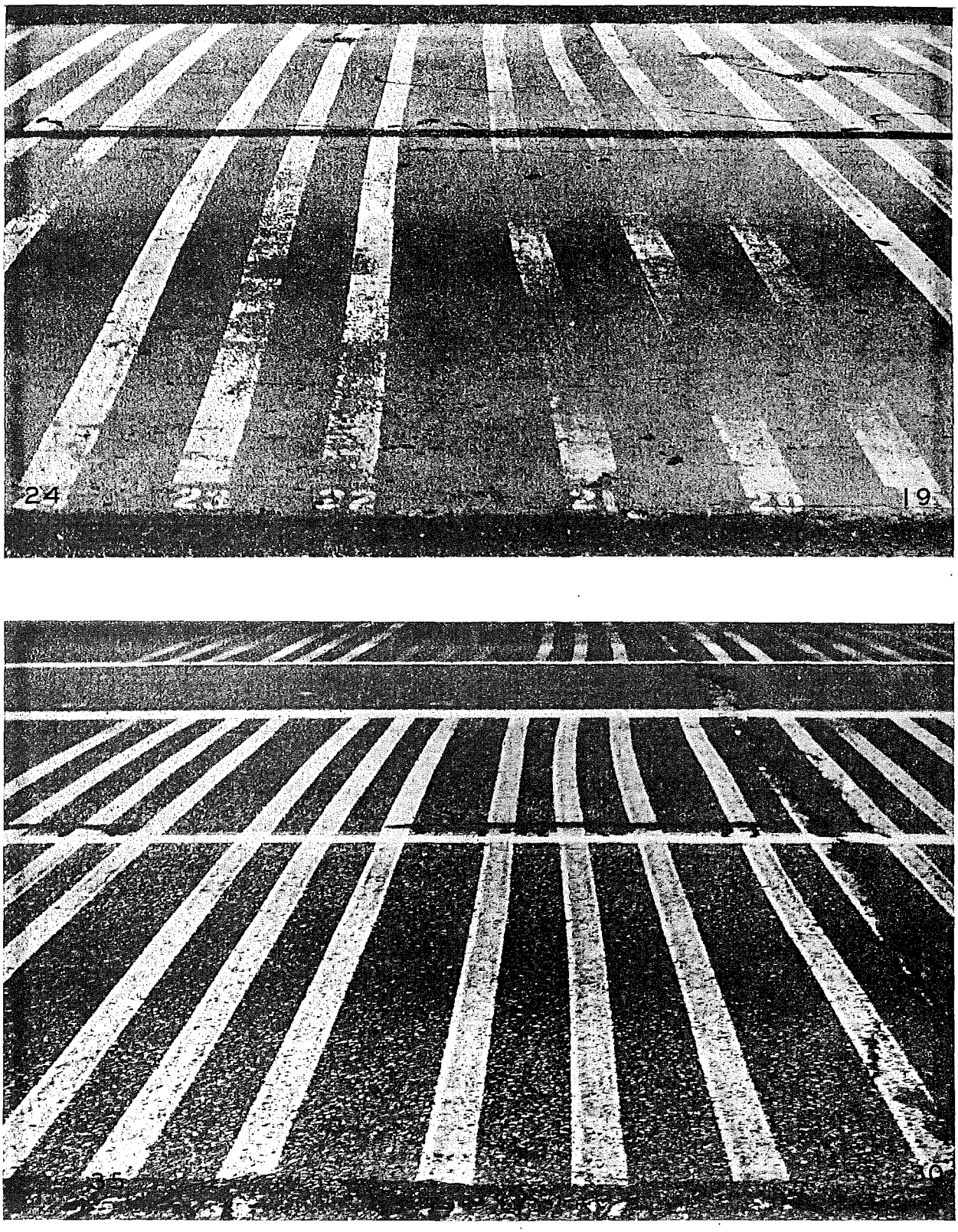

Figure 1. Some 1958 stripes after one year's exposure in test areas of US 127. Upper photo shows condition of white stripes 19-24 on concrete. Bottom photo shows yellow stripes 30-35 on black-top; stripes 31-33 are MSHD experimental yellow paint: Upper part of photo shows remains of previous year's stripes.

