SUMMARIES OF MICHIGAN PAVEMENT SKID RESISTANCE
1966 Test Program

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ABSTRACT: Results are summarized for nearly 4000 skid resistance tests performed on Michigan trunkline pavements and bridge decks, during the calendar 1966 test year. The program includes testing of a) all new conventional trunkline pavement projects, b) bituminous surfaces incorporating experimental mixtures or unusual construction features for improved skid resistance, c) high accident locations, and d) locations by special request.

KEY WORDS: pavement skidding characteristics, skid resistance testing, skidding, de-slicking treatment.

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SUMMARIES OF MICHIGAN PAVEMENT SKID RESISTANCE
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The annual reporting procedure for skid resistance testing initiated last year is continued with this report, which summarizes nearly 4000 skid tests conducted during the calendar 1966 test year. This report is organized in the following four sections:

1. Conventional Concrete and Bituminous Pavements
2. Experimental Features in Bituminous Surfaces
3. High Accident Locations
4. Special Request Tests

Explanatory remarks are given at the beginning of each section as a preface to the tabulated data for that category of pavement testing. Of these categories, all Special Request tests and all High Accident Location tests have previously been reported to interested agencies within the Department.

All skid test values are expressed as 40-mph coefficients of wet sliding friction (wsf). A coefficient value of 0.40 is generally considered the dividing point between "satisfactory" and "unsatisfactory" pavement surfaces. Surfaces with coefficient values of 0.35 to 0.40 are in a "transitional" or "questionable" range. Projects below 0.35 under wet conditions could be dangerous, depending on prevailing speeds, road alignment, and geometrics. Surfaces with coefficients of 0.20 or less are as slippery as packed snow or ice.

Reference should be made to Research Report No. R-585 (Summaries of Michigan Pavement Skid Resistance: 1965 Test Program) for information regarding operation of the skid test device, selection of test areas, and verification retests.

NOTATION

Direction of Test Vehicle

EB = eastbound
WB = westbound
NB = northbound
SB = southbound
NWB = northwestbound
SEB = southeastbound
NEB = northeastbound
SWB = southwestbound

Lane Tested (follows code for direction of test vehicle)

OL = outer lane
CL = center lane
IL = inner lane
#4, #3, #2 = fourth, third, or second lane from centerline or median
RT = right turn lane
LT = left turn lane

Surface Type

CONC = portland cement concrete
BA = bituminous aggregate
BC = bituminous concrete
ST = surface treatment
NSST = non-skid surface treatment
SA = sand-asphalt

Section 1
CONVENTIONAL CONCRETE AND BITUMINOUS PAVEMENTS
First and Fifth Year Surveys

CONVENTIONAL CONCRETE AND BITUMINOUS PAVEMENTS

Skid tests were conducted this year on as many 1966 construction projects built to "conventional" specifications as could be scheduled in the test program, as well as certain 1964 and 1965 projects that were not included in previous annual test series. Friction values for these 73 "conventional" construction projects (68 group lettings) in 1966 are summarized in Tables 1 through 4 with pertinent construction data. As mentioned in Research Report R-585, follow-up skid tests will be conducted at five-year intervals after construction. These five-year values will first be included in the 1968 annual skid resistance report.

Table 1--Concrete Pavement Constructed in 1964, 1965, and 1966

Average wsf values were obtained in 1966 on 16 lanes of four 1964 concrete projects after two years of service. Coefficients ranged from 0.29 to 0.58 and averaged 0.43. No project had an average friction value below 0.40 for all lanes.

After one year of service, 25 lanes of eight 1965 concrete projects were tested. Low and high coefficients of 0.34 and 0.60, respectively, were obtained with an average wsf value of 0.46. Although 16 percent of all individual lanes were below the 0.40 skid resistance level, at least one lane of each project was above this level.

The average wsf was 0.46 for seven 1966 concrete projects (16 lanes) tested during their initial year of service. Low and high friction values were 0.33 and 0.56, respectively. Only one lane tested below 0.40.

Table 2--Bituminous Concrete Pavement Constructed in 1964, 1965, and 1966

Two bituminous concrete projects constructed in 1964 and tested during 1965, but not included in Research Report No. R-585, have been added to this year's summary and are shown in Table 2. Table 2 also contains three 1964 bituminous concrete projects (ten lanes) tested during 1966. After two years of service, friction values range from 0.24 to 0.52 and average 0.39. Coefficients indicate good skid resistance performance on two of these latter three projects, but all lanes of the third project had average wsf values below 0.40.

Two bituminous concrete projects built and tested during 1965, but not included in last year's annual report, have been added to this year's summary and are shown in Table 2. Data for ten bituminous concrete projects constructed in 1965 and tested during 1966 are also given in Table 2, with wsf values ranging from 0.30 to 0.64 and averaging 0.44. Low average coefficients ranging from 0.30 to 0.40 and averaging 0.34 were found for all lanes tested on two of these ten projects.

Four bituminous concrete projects (five locations) constructed during 1966 were tested the same year. Friction levels obtained during the initial year of service show good performance, with wsf values ranging from 0.42 to 0.56 and averaging 0.46.

Table 3--Bituminous Aggregate Pavement Constructed in 1965 and 1966

Table 3 contains a summary of 1966 skid tests for ten bituminous aggregate projects constructed in 1965 and six constructed in 1966. Wsf values for the 1965 projects ranged from 0.15 to 0.61 and averaged 0.43. Two projects yielded extremely low friction values. Project F 66022A, C4, had coefficients ranging from 0.15 to 0.43 and averaging 0.29. The slippery condition existed over approximately 20 percent of this 2-1/2 mile project and has been reported for appropriate action. The remaining 80 percent had satisfactory friction levels. Project F 66022B, C3, also yielded wsf values below 0.40 for all lanes tested, ranging from 0.32 to 0.35 and averaging 0.33. Coefficients obtained on the six bituminous aggregate projects constructed in 1966 range from 0.31 to 0.55 and average 0.42. Generally, all of these projects show good skid resistance qualities except Project SS 20031A, C2, where coefficients obtained during the initial year of service ranged from 0.31 to 0.38 and averaged 0.34.

Table 4--Miscellaneous Bituminous Surfaces Constructed in 1965 and 1966

Summarized in Table 4 are 1966 skid tests conducted on three sheet asphalt projects, eleven non-skid surface treatments, and one special hot-emulsion surfacing. Sheet asphalt Project Mm 6BC-7B, constructed in 1965, had good skid resistance qualities after one year of service with wsf values from 0.41 to 0.58, averaging 0.53. Sheet asphalt Project Mns 04031C, C2, yielded average coefficients below 0.40 in all lanes tested with values from 0.35 to 0.42, averaging 0.38.

The surface on M 72 from Traverse City west was tested again this year. In June 1966, a special sheet asphalt non-skid resurfacing was applied. Skid tests were conducted June 24 with values shown in Table 4.

Thirty-eight percent of the initial skid tests produced values below 0.40. The range was 0.32 to 0.51, averaging 0.41. In October, a second series of tests were made with basically the same results, wsf values from 0.35 to 0.45, averaging 0.41. In this four-month service interval, 33 percent of the friction values fell below 0.40. Results of these tests have previously been reported as 1966 Special Requests Nos. 5 and 11.

Generally, good skid resistance qualities were obtained on the 11 non-skid surface treatments applied in 1965, given in this table. Only two locations exhibit friction levels below 0.40. M 37 from north of White Cloud to the Newaygo-Lake County Line tests considerably below the Department's safety standard--values averaged 0.26 and spanned a range of 0.16 to 0.37. The other locations (M 57 from Greenville east to M 66) gave coefficients ranging from 0.30 to 0.43, averaging 0.38.

The special hot emulsion surface applied in 1966 to US 27 from "G Drive N" to the south limits of Olivet produced a range of friction values from 0.35 to 0.41, averaging 0.39.

TABLE 1
CONCRETE PAVEMENT CONSTRUCTED IN 1964, 1965, AND 1966

	Project No.	Location	Paving Contractor	Aggregate Source		Route	Direction and Lane	Coefficient of Wet Sliding Friction		
				Coarse	Fine			Low	High	Average
1964	U 33061D, C11 U 33061E, C12	M 43 WB from Center St. W to Logan St. in Lansing	Eisenhour Construction Co., Inc.	Pit 47-3	Pit 33-6	M 43 M 43 M 43	WBOL WBCL WBIL	0.41 0.41 0.40	0.44 0.43 0.42	0.43 0.42 0.41
	M 63201B, C1	M 59 (Widetrack Dr.) from intersection of Cass St. and Huron St., SE to S of Wesson St. in Pontiac	Anderson & Ruzzin, Inc.	E. C. Levy (Dix Yd.)	Pit 63-56	M 59 M 59 M 59 M 59 M 59	OL #4 #3 #2 IL	0.31 0.29 0.32 0.40 0.35	0.33 0.33 0.37 0.41 0.36	0.32 0.31 0.35 0.41 0.36
	F 81103B, C7	M 14 from US 23 to Plymouth Rd.	L. A. Davidson	Pit 47-3	Pit 47-3	M 14 M 14 M 14 M 14	EBOL EBIL WBOL WBIL	0.50 0.52 0.43 0.48	0.56 0.58 0.45 0.55	0.53 0.56 0.44 0.51
	F 81121A, C2	M 153 relocation from intersection of M 14 relocation and existing M 14, SE to intersection of Franks Lake Rd. and existing M 153 (Ford Rd.)	Eisenhour Construction Co., Inc.	Pits 81-1 & 81-57	Pits 81-1 & 81-57	M 153 M 153 M 153 M 153	NWBOL NWBIL SEBOL SEBIL	0.41 0.45 0.43 0.47	0.43 0.46 0.44 0.48	0.42 0.45 0.44 0.48
1965	I 11015B, C36	I 94 from US 31-US 33 S 4 mi. to bituminous concrete	Denton Construction Co.	Pits 70-9 & 75-5	Pits 14-58 & 80-20	I 94 I 94	NBIL SBIL	0.54 0.55	0.54 0.58	0.54 0.56
	U 13121G, C6	I 94BL from near Capital Ave. E to "E" St. in Battle Creek	Carl Goodwin & Sons, Inc.	Pit 8-80	Pit 8-80	I 94BL I 94BL I 94BL I 94BL	NBOL NBIL SBOL SBIL	0.37 0.43 0.40 0.43	0.38 0.47 0.43 0.46	0.38 0.45 0.42 0.44
	SS 22051A, C2	US 8 relocation from interstate bridge over Menominee River N to existing US 8	Bacco Construction Co.	Pit 22-4	Pit 22-4	US 8 US 8	NB SB	0.51 0.44	0.52 0.50	0.52 0.47
	F 50013A, C2	M 53 relocation from N of 24 Mile Rd. N to existing M 53	Sargent Construction Co.	Pit 63-4	Pit 63-4	M 53 M 53 M 53 M 53	NBOL NBIL SBOL SBIL	0.52 0.56 0.43 0.52	0.54 0.60 0.44 0.57	0.53 0.58 0.43 0.55
	U 73073B, C9	M 81 (Davenport St.) from Carolina St. E to Schaefer St. in Saginaw	W. F. McNally Co.	Pit 71-47	Pits 63-54 & 79-63	M 81 M 81 M 81	WBOL WBCL WBIL	0.35 0.35 0.39	0.37 0.37 0.43	0.36 0.36 0.40

TABLE 1 (Cont.)
CONCRETE PAVEMENT CONSTRUCTED IN 1964, 1965, AND 1966

	Project No.	Location	Paving Contractor	Aggregate Sources		Route	Direction and Lane	Coefficient of Wet Sliding Friction		
				Coarse	Fine			Low	High	Avg.
1965 (CONT)	SS 76012B, C2	M 47 from N limits of Owosso N to Shiawassee-Saginaw Co. Line	Sargent Construction Co.	Pit 47-3	Pit 76-36	M 47	NBOL	0.34	0.38	0.36
						M 47	SBOL	0.41	0.44	0.43
	SS 77052A, C3	M 29 relocation from 2550 ft S of Marysville N to 250 ft S of Bunce Ave. on existing M 29	Anderson & Ruzzin, Inc.	Pit 75-5	Pit 74-51	M 29	NBOL	0.47	0.51	0.49
						M 29	NBIL	0.50	0.51	0.50
						M 29	SBOL	0.46	0.51	0.49
						M 29	SBIL	0.41	0.45	0.43
	U 81105A, C1 U 81105B, C2	M 14 relocation from 0.83 mi. W of Wagner Rd. NE to US 23 at the Huron River	Sargent Construction Co.	Pit 47-3	Pit 47-3	M 14	EBOL	0.42	0.48	0.46
						M 14	EBIL	0.44	0.49	0.46
						M 14	WBOL	0.44	0.49	0.46
						M 14	WBIL	0.45	0.49	0.47
1966	U 38071A, C1	US 127BR relocation from N of Mansion St. NW to N of E Franklin St. in Jackson	Eisenhour Construction Co., Inc.	Pits 30-35 & 47-3	Pit 30-35	US 127BR	NBOL	0.44	0.50	0.48
						US 127BR	NBIL	0.50	0.56	0.53
						US 127BR	SBOL	0.45	0.52	0.49
						US 127BR	SBIL	0.51	0.56	0.54
	I 47064A, C20 I 63022A, C10	I 96 from existing 36-ft pavement, E of US 23, SE to 1025 ft W of Beck Rd., omitting from Livingston-Oakland Co. Line E to E of Kent Lake Rd.	L. W. Edison Co.	Pit 63-7	Pit 63-7	I 96	EBIL	0.43	0.52	0.48
						I 96	WBIL	0.43	0.53	0.48
	F 59045A, C2	M 46 from 488 ft E of M 66 E to Second St. in Edmore	Denton Construction Co.	Pits 67-2 & 37-26	Pit 37-26	M 46	EB	0.35	0.40	0.38
						M 46	WB	0.40	0.43	0.41
	I 63022A, C9	I 96 from Beck Rd. SE to I 696	L. W. Edison Co.	Pit 63-7	Pit 63-7	I 96	EBIL	0.47	0.52	0.49
						I 96	WBIL	0.43	0.47	0.46
	F 67015A, C1	US 131 relocation from 860 ft S of 1 Mile Rd. N to 1717 ft N of Marion Rd.	Denton Construction Co.	Pit 67-2	Pit 67-2	US 131	NB	0.43	0.46	0.45
						US 131	SB	0.40	0.45	0.42
	F 67015A, C2 F 83031A, C6	US 131 relocation N from 1717 ft N of Marion Rd. to 0.52 mi. N of Osceola-Wexford Co. Line	Denton Construction Co.	Pit 67-2	Pit 67-2	US 131	NB	0.38	0.48	0.43
						US 131	SB	0.33	0.45	0.40
	U 83032A, C6	US 131 from 13th St. to Boon Rd. in Cadillac	Hodgkiss & Douma, Inc.	Pit 67-2	Pit 67-2	US 131	NBOL	0.48	0.50	0.49
						US 131	SBOL	0.44	0.44	0.44

TABLE 2
BITUMINOUS CONCRETE PAVEMENT (4.12)
CONSTRUCTED IN 1964, 1965, AND 1966

	Project No.	Location	Paving Contractor	Aggregate Source		Route	Direction and Lane	Coefficient of Wet Sliding Friction		
				Coarse	Fine			Low	High	Average
1964	F 30033C, C1	M 99 from N limits of Jonesville NW to E limits of Litchfield	Yerington & Brown, Inc.	Pit 12-35	National Lime & Stone Co. Findley, Ohio	M 99 M 99	NB SB	0.43 0.45	0.50 0.49	0.47 0.47
	F 32091C, C1	US 25 from 500 ft S of Helena Rd. N to 1035 N of S limits of Harbor Beach	Lake & Howell Construction Co.	Pit 32-6 & Local Pit	Pit 32-4	US 25 US 25	NB SB	0.44 0.43	0.52 0.52	0.49 0.48
	Mb 39041C, C7*	I 94BL from 9 Mile Rd. in Oshtemo NE to US 131	Globe Construction Co.	Material Service Harvey, Ill.	Pit 39-4	I 94BL I 94BL	EB WB	0.36 0.44	0.40 0.45	0.38 0.44
	F 50011E, C11	M 53 from 15 Mile Rd. to 17-1/2 Mile Rd.	Cooke Contracting Co.	Pits 50-35 & 63-4	Pits 50-21 & 50-35	M 53 M 53 M 53 M 53 M 53 M 53	NBOL NBCL NBIL SBOL SBCL SBIL	0.30 0.24 0.27 0.29 0.27 0.30	0.42 0.34 0.37 0.37 0.36 0.38	0.35 0.30 0.32 0.33 0.31 0.34
	F 73051B, C1* F 73051D, C2*	M 13 from M 57 N to Washington St. in Saginaw	Saginaw Asphalt Paving Co.	Pits 17-40 & 75-5	Local Pits	M 13 M 13	NB SB	0.32 0.32	0.42 0.44	0.36 0.37
1965	I 11014B, C9 I 11015A, C35	I 94 from LaPorte Rd. NE to S limits of Bridgman	Rieth-Riley Construction Co., Inc.	US Steel Gary, Ind.	Pits 11-36 & 14-36	I 94 I 94 I 94 I 94 I 94 I 94	NBOL NBCL NBIL SBOL SBCL SBIL	0.34 0.49 0.51 0.37 0.50 0.64	0.45 0.52 0.61 0.40 0.54 0.64	0.40 0.50 0.56 0.39 0.52 0.64
	I 11015B, C36	I 94 from concrete pavement, 4 mi. S of US 31-US 33, S to Bridgman	Rieth-Riley Construction Co., Inc.	US Steel Gary, Ind.	Pit 11-36	I 94 I 94 I 94 I 94 I 94 I 94	NBOL NBCL NBIL SBOL SBCL SBIL	0.37 0.54 0.60 0.39 0.50 0.60	0.40 0.56 0.62 0.40 0.52 0.64	0.38 0.55 0.61 0.39 0.51 0.62
	Mb 13121D, C12	I 94BL (Dickman Rd.) from GTW RR E to 20th St. in Springfield	Rieth-Riley Construction Co., Inc.	Pit 13-30	Pit 13-30	I 94BL I 94BL I 94BL I 94BL	EBOL EBIL WBOL WBIL	0.36 0.38 0.33 0.41	0.37 0.41 0.34 0.44	0.36 0.39 0.34 0.42
	F 21024B, C4	US 2 from Sturgeon River E to Big Fishdam	Thornton Construction Co., Inc.	Pit 75-43	Local Pits	US 2 US 2	EB WB	0.50 0.49	0.52 0.54	0.50 0.51
	F 24031A, C2 U 24031A, C3	US 131 from 1500 ft S of State Police Post, S of Petoskey, N to US 31 (Charlevoix St.)	Hodgkiss & Douma, Inc.	Pit 17-20	Pit 15-32	US 131 US 131 US 131 US 131	NBOL NBIL SBOL SBIL	0.41 0.44 0.45 0.48	0.47 0.45 0.50 0.52	0.44 0.44 0.48 0.50
	F 28012A, C1* F 28051B, C2*	M 37 from M 113 (Miller Rd.) N to 4030 ft N of Silver Lake Shore Rd.	Peninsula Asphalt & Construction Co.	Pit 45-19	Pit 45-19	M 37 M 37	NB SB	0.41 0.44	0.56 0.54	0.50 0.49

*Skid tests were conducted during the 1965 test year, but were omitted from Research Report No. R-585.

TABLE 2 (Cont.)
BITUMINOUS CONCRETE PAVEMENT (4.12)
CONSTRUCTED IN 1964, 1965, AND 1966

	Project No.	Location	Paving Contractor	Aggregate Sources		Route	Direction and Lane	Coefficient of Wet Sliding Friction		
				Coarse	Fine			Low	High	Avg.
1965 (CONT)	SS 29021A, C2	M 57 from Gratiot-Montcalm Co. Line E of Carson City, E to S limits of Perrington (Luce Rd.)	The Hicks Co.	Pit 63-4	Pit 59-48	M 57	EB	0.44	0.49	0.46
						M 57	WB	0.46	0.50	0.49
	U 37011C, C7*	US 27BR from Broomfield Rd. N to 940 ft N of Preston Rd. in Mt. Pleasant	The Hicks Co.	Pit 37-26	Pit 37-26	US 27BR	NBOL	0.47	0.49	0.48
						US 27BR	NBIL	0.43	0.44	0.44
						US 27BR	SBOL	0.40	0.43	0.42
						US 27BR	SBIL	0.41	0.41	0.41
	U 44012C, C2	M 24 from Second St. N to N limits of Lapeer	Flint Asphalt & Paving Co.	Pits 32-4 & 63-4	Pit 63-54	M 24	NBOL	0.36	0.39	0.38
						M 24	NBIL	0.37	0.39	0.38
						M 24	SBOL	0.41	0.45	0.42
						M 24	SBIL	0.37	0.42	0.39
	SS 73031C, C7 USS 76012A, C1 SS 76012B, C2	M 47 from M 21 in Owosso, N to 5th St. in Oakley	Saginaw Asphalt Paving Co.	Pit 47-3	Local Pits	M 47	NBOL	0.33	0.50	0.44
						M 47	NBIL	0.40	0.42	0.41
						M 47	SBOL	0.39	0.50	0.46
						M 47	SBIL	0.39	0.44	0.41
	U 78042A, C5	M 60-US 131BR from US 131 E to Rocky River in Three Rivers	Globe Construction Co.	Material Services Corp., Chicago, Ill.	Pit 78-25	M 60-US 131BR				
							EBOL	0.37	0.37	0.37
							EBIL	0.36	0.40	0.38
							WBOL	0.34	0.34	0.34
							WBIL	0.34	0.36	0.35
	Mns 82041C, C11	M 17 from Monroe Blvd. to Pelham Rd.	Detroit Asphalt Paving Co.	Pit 47-3	Pit 47-3	M 17	EBOL	0.30	0.32	0.31
						M 17	EBIL	0.31	0.34	0.32
						M 17	WBOL	0.33	0.34	0.34
						M 17	WBIL	0.32	0.34	0.33
1966	F 55012B, C7 F 55012D, C8	US 41 from N limits of Daggett N to 740 ft S of US 2	Payne & Dolan of Wisconsin, Inc.	Pit 55-119	Pit 55-4	US 41	NBOL	0.46	0.47	0.46
						US 41	NBIL	0.51	0.53	0.53
						US 41	SBOL	0.44	0.47	0.46
						US 41	SBIL	0.48	0.55	0.52
	F 74072C, C2	US 25 from N of Huron Ave. in Lexington N to S limits of Port Sanilac	Rieth-Riley Construction Co., Inc.	Pits 17-40 & 32-4	Pits 63-4 & 74-60	US 25	NB	0.47	0.51	0.49
						US 25	SB	0.50	0.56	0.53
	F 83031A, C6 (part)	US 131 relocation N from 0.52 mi. N of Osceola-Wexford Co. Line to existing US 131	The Hicks Co.	Pit 67-2	Pit 67-2	US 131	NBOL	0.44	0.48	0.46
						US 131	NBIL	0.48	0.52	0.49
						US 131	SBOL	0.42	0.43	0.42
						US 131	SBIL	0.43	0.46	0.45
	F 83031A, C6 (part)	M 115 from intersection with old US 131 W 0.7 mi.	The Hicks Co.	Pit 67-2	Pit 83-57	M 115	EBOL	0.44	0.48	0.47
						M 115	EBIL	0.42	0.44	0.43
						M 115	WBOL	0.42	0.45	0.44
						M 115	WBIL	0.43	0.45	0.44
	U 83032A, C6	US 131 from Clam River to Boon Rd. in Cadillac	Hodgkiss & Douma	Pit 67-2	Pit 67-2	US 131	NBOL	0.40	0.41	0.41
						US 131	NBIL	0.42	0.47	0.44
						US 131	SBOL	0.41	0.48	0.44
						US 131	SBIL	0.36	0.42	0.40

*Skid tests were conducted during the 1965 test year, but were omitted from Research Report No. R-585.

TABLE 3
BITUMINOUS AGGREGATE PAVEMENT (4.11) CONSTRUCTED IN 1965 AND 1966

	Project No.	Location	Paving Contractor	Aggregate Sources		Route	Direction and Lane	Coefficient of Wet Sliding Friction		
				Coarse	Fine			Low	High	Avg.
1965	SS 05051A, C1	M 66 from US 131 N to Co. Rd. 620	Hodgkiss & Douma, Inc.	Pit 05-70	None	M 66 M 66	NB SB	0.47 0.47	0.49 0.50	0.48 0.49
	F 16032C, C5	M 27 from N limits of Topinabee NE to NYCRR	Lake & Howell Construction Co.	Pit 16-64	None	M 27 M 27	NB SB	0.44 0.43	0.49 0.48	0.47 0.46
	Mb 17043C, C3	M 48 from Co. Rd. intersection in Goetzville S to Caribou Lake Rd.	Hodgkiss & Douma, Inc.	Pit 17-69	None	M 48 M 48	NB SB	0.45 0.43	0.52 0.50	0.49 0.48
	F 32032C, C2	M 53 from 480 ft S of M 142 N to US 25 in Port Austin	Saginaw Asphalt Paving Co.	Pits 32-9, 32-10, 32-15, 32-48, 32-51, 32-59, 32-60, & 74-10	None	M 53 M 53	NB SB	0.37 0.38	0.48 0.49	0.43 0.43
	Mb 52032C, C7	M 35 from S limits of Palmer N 0.906 mi	Payne & Dolan of Wisconsin, Inc.	Pit 52-9	None	M 35 M 35	NB SB	0.41 0.38	0.42 0.41	0.41 0.39
	F 66021D, C5	M 28-M 64 from Merriweather Creek NE to M 28-M 64 junction W of Bergland	Mathy Construction Co.	Pit 66-63	None	M 28-M 64 M 28-M 64	NEB SWB	0.56 0.56	0.60 0.61	0.59 0.59
	F 66022B, C3	M 28 from W of Ewen to 0.7 mi E of Baltimore	Thornton Construction Co., Inc.	Pit 66-33	None	M 28 M 28	EB WB	0.32 0.32	0.35 0.34	0.34 0.33
	F 66022A, C4*	M 28 from M 64 (E Jct.) E to W branch of Ontonagon River	Thornton Construction Co., Inc.	Pits 27-27 & 66-63	None	M 28 M 28	EB WB	0.16 0.15	0.43 0.42	0.29 0.29
	Mm 5BA-3D	M 66 from M 32 in East Jordan NW to N limits of East Jordan; also on M 66 from 5.1 mi N of East Jordan NW intermittently for 0.5 mi	Hodgkiss & Douma, Inc.	Pit 5-70	None	M 66 M 66	NB SB	0.39 0.37	0.41 0.39	0.40 0.38
	Mm 6BA-3B	US 31 N from 7 mi N of Scottville in Mason County	Laman Asphalt & Paving Co.	Pit 64-41	None	US 31 US 31	NB SB	0.42 0.39	0.43 0.41	0.42 0.40
1966	SS 15071B, C4	M 75 relocation from 0.14 mi E of Boyne City NE to existing M 75	Hodgkiss & Douma, Inc.	Pit 15-43	None	M 75 M 75	EB WB	0.40 0.37	0.42 0.42	0.41 0.40
	Mb 15071C, C5	Existing M 75 from 0.4 mi E of Boyne City N intermittently for 0.1 mi; also existing M 75 from 0.1 mi S of Shadow Trails Rd. N 1.4 mi	Hodgkiss & Douma, Inc.	Pit 15-43	None	M 75 M 75	EB WB	0.44 0.41	0.46 0.47	0.45 0.44
	SS 20031A, C2	M 93 relocation from 800 ft N of Weber Rd., N and E to intersection with existing M 93-M 72	Hodgkiss & Douma, Inc.	Pit 20-28	None	M 93 M 93	NB SB	0.31 0.32	0.34 0.38	0.32 0.36
	Mb 20031C, C3	M 93 from 344 ft S of Military Rd., N and E 1.13 mi	Hodgkiss & Douma, Inc.	Pit 20-28	None	M 93 M 93	EB WB	0.36 0.42	0.40 0.44	0.38 0.43
	Mb 31031-3	M 203 from W limits of Calumet W 1.587 mi.	George Hocking Construction Co.	Pit 31-65	None	M 203 M 203	EB WB	0.41 0.41	0.41 0.45	0.41 0.43
	M 75021-008	M 219 (entire route), in Manistee from US 2 E	Payne & Dolan of Wisconsin, Inc.	Pit 21-62	None	M 219 M 219	NB SB	0.51 0.51	0.55 0.54	0.52 0.53

TABLE 4
MISCELLANEOUS BITUMINOUS SURFACES CONSTRUCTED IN 1965 AND 1966

	Project No.	Location	Paving Contractor	Aggregate Sources		Route	Direction and Lane	Coefficient of Wet Sliding Friction		
				Coarse	Fine			Low	High	Avg.
1965	**Non-Skid Surface Treatments (4.06)**									
	Mm 5SC-5B	M 57 from Greenville E to M 66	Klett Construction Co.	Pit 34-51	None	M 57	EB	0.30	0.43	0.37
						M 57	WB	0.31	0.43	0.38
	Mm 5SC-5C (part)	M 20 from E limits of White Cloud E to Newaygo-Mecosta Co. line	Rieth-Riley Construction Co., Inc.	Pit 54-27	None	M 20	NB	0.52	0.58	0.55
						M 20	SB	0.53	0.57	0.55
	Mm 5SC-5C (part)	M 37 from N of White Cloud E to Newaygo-Lake Co. line	Rieth-Riley Construction Co., Inc.	Pit 54-27	None	M 37	NB	0.20	0.32	0.26
						M 37	SB	0.16	0.37	0.27
	Mm 5SC-6B	M 18 from Gladwin-Roscommon Co. line S 17 mi.	Gilliland Construction and Equipment Co.	Pit 67-2	None	M 18	NB	0.45	0.46	0.45
						M 18	SB	0.47	0.51	0.48
	Mm 5SC-6C	M 90 from Brown City E to M 19	Thompson-McCully Asphalt Paving Co.	Pit 50-35	None	M 90	EB	0.52	0.56	0.54
						M 90	WB	0.53	0.57	0.55
	Mm 5SC-7A	M 37 from N limits of Middleville N to Barry-Kent Co. line	Bekman Co.	Pit 8-58	None	M 37	NB	0.45	0.48	0.46
						M 37	SB	0.43	0.44	0.43
	Mm 5SC-8D	M 52 from E of Manchester S to US 12	Ann Arbor Construction Co.	Pit 81-57	None	M 52	NB	0.40	0.47	0.43
						M 52	SB	0.43	0.46	0.45
	Mm 6SC-4A	M 144 from W of AuSable River E in Roscommon	Comstock Construction Co.	Pit 71-15	None	M 144	EB	0.41	0.45	0.43
						M 144	WB	0.40	0.45	0.42
	Mm 6SC-4B (part)	M 33 from 4 mi N of M 68 N 5.8 mi	Gilliland Construction and Equipment Co.	Pit 16-17	None	M 33	NB	0.46	0.48	0.47
						M 33	SB	0.44	0.46	0.45
	Mm 6SC-4B (part)	M 33 from 12.3 mi N of M 68 N 1.4 mi	Gilliland Construction and Equipment Co.	Pit 16-17	None	M 33	NB	0.41	0.44	0.43
						M 33	SB	0.31	0.37	0.34
	Mm 6SC-4B (part)	M 131 from 300 ft S of Middle Village Rd. N to 1.5 mi N of Robinson Rd.	Gilliland Construction and Equipment Co.	Pit 16-17	None	M 131	NB	0.59	0.62	0.61
						M 131	SB	0.56	0.62	0.59
	Sheet Asphalt (4.13)									
	Mns 04031C, C2*	US 23 at Werth Rd., 0.5 mi SW of Alpena	Hodgkiss & Douma, Inc.	Pit 17-40	Pit 71-15	US 23	NB	0.35	0.42	0.38
						US 23	SB	0.38	0.41	0.39
						Werth	EB	0.37	0.37	0.37
	Mb 45021C, C4**	M 72 from 6 mi E of Empire E to M 22 (Leelanau-Grand Traverse Co. line)	Peninsula Asphalt Paving Co.	None	Local	M 72	EB	0.32	0.50	0.44
						M 72	WB	0.32	0.51	0.39
	Mm 6BC-7B	M 60 from M 66 (formerly M 78) NE to US 27, omitting Burlington	Rieth-Riley Construction Co., Inc.	None	Pit 12-35 & Local Pit	M 60	EB	0.43	0.58	0.53
						M 60	WB	0.41	0.56	0.53
1966	**Special Hot-Emulsion Surfacing**									
	Mb 13072-4	US 27 from "G Drive N" to S Limits of Olivet	Rieth-Riley Construction Co., Inc.	None	Pits 13-38 & 13-47	US 27	NB	0.35	0.39	0.38
						US 27	SB	0.37	0.41	0.40

* Special sheet asphalt mix
** Also reported as a Special Request.

Section 2
EXPERIMENTAL FEATURES IN BITUMINOUS SURFACES

EXPERIMENTAL FEATURES IN BITUMINOUS SURFACES

Testing of bituminous pavement and bridge deck surfaces of various types, incorporating experimental materials or unusual construction techniques, is reported in this section. The following areas of study were successfully completed in the 1965 test program and were deleted from the 1966 schedule of skid tests:

1. Mine Rock and Related Aggregate in Upper Peninsula Bituminous Concrete and Bituminous Aggregate Projects.
2. 2NS and 3BC Sands in Bituminous Concrete Resurfacing.
3. 2NS Modified Sand-Asphalt Resurfacing (District 10 Intersections).
4. 3BCS Slag Sand-Asphalt Resurfacing (District 10 Intersections).
5. Ground Corncobs in Bituminous Mixtures.

Projects not tested during the 1966 test year but scheduled for continued field studies on a biennial basis include the following:

1. 31A Slag Aggregate in Bituminous Concrete Resurfacing.
2. 2NS Modified Sand-Asphalt Resurfacing; US 131: Reed City North (Project Mb 67014, C3R).
3. 3BC Sand-Asphalt Resurfacing.
4. Wyton Synthetic Binder Surface Course Mixtures.

Annual skid tests were continued in 1966 for seven areas of study, for which wsf values and pertinent construction data are given in Tables 5 through 11.

Table 5--Rubberized Sand-Asphalt Resurfacing; US 31: City of Charlevoix.

In Research Report R-585, the US 31 rubberized sand-asphalt resurfacing project, located in Charlevoix from the bascule bridge at the Island Lake outlet north to Dixon St., was compared with one bituminous concrete and one bituminous aggregate project. Of the three types, the rubberized sand-asphalt surface gave the best performance over five years of service. In 1966, skid tests were performed only on the rubberized sand-asphalt, on September 7 at air and pavement temperatures of 56 and 53 F, respectively. Wsf values ranged from 0.37 to 0.42 and averaged 0.40. The friction value dropped 0.04 or 9 percent from last year's tests.

Table 6--Asphalt Emulsion Hot-Mix Surface Courses; US 127: Lansing Intersections (Project Mob 33032C, C6)

Two Lansing intersections were resurfaced with asphalt-emulsion hot-mix surface courses in October 1964. Skid tests were conducted May 24, 1966 (during the second year of service) at air and pavement temperatures of 71 and 78 F, respectively. Since initial construction, wsf values of the sand-emulsified asphalt hot-mix surface course (Cedar St.-Holmes Rd. intersection) have decreased 32 percent and values for the bituminous concrete emulsified hot-mix surface course (Cedar St.-Baker St. intersection) have decreased 33 percent. Both locations yield low coefficients, which range from 0.27 to 0.39 and average 0.34. No extensive deterioration is visible in the stopping areas at Baker Street but aggregate is exposed and polished. The 1964 surface course at Holmes Road has been worn off in the stopping area, apparently by traffic.

Table 7--3BC Sand-Asphalt Resurfacing; US 131 SB: North and South of Alba (Project Mm 4BC-3A: Control Section 05072).

Test results are summarized in Table 7 for a special 3BC sand-asphalt non-skid resurfacing project where two penetration grades of asphalt were used. The 1966 skid tests were conducted September 7 at air and pavement temperatures of 69 and 76 F, respectively. Coefficients obtained on the 85/100 penetration grade ranged from 0.49 to 0.66 and averaged 0.56. Coefficients obtained on the 150/175 penetration grade ranged from 0.51 to 0.67 and averaged 0.58. After the second year of service, both penetration grades continue to exhibit good skid resistance qualities.

Table 8--Bituminous Concrete Interstate Projects

Six of the 19 projects reported last year were selected for annual skid tests in 1966. Those included were constructed between September 1961 and September 1962. Skid tests were obtained during June and August 1966. Air and pavement temperatures at time of test ranged from 65 to 81 F and 64 to 90 F, respectively. Wsf values for outside (traffic) lanes ranged from 0.32 to 0.54 and averaged 0.45; values for inside (passing) lanes ranged from 0.43 to 0.71 and averaged 0.57. This differential wear pattern between lanes is continuing from previous tests. For the second consecutive year, the coefficients of the inside lane are 27 percent higher than those of the outside lane.

Table 9--Bridge Deck Surface Coatings

Skid tests on seven structures were discontinued this year. Wsf values were obtained on the remaining structures during June, July, and August. Air and pavement temperatures ranged from 69 to 85 F and 77 to 100 F, respectively. After one to three years of service, coal tar epoxy coatings have given the best performance, with wsf values ranging from 0.34 to 0.52 and averaging 0.42. Other coatings yielding average wsf values below the Department's safety standard of 0.40 include a coal tar slurry (applied in 1961), a 31A bituminous concrete (applied in 1964), and a rubberized sand-asphalt (also applied in 1964).

Table 10--Experimental Skid-Resistant Resurfacing

Experimental skid-resistant resurfacings were applied at 19 locations in September and October 1965. Specifications required various hard aggregates and mix designs, applied to intersections selected as a result of previously determined low friction levels. After approximately one year of service, average wsf values determined on eight locations are at or below the Department's safety standard of 0.40. Although average friction levels for the remaining 11 locations have declined from initial wsf values by about 30 percent, they continue to exhibit good skid-resistant qualities:

a. US 23 at Linwood Rd., North of Bay City
b. US 23 at Grove St., North of Bay City
c. M 25 at Wagner Rd., East of Bay City
d. M 54 at Carpenter Rd., North of Flint
e. M 54 at Coldwater Rd., North of Flint
f. M 54 at M 57, north of Flint
g. M 54 at M 54BR (South Junction), South of Flint
h. M 121 at Fenton Rd., South of Flint
i. I 96 WB Off-ramp at Grand River, West of Brighton
j. US 12, West from Neblo Rd., Northwest of Clinton
k. US 12, East from Lima Center Rd., Northwest of Clinton.

Crushed pieces of old, seasoned grindstones used in mix designs for (a), (b), and (c) were hauled approximately 70 miles to the job site. After resurfacing, wsf values averaged 0.48. Skid resistance properties of bituminous mixes containing Upper Peninsula aggregates were evaluated at intersections (d) through (h). To conduct the tests under a range of traffic volumes, intersections were chosen almost 400 miles from the aggregate

source. Quartzite (Ajbik Quartzite) from the Julius Laiture Pit (52-68), south of Negaunee, was used in the bituminous mix for intersections (d), (e), and (f). Wsf values for these averaged 0.51 after approximately one year of service. Crushed beach pebbles from the Lake Superior shore, near Whitefish Point in Chippewa County, were used at intersection (g). Trap rock of igneous origin was obtained from the property of Cleveland Cliffs Iron Mining Co. south of Ispheming and was used at intersection (h). Average friction levels for (g) and (h) were 0.44 and 0.42, respectively. Mix designs for intersections (i), (j), and (k) employed aggregate from the Green Oak Pit (47-3). Good skid resistance qualities were obtained on the Wyton-sand mix (i), where the average coefficient of friction was 0.46. However, the bond between underlying portland cement concrete and the Wyton resurfacing failed, causing patches to be pulled out by traffic and deterioration. This surface was removed by maintenance crews on November 10, 1966. Locations (j) and (k) yielded average wsf values of 0.46.

Table 11--Sand-Asphalt Skid-Resistant Resurfacing at Intersections

Last year 30 intersections with sand-asphalt skid-resistant surfaces were tested. A representative sample of these intersections was re-tested this year. Average wsf values ranged from 0.34 to 0.50 and averaged 0.41. This year's 10 intersection average is 27 percent lower than last year's 30 intersection average.

TABLE 5
RUBBERIZED SAND-ASPHALT
US 31: City of Charlevoix

Test Year	Average Coefficient of Wet Sliding Friction	
	Firestone Tire	General Tire
1958*	0.19	--
1959**	0.48	--
1960	0.52	--
1961	0.40	--
1963	0.38	--
1964	--	0.46
1965	--	0.44
1966	--	0.40

*Initial tests on polished portland cement surface.

**Tests conducted on temporary seal coat applied in summer 1959, with surfacing in October 1960.

TABLE 6
ASPHALT-EMULSION HOT-MIX SURFACE COURSES
US 127: Lansing Intersections (Project Mob 33032C, C6)

Intersection	Surface Type	Route	Direction and Lane	Average Coefficient of Wet Sliding Friction			
				1964*	1964**	1965	1966
Cedar Street (US 127) at Holmes Road	Sand emulsified asphalt hot mix surface course	US 127	NBOL	0.19	0.49	0.42	0.34
		US 127	NBIL	0.20	0.47	0.41	0.33
		US 127	SBOL	0.23	0.45	0.40	0.29
		US 127	SBIL	0.22	0.47	0.40	0.32
			Avg.	0.21	0.47	0.41	0.32
Cedar Street (US 127) at Baker Street	Bituminous concrete emulsified hot mix surface course	US 127	NBOL	0.24	0.48	0.38	0.34
		US 127	NBIL	0.31	0.56	0.47	0.37
		US 127	SBOL	0.33	0.47	0.39	0.35
		US 127	SBIL	0.32	0.55	0.39	0.35
			Avg.	0.30	0.52	0.41	0.35

* Tests conducted prior to resurfacing.

** Initial tests after resurfacing.

TABLE 7
3BC SAND-ASPHALT RESURFACING
US 131SB: North and South of Alba
(Project Mm 4BC-3A, Control Section 05072)

Test Area Locations	Asphalt Cement*	Aggregate	Mineral Filler	Direction and Lane	Average Coefficient of Wet Sliding Friction			
					July 1964	Oct. 1964	June 1965	Sept. 1966
Mancelona to S of Alba	85/100 penetration (6.9-percent bitumen)	1:1 mixture from Polous and Gerstenberger Pits	fly ash (Detroit Edison)	SBOL	0.51	0.54	0.56	0.50
				SBIL	0.68	0.66	0.68	0.62
N of Alba to M 32	150/175 penetration (6.4-percent bitumen)			SBOL	0.50	0.60	0.56	0.52
				SBIL	0.63	0.68	0.68	0.64

TABLE 8
BITUMINOUS CONCRETE INTERSTATE PROJECTS

Project No.	Length, mi.	Location	Date Paved (Wearing Course)	Paving Contractor	Source of Coarse Aggregate	Average Coefficient of Wet Sliding Friction													
						Firestone Tire								General Tire					
						1961		1962		Apr. 1963		Aug. 1963		1964		1965		1966	
						IL*	OL*	IL	OL	IL	OL	IL	OL	IL	OL	IL	OL	IL	OL
18034, C3	6.758	M 61 to Arnold Rd.	May-June 1962	Rieth-Riley	Wallace Stone Co. (Pit 32-4)	0.52**	0.51**	--	--	--	--	--	--	0.58	0.47	0.64	0.48	0.56	0.41
72014, C4 20016, C1	6.273	0.6 mi. S of Roscommon-Crawford Co. Line to M 18-M 76	May-June 1962	Thornton Const.	Pickitt, Schreur (Merrit Pit)	--	--	0.51	0.48	--	--	0.58	0.53	0.68	0.59	0.63	0.53	0.56	0.49
20015, C3	4.847	Co. Rd. 612 to N Crawford Co. Line	Sept. 1961	Thornton Const.	McCready Pit (Pit 60-18)	0.60	0.56	0.60	0.52	0.61	0.56	0.59	0.51	0.73	0.63	0.66	0.59	0.59	0.52
69013, C1	7.665	Otsego Co. Line N	Oct. 1961	Saginaw Asphalt	Afton Quarry (Pit 20-35)	--	--	--	--	0.57	0.49	0.59	0.54	0.70	0.54	0.60	0.44	0.49	0.36
		Marlette Rd. to Charles Brink Rd.	June 1962			--	--	--	--	0.56	0.47	0.59	0.47	0.68	0.48	0.64	0.44	0.48	0.35
69013, C3, C5	5.385	Charles Brink Rd. N to M 32 (Gaylord)	June 1962	Spartan Asphalt	Lewiston Pit	--	--	--	--	0.59	0.54	0.63	0.57	0.71	0.62	0.66	0.57	0.60	0.50
16091, C9	2.629	0.5 mi. S of M 68 N to MC RR	Aug.-Sept. 1962	East Shore Asphalt	Big Cut Pit (Pit 71-15)	--	--	0.62	0.58	--	--	0.63	0.56	0.75	0.58	0.75	0.60	0.70	0.52

* IL and OL denote passing and traffic lanes.
** Tested on leveling course mix.

TABLE 9
BRIDGE DECK SURFACE COATINGS

Bridge No.	Location	Year Coated	Type of Coating	Direction and Lane	Average Coefficient of Wet Sliding Friction		
					1964	1965	1966
B04 of 06073	US 23 over Whitney Drain	1965	Coal tar epoxy plus quartz applied to steel plate deck	NB	--	0.59	0.36
				SB	--	0.63	0.39
X01 of 11016*	I 94 over NYC RR	1963	Coal tar epoxy plus crushed quartz applied to cracked concrete deck.	EBOL	--	0.50	0.41
				WBOL	--	0.44	0.35
				EBCL	--	*	0.45
				WBCL	--	*	0.44
X01 of 11031	M 139 over NYC RR	1964	North 5 spans of deck only 31A bituminous concrete applied to repaired concrete deck	NBOL	--	0.40	0.32
				NBIL	--	0.42	0.34
				SBOL	--	0.47	0.35
				SBIL	--	0.43	0.35
			South 4 spans of deck only Rubberized sand asphalt applied to repaired concrete deck	NBOL	--	0.41	0.36
				NBIL	--	0.45	0.38
				SBOL	--	0.42	0.35
				SBIL	--	0.49	0.38
B01 of 34044	I 96 WB over Grand River	1961	East half of deck only Coal tar slurry (rubberized) and B-30 mesh quartz applied to cracked concrete	WBOL	0.31	0.34	0.37
				WBIL	0.41	0.38	0.36
			West half of deck only Coal tar epoxy (Guard Kote 140) 0.3 gal/sq yd and 80-30 mesh quartz applied to cracked concrete	WBOL	0.52	0.51	0.40
				WBIL	0.67	0.60	0.41
B01 of 35032	US 23 over Au Sable River, Oscoda	1965	Coal tar epoxy membrane and rubberized sand asphalt surface on steel plate deck	NB	--	0.51	0.41
				SB	--	0.48	0.39
B01 of 45041	M 204 over Lake Leelanau Narrows	1964	Coal tar epoxy plus quartz applied to repaired concrete deck	EB	--	0.59	0.45
				WB	--	0.60	0.45

* Due to construction in the area, it was impractical to test inside lanes this year.

TABLE 10
EXPERIMENTAL SKID-RESISTANT RESURFACING

Control Section	Location	1965 Construction Months	Mixture Type	Route	Direction and Lane	Average Coefficient of Wet Sliding Friction		
						1965	1966	
							Spring	Fall
09033	US 23 at Linwood Rd., N of Bay City	Oct.	80-lb Sandstone + asphalt	US 23	NBOL	0.71	0.49	0.43
				US 23	NBIL	0.72	0.52	0.46
				US 23	SBOL	0.73	0.49	0.45
				US 23	SBIL	0.74	0.58	0.49
09033	US 23 at Grove St., N of Bay City	Sept.-Oct.	80-lb Sandstone + asphalt	US 23	NBOL	0.73	0.53	0.49
				US 23	NBIL	0.76	0.61	0.56
				US 23	SBOL	0.75	0.51	0.44
				US 23	SBIL	0.76	0.55	0.51
09042	M 25 at Wagner Rd., E of Bay City	Sept.	80-lb Sandstone + asphalt	M 25	EB	0.77	0.53	0.47
				M 25	WB	0.74	0.54	0.47
25072	M 54 at Carpenter Rd., N of Flint	Oct.	50-lb Quartzite + asphalt	M 54	NBOL	0.74	0.51	0.53
				M 54	NBIL	0.78	0.55	0.54
				M 54	SBOL	0.73	0.50	0.53
				M 54	SBIL	0.76	0.56	0.54
25072	M 54 at Coldwater Rd., N of Flint	Oct.	50-lb Quartzite + asphalt	M 54	NBOL	0.67	0.50	0.51
				M 54	NBIL	0.77	0.54	0.52
				M 54	SBOL	0.70	0.51	0.51
				M 54	SBIL	0.76	0.53	0.53
25073	M 54 at M 57 N of Flint	Sept.	50-lb Quartzite + asphalt + additive	M 54BR	NBOL	0.70	0.48	0.43
				M 54BR	NBIL	0.71	0.53	0.47
				M 54BR	SBOL	0.65	0.50	0.44
				M 54BR	SBIL	0.71	0.52	0.49
				M 57	EB	0.70	0.51	0.45
				M 57	WB	0.72	0.53	0.48
25072	M 54 at M 54BR (S Jct.), S of Flint	Oct.	50-lb crushed beach pebbles + asphalt	M 54	NBOL	0.60	0.49	0.43
				M 54	NBIL	0.66	0.47	0.41
				M 54BR	SBOL	0.62	0.47	0.46
				M 54BR	SBIL	0.66	0.47	0.41
				M 54 (Dort)	WBOL	0.62	0.45	0.45
				M 54 (Dort)	WBIL	0.62	0.45	0.47
25061	M 121 at Fenton Rd., S of Flint	Oct.	50-lb trap rock + asphalt	M 121	EBOL	0.66	0.53	0.42
				M 121	EBIL	0.66	0.52	0.40
				M 121	WBOL	0.68	0.49	0.44
				M 121	WBIL	0.69	0.50	0.41
47065	I 96 WB Off-Ramp at Grand River, W of Brighton	Sept.	80-lb 2MS + Wyton	I 96 Off-Ramp	WBOL	0.58	0.49	0.46
				I 96 Off-Ramp	WBIL	0.62	0.51	0.47
81031	US 12, W from Neblo Rd., NW of Clinton	Sept.	50-lb 3BC + hot asphalt emulsion	US 12	EB	0.60	0.49	0.49
				US 12	WB	0.62	0.47	0.45
81031	US 12, E from Lima Center Rd., NW of Clinton	Sept.	50-lb 2MS + hot asphalt emulsion	US 12	EB	0.58	0.48	0.44
				US 12	WB	0.60	0.49	0.47
82052	US 24 at Fenkell Rd. (Five Mile Rd.), Detroit	Sept.	50-lb 3BC + asbestos fiber + asphalt	US 24	NBOL	0.56	0.36	0.34
				US 24	NB#3	0.53	0.36	0.34
				US 24	NB#2	0.57	0.36	0.34
				US 24	NBIL	0.60	Not Tested	Not Tested
				US 24	SBOL	0.52	0.38	0.37
				US 24	SBCL	0.60	0.37	0.35
				US 24	SBIL	0.59	0.35	0.34
				Five Mile Rd.	EBOL	0.51	0.37	0.31
				Five Mile Rd.	EBIL	0.55	0.39	0.33
				Five Mile Rd.	WBOL	0.55	0.37	0.33
				Five Mile Rd.	WBIL	0.60	0.39	0.33

TABLE 10 (Cont.)
EXPERIMENTAL SKID-RESISTANT RESURFACING

Control Section	Location	1965 Construction Months	Mixture Type	Route	Direction and Lane	Average Coefficient of Wet Sliding Friction		
						1965	1966	
							Spring	Fall
82053	US 24 at Schoolcraft Rd., Detroit	Sept.	50-lb 3BC + asbestos fiber + asphalt	US 24	NBOL	0.54	0.38	0.33
				US 24	NBCL	0.53	0.40	0.35
				US 24	NBIL	0.55	0.37	0.34
				US 24	SBOL	0.48	0.34	0.33
				US 24	SBCL	0.51	0.37	0.33
				US 24	SBIL	0.52	0.37	0.33
				Schoolcraft Rd.	EB R Turn	0.55	0.41	0.35
				Schoolcraft Rd.	EB#3	0.52	0.38	0.36
				Schoolcraft Rd.	EB#2	0.54	0.38	0.34
				Schoolcraft Rd.	EBIL	0.56	0.43	0.39
				Schoolcraft Rd.	WB R Turn	0.55	Not Tested	0.37
				Schoolcraft Rd.	WB#3	0.55	0.43	0.34
				Schoolcraft Rd.	WB#2	0.51	0.39	0.34
				Schoolcraft Rd.	WBIL	0.55	0.46	0.36
82053	US 24 at Plymouth Rd., Detroit	Sept.-Oct.	50-lb 2MS + asbestos fiber + asphalt	US 24	NBOL	0.59	0.36	0.35
				US 24	NB#3	0.59	0.37	0.36
				US 24	NB#2	0.62	0.40	0.36
				US 24	NBIL	0.62	0.40	0.38
				US 24	SBOL	0.60	0.37	0.35
				US 24	SB#3	0.62	0.39	0.35
				US 24	SB#2	0.61	0.39	0.36
				US 24	SBIL	0.64	0.42	0.37
				Plymouth Rd.	EBOL	0.62	0.40	0.36
				Plymouth Rd.	EBCL	0.63	0.39	0.36
				Plymouth Rd.	EBIL	0.64	0.39	0.37
				Plymouth Rd.	WBOL	0.63	0.40	0.38
				Plymouth Rd.	WBCL	0.61	0.41	0.37
				Plymouth Rd.	WBIL	0.60	0.40	0.38
82053	US 24 at W. Chicago Rd., Detroit	Oct.	80-lb 2MS + 31AA + asphalt	US 24	NBOL	0.57	0.38	0.37
				US 24	NB#3	0.58	0.40	0.37
				US 24	NB#2	0.61	0.41	0.36
				US 24	NBIL	0.62	0.40	0.37
				US 24	NB L Turn	0.62	Not Tested	Not Tested
				US 24	SBOL	0.56	0.42	0.41
				US 24	SBCL	0.57	0.41	0.40
				US 24	SBIL	0.59	0.41	0.40
				W. Chicago Rd.	EB R Turn	0.63	0.45	0.44
				W. Chicago Rd.	EBIL	0.63	0.44	0.40
				W. Chicago Rd.	WB R Turn	0.63	0.43	0.41
				W. Chicago Rd.	WBIL	0.63	0.41	0.37
82071	US 24 at Sibley Rd., Detroit	Oct.	80-lb 3NS + 31AA + asphalt	US 24	NBOL	0.50	0.41	0.34
				US 24	NBIL	0.52	0.42	0.38
				US 24	SBOL	