MICHIGAN
STATE HIGHWAY DEPARTMENT
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1957

PERFORMANCE TESTS

ON WHITE AND YELLOW TRAFFIC PAINT

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Progress Report 1

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1957 PERFORMANCE TESTS
ON WHITE AND YELLOW TRAFFIC PAINT

This report describes application of the traffic paints included in the 1957 Performance Tests, which are being conducted in the four standard highway areas. Application of the same traffic paints in a Detroit City test area is described in an Appendix to this report.

Ratings and observation of Catatherm, a white thermoplastic sprayed-on striping applied in Sections 3C and 4B about six weeks after the deposition of standard performance paints, will be given in a separate report.

STANDARD PERFORMANCE TESTS

Transverse stripes of all pavement marking paints participating in the 1957 Performance Tests were deposited in the four test areas from August 14 to 21, 1957. According to established practice, the test areas included two concrete and two bituminous roadways.

Twenty-two paints were put down, including one white and one yellow from each of ten producers, a white only from another producer, and one yellow experimental paint formulated by the Research Laboratory. The sources of the test paints were as follows:

1. Baltimore Paint and Color Works, Baltimore.
2. Boydell Brothers Company, Detroit.
3. Buckeye Paint and Varnish Company, Toledo.
4. Cook Paint and Varnish Company, Detroit.
5. Franklin Paint Company, Franklin, Massachusetts.
6. Glidden Company, Cleveland.
7. Jaegle Paint and Varnish Company, Philadelphia: white only. MSHD No. 13A Yellow Experimental Traffic Paint.
8. L. K. R. Chemical Company, Detroit.
9. Patterson-Sargent Company (BPS), Cleveland.
10. Prismo Safety Corporation, Huntingdon, Pennsylvania.
11. Truscon Laboratories, Detroit.

Physical requirements and application details for the paints evaluated in the 1957 tests were governed by Michigan State Highway Department Specifications for white and yellow traffic paint, as revised June 15, 1956 and amended May 29, 1957, by action of the traffic paint committee. In conformance with these specifications, which require that reflectorizing beads be applied by the "drop in" method only, each of the 1957 performance test stripes had its entire bead complement dropped on, at the rate of six pounds per gallon of paint. Prismo white and yellow Lifeline paints received their own "duck spheres", while all other performance paints received Michigan Specification Type III beads.

All test paints were applied at the same thickness, at the rate of 16.5 gallons per mile of four-inch stripe, since no specific stripe thickness recommendations were received from any of the producers. The producers submitting paints for the 1957 performance tests were the same as for the 1956 tests, except for one addition and one deletion; also, the California Division of Highways white traffic paint was not resubmitted for the 1957 tests. An experimental MSHD No. 13A yellow traffic paint is being evaluated in the 1957 tests, continuing the Department's research on the suitability of alkyd vehicles for this purpose.

Three of the four 1956 test areas are being used again in the 1957 tests. Test Area 4 (Bituminous) has been transferred from Highway US-16 east of East Lansing to Highway US-127, because of resurfacing scheduled for the former highway. The four 1957 performance areas are located as follows:

1. US-27, three miles south of St. Johns, concrete, west roadway.
2. US-27, three miles south of St. Johns, bituminous, east roadway.
3. US-127, between Miller Rd. and Pennsylvania Ave. extension, concrete, east roadway.
4. US-127, between Miller Rd. and Pennsylvania Ave. extension, bituminous, west roadway.

Three stripes of each test paint were applied in each test area. The stripes were identified only by numbers, which increased consecutively in order of application. The order of application of test paints in the four areas was again rotated, as shown in Figure 1 and Table 1, to compensate for any inequalities arising from differences in the time and order of application. All paints were applied as 4-inch wide transverse stripes across two lanes of highway, traffic and passing.

In depositing the 1957 transverse stripes, the spray machine transmission setting was the same (15 mils thickness) for all performance paints. Field checks for film thickness, accomplished by weighing specified lengths of the fresh striping, were made only once for each paint. The weight deviation from the amount calculated for a 15 mil film theoretically should represent the loss due to evaporation of solvent from paint in the process of deposition, and should vary in different paints. These weight deviations are tabulated in a column of Table 1.

Detailed observations again were made by the Research Laboratory during the application of these paints, including air temperature and relative humidity, atomization pressure, stripe width and drying time. These values are listed in Table 1.

No difficulty was experienced in depositing any of the paints in the test areas. The paint stripes in Test Area 4 (Bituminous) were smudged within a few weeks of deposition by truck traffic transporting plant-mix bituminous concrete (Figure 2). However, ratings can be continued in that section. Initial evaluations of performance stripes have been completed and will be transmitted with subsequent evaluations, in a final report.

TABLE I

SUMMARY OF APPLICATION DATA

		Code No.	Stripe No.	Application Time	Air Temp. °F.	R. H. %	Drying Time Minutes	Wt. Diff. %	Weather Comments	
TEST AREA ① US 27. 3 MILES SOUTH OF ST. JOHNS, CONCRETE, 22 FEET WEST ROADWAY, CONSTRUCTION DATE SEPT. 1949	8-21-57	108	1- 3	11:12	78	60	25	-7.8	Partly	WHITE
		110	4- 6				35	-		
		90	7- 9				47	-3.4	cloudy	
		92	10-12				44			
		94	13-15				41	-0.3	with	
		96	16-18				19			
		98	19-21				35	-3.3	light	
		100	22-24				39			
		102	25-27				42	-2.6	wind.	
		104	28-30				46			
		106	31-33				53	-3.7		
		42	34-42	12:49	82	48	41	-4.2		
	8-21-57	109	1- 3	9:51	68	80	26	-4.1	Partly	YELLOW
		105	4- 6				76			
		89	7- 9				26	-6.0	cloudy	
		91	10-12				42			
		93	13-15				30	-3.5	with	
		95	16-18				27			
		97	19-21				53	-2.9	light	
		99	22-24				43			
		101	25-27				23	-5.1	wind.	
		103	28-30				49			
		118	31-33				36	-4.5		
		107	34-36	10:47	74	69	39			
TEST AREA ② US 27. 3 MILES SOUTH OF ST. JOHNS, BITUMINOUS, 18 FEET EAST ROADWAY, RESURFACED SUMMER 1956	8-20-57	96	1- 3	10:12	75	58	18	-4.1	Clear,	WHITE
		98	4- 6				26			
		100	7- 9				29	-1.1	sunny	
		102	10-12				37			
		104	13-15				35	-3.9	with	
		106	16-18				30			
		108	19-21				27		light	
		110	22-24				24	-2.0		
		90	25-27				34		wind.	
		92	28-30				31	-4.6		
		94	31-33	11:41	79	50	27			
	8-20-57	95	1- 3	12:56	81	42	20	-4.3	Clear,	YELLOW
		97	4- 6				25			
		99	7- 9				19	-2.4	sunny,	
		101	10-12				13			
		103	13-15				24	-2.8	with	
		105	16-18				51	-2.4		
		107	19-21				39	-2.6	light	
		109	22-24				30			
		89	25-27				28		wind.	
		91	28-30				23	-1.0		
		93	31-33	2:24	84	40	30			

TABLE I

SUMMARY OF APPLICATION DATA

		Code No.	Stripe No.	Application Time	Air Temp. °F.	R. H. %	Drying Time Minutes	Atom. Pressure psi	Weather Comments	
TEST AREA ③ US 127. SOUTH OF MILLER ROAD, CONCRETE 22 FEET, EAST ROADWAY, CONSTRUCTION DATE 1948	8-14-57	90	1- 3	11:05	76	91	50	30	Cloudy,	WHITE
		92	4- 6				46	30		
		94	7- 9				33	30	overcast	
		96	10-12				28	30		
		98	13-15				37	30	with	
		100	16-18				31	30		
		102	19-21				39	30	light	
		104	22-24				37	30		
		106	25-27				47	30	wind.	
		110	28-30				42	30		
		108	31-33	12:33	83	65	27	30		
	8-14-57	107	1- 3	2:03	85	60	42	30	Cloudy,	YELLOW
		109	4- 6				48	30		
		105	7- 9				53	30	overcast	
		103	10-12				43	30		
		101	13-15				16	30	with	
		99	16-18				40	30		
		97	19-21				47	30	light	
		95	22-24				40	30		
		93	25-27				35	30	wind.	
		91	28-30				28	30		
		89	31-33	3:23	85	60	36	30		
TEST AREA ④ US 127. SOUTH OF MILLER ROAD, BITUMINOUS 22 FEET, WEST ROADWAY, RESURFACED FALL 1956	8-15-57	108	1- 3	11:33	84	56	25	30	Overcast	WHITE
		106	4- 6				62	30		
		104	7- 9				53	30	with light	
		102	10-12				50	30		
		100	13-15				46	30	wind.	
		98	16-18				42	30		
		96	19-21				36	30	Few raindrops	
		94	22-24				31	30	fell just after	
		92	25-27				58	30	stripes were	
		90	28-30				55	30	deposited.	
		110	31-33	12:23	83	60	47	30		
	8-15-57	89	1- 3	10:01	82	69	27	30	Overcast	YELLOW
		91	4- 6				22	30		
		93	7- 9				30	30	with	
		95	10-12				26	30		
		97	13-15				31	30	light	
		99	16-18				30	30		
		101	19-21				15	30	wind.	
		103	22-24				31	30		
		105	25-27				46	30		
		109	28-30				25	30		
		107	31-33	11:09	84	56	32	30		

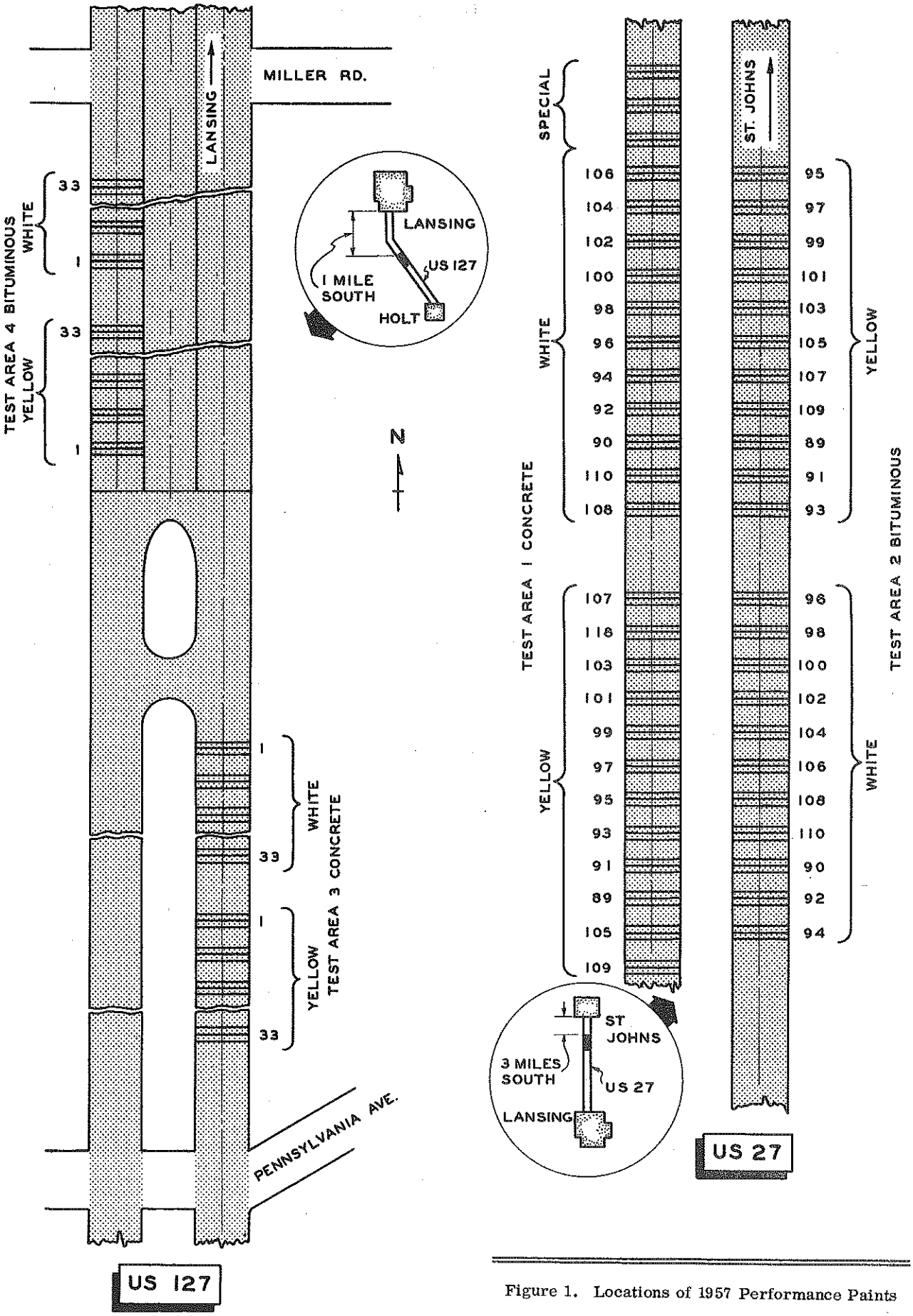


Figure 1. Locations of 1957 Performance Paints

Research Project 47 G-36 (10)

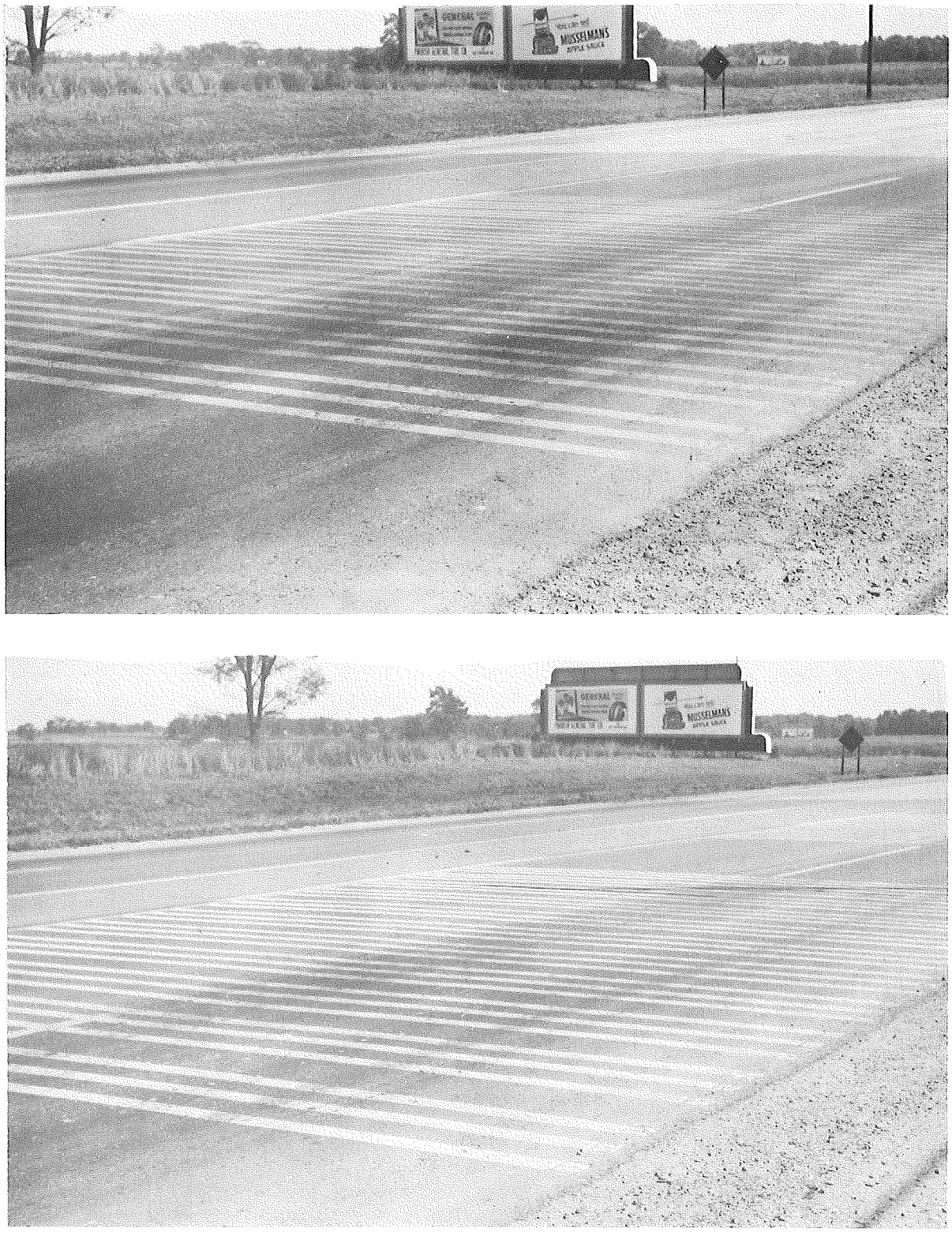


Figure 2. 1957 test stripes in Area 4B were smudged over with asphalt droppings from trucks a few weeks after deposition. Yellow stripes in upper photograph; white stripes in lower photograph.

APPENDIX

1957

PERFORMANCE TESTS

on

Oakland Avenue

in

City of Detroit

1957
PERFORMANCE TEST IN DETROIT

All 1957 performance traffic paints were deposited on sheet asphalt surfacing in a test area on Oakland Avenue in the City of Detroit just north of that City's test traffic stripes. In addition to the Department's test paints, stripes were deposited of the white and of the yellow traffic paint used by the City of Detroit on its roadways in 1957.

The Department's test stripes in the Detroit area were deposited in quadruplicate rather than triplicate as in the Department's standard test areas. The first two stripes of every paint were left unbeaded while the other two stripes were beaded, in order to obtain comparative evaluations on unbeaded paint as customarily used by Detroit, and on reflectorized paint as used by the Department.

All of the Detroit area test paints were deposited at the same machine setting (16.5 gal. per mile) to give a 15 mil stripe thickness. On the reflectorized stripes bead addition was by "drop-in" application, and followed Department requirements, and was identical to that used in the standard test areas.

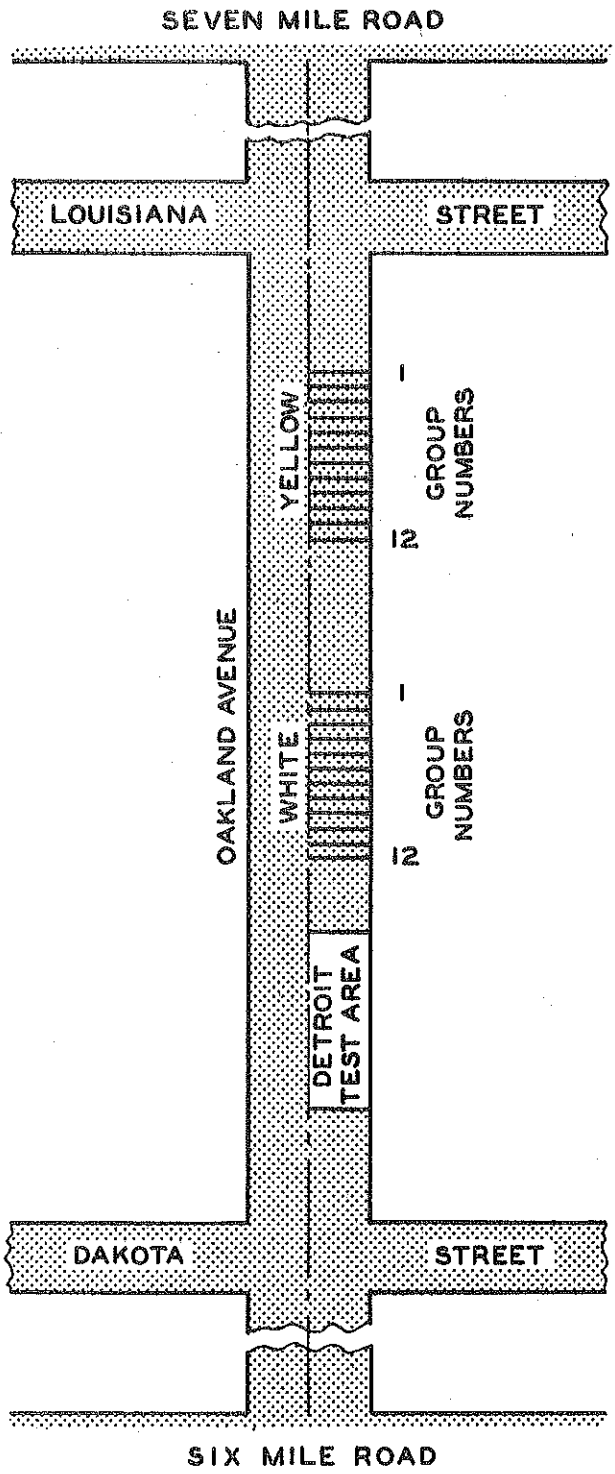
The stripes were deposited on September 5, 1957. Application data on the test stripes are presented in Table 2 and the location of the test area is given in Figure 3. Figure 4 shows photographs of the freshly applied stripes in the Detroit area.

Initial evaluation ratings on these stripes have been made. Because of possible faster deterioration of traffic stripes exposed to a big city environment this test area will be rated subsequently at four- to six-week intervals. The evaluation data and final ratings will be transmitted in a final report, at conclusion of the tests.

TABLE 2
SUMMARY OF APPLICATION DATA
Detroit Test Area
Applied September 5, 1957

	Code No.	Group No.	Application Time	Air Temp. °F.	R. H. %	Dry mins *Unb. - B.	Atom. Pressure psi	Weather Comments
White	94	1	11:07	64	56	19 - 23	30	Clear,
	96	2				15 - 15	30	Sunny and
	98	3				25 - 26	30	Cool.
	100	4				34 - 33	30	Light wind.
	102	5				36 - 29	30	
	104	6				28 - 33	30	
	106	7				51 - 50	30	
	Detroit (1)	8				26 - 25	30	
	110	9				24 - 23	30	
	90	10				33 - 32	30	
	92	11				28 - 29	30	
	108	12	12:05	68	50	23 - 22	30	
Yellow	107	1	12:45	70	44	37 - 36	30	
	109	2				31 - 34	30	
	Detroit (2)	3				24 - 23	30	
	89	4				27 - 26	30	
	91	5				22 - 23	30	
	93	6				24 - 30	30	
	95	7				16 - 15	30	
	97	8				23 - 22	30	
	99	9				24 - 23	30	
	101	10				15 - 14	30	
	103	11				27 - 22	30	
	105	12	2:34	75	54	56 - 55	30	

(1) Procured from Berry Brothers Company of Detroit.
(2) Procured from Cook Paint and Varnish Co. of Detroit.
* Unb. = Unbeaded; B = Beaded.



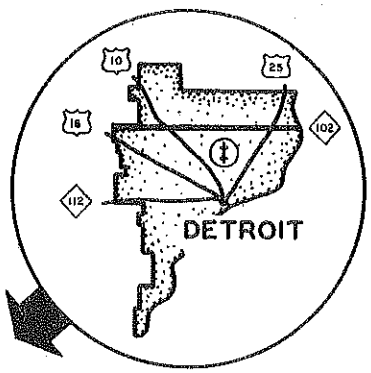


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Figure 3
Location of
Detroit Area
Test Stripes

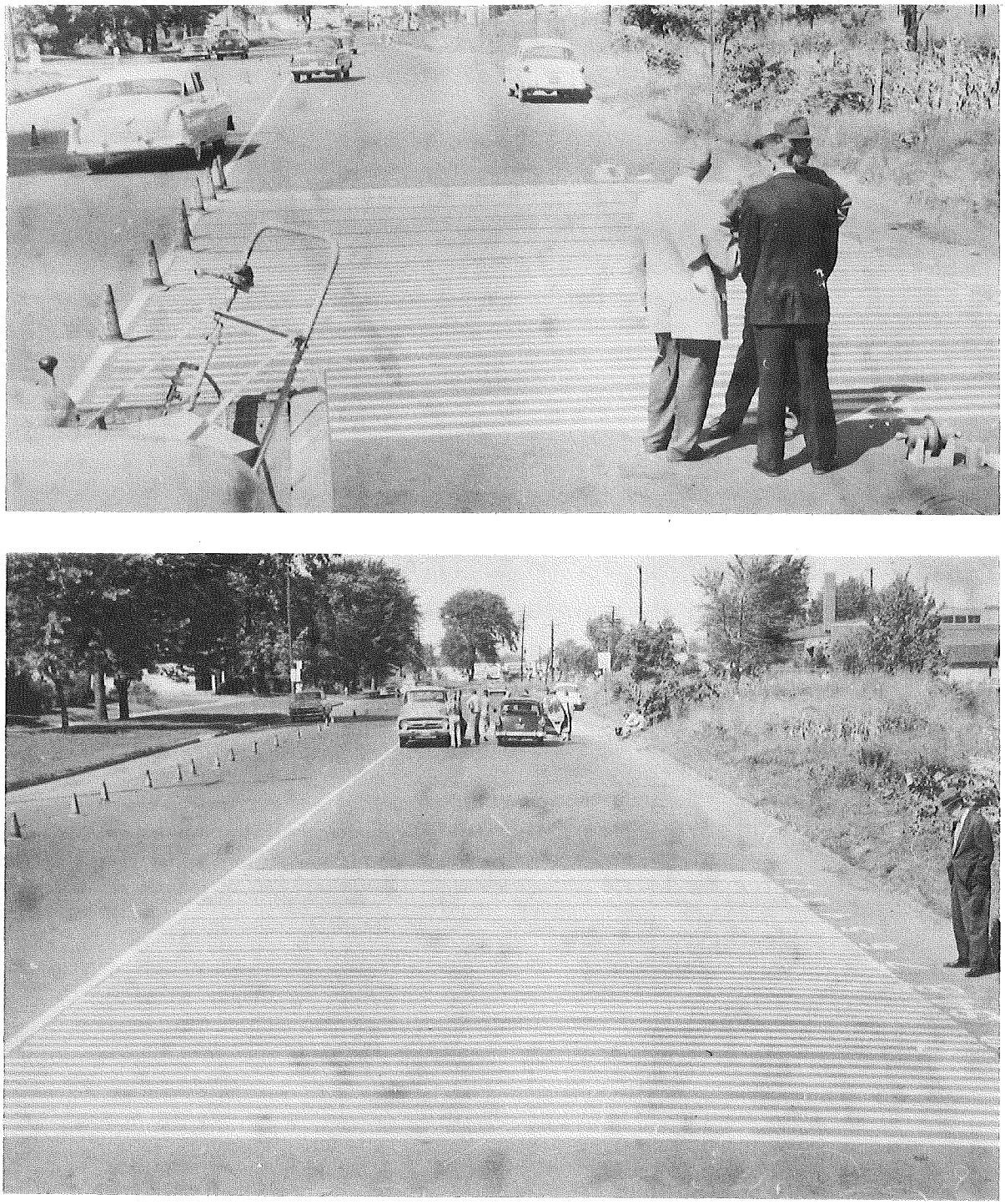

Figure 4. 1957 Detroit area test stripes. Yellow stripes in top photograph and new white stripes in bottom photograph. Both photographs were taken looking north on Oakland Avenue.