TABLE 3
HIGHWAY PERFORMANCE DATA

Exposure Days	Factor Evaluated	White Paints											Yellow Paints									
		108P	108	116	118	122	124	128	130	132	136	138	117	119	123	125	129	131	133	135	137	139	140
10	General Appearance	8.5	8.1	8.3	9.6	9.8	9.4	7.9	9.0	8.8	9.0	9.3	10.0	9.4	9.4	9.5	8.5	8.8	8.9	8.7	9.7	9.9	8.7
	Durability	10.0	10.0	10.0	10.0	10.0	9.9	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	9.9	9.9
	Night Visibility	6.9	8.1	8.5	2.0	1.5	2.4	9.8	3.4	3.7	5.2	2.7	3.0	3.0	2.0	3.9	9.7	3.5	3.7	3.6	4.4	2.6	3.0
	Weighted Rating	8.3	8.9	9.1	6.0	5.7	6.1	9.7	6.6	6.7	7.5	6.3	6.5	6.4	6.0	6.9	9.7	6.6	6.7	6.7	7.2	6.3	6.3
38	General Appearance	7.3	6.1	6.6	8.3	8.7	8.1	5.9	7.5	7.5	8.0	8.5	8.5	8.7	8.1	8.6	6.5	7.7	8.1	7.7	8.3	9.1	7.5
	Durability	9.9	9.8	9.5	9.8	9.9	9.4	10	9.8	9.9	9.9	9.6	9.9	9.8	10	9.6	10	9.9	9.9	9.8	9.8	9.3	9.8
	Night Visibility	7.0	8.0	7.8	3.1	2.8	4.6	9.3	5.7	6.0	6.5	4.6	4.7	3.6	3.2	4.3	9.3	5.2	5.5	5.4	5.2	3.9	3.8
	Weighted Rating	8.2	8.5	8.4	6.3	6.2	6.9	9.2	7.5	7.7	8.0	7.0	7.2	6.6	6.4	6.9	9.3	7.3	7.5	7.4	7.4	6.6	6.6
91	General Appearance	7.1	5.8	6.6	7.5	7.4	7.2	5.7	7.1	7.4	7.4	7.5	7.9	7.7	6.9	7.3	5.9	6.8	7.4	7.1	7.9	8.7	5.8
	Durability	9.3	9.2	9.3	9.4	9.0	9.2	9.5	9.3	9.1	9.2	9.2	9.2	9.2	9.3	9.0	9.4	9.6	9.4	9.3	9.3	8.6	9.0
	Night Visibility	6.2	7.9	5.6	3.1	2.4	4.7	8.5	5.5	5.0	5.5	3.9	4.7	4.4	3.4	6.4	7.3	5.1	5.2	5.3	4.6	4.5	4.1
	Weighted Rating	7.5	8.2	7.2	6.1	5.5	6.8	8.6	7.2	6.9	7.2	6.4	6.8	6.7	6.1	7.5	8.0	7.1	7.1	7.1	6.8	6.6	6.2
198	General Appearance	6.3	6.6	5.5	5.1	6.3	4.9	6.7	6.7	3.1	6.5	5.1	6.8	4.2	6.9	6.8	6.9	5.7	3.7	6.7	6.4	5.2	5.4
	Durability	7.0	7.1	5.6	5.8	6.9	5.5	7.0	7.3	3.3	7.0	5.5	6.8	4.4	7.6	7.6	6.9	6.6	4.1	6.9	6.8	5.2	6.2
	Night Visibility	4.3	3.8	1.8	2.9	4.6	3.3	2.5	4.0	1.6	4.3	3.0	4.8	2.4	4.6	4.6	2.5	3.3	1.6	4.4	4.8	3.1	3.9
	Weighted Rating	5.4	5.6	3.7	4.3	5.7	4.3	4.7	5.6	2.4	5.6	4.2	5.8	3.4	6.0	6.0	4.7	4.9	2.8	5.6	5.8	4.2	5.0
277	General Appearance	5.5	5.7	5.0	3.9	5.8	4.0	6.0	5.9	2.4	5.5	4.3	5.6	3.1	5.8	6.0	5.8	5.0	2.8	5.4	5.5	4.3	4.3
	Durability	5.9	6.2	4.6	4.8	6.3	4.3	6.0	6.5	2.7	6.3	4.8	5.9	3.5	6.8	6.6	5.8	5.4	3.1	5.9	5.9	4.6	5.4
	Night Visibility	2.7	2.6	0.8	2.3	4.1	2.5	1.4	3.2	0.7	2.9	2.1	3.2	1.3	3.2	4.8	1.5	2.1	0.8	2.8	3.2	2.0	2.6
	Weighted Rating	4.3	4.4	2.7	3.5	5.2	3.4	3.7	4.8	1.7	4.5	3.4	4.5	2.4	4.9	5.6	3.7	3.7	1.9	4.3	4.5	3.3	3.9
374	General Appearance	5.0	5.5	3.7	3.3	5.2	3.1	5.5	5.7	2.4	5.3	4.1	5.0	3.1	5.0	5.7	5.3	4.3	3.2	5.1	5.2	4.3	3.7
	Durability	5.6	5.7	3.9	3.9	5.4	3.0	5.7	6.2	2.4	6.0	4.2	5.5	3.3	5.9	6.3	5.6	4.9	3.3	5.4	5.8	4.2	4.8
	Night Visibility	2.9	2.4	1.2	2.2	3.6	1.1	1.5	2.9	0.9	2.9	2.2	3.1	1.2	3.2	3.7	1.7	1.8	0.9	2.8	3.1	1.9	2.5
	Weighted Rating	4.2	4.0	2.5	3.0	4.5	2.1	3.6	4.5	1.7	4.4	3.2	4.3	2.2	4.5	4.9	3.6	3.3	2.1	4.1	4.4	3.1	3.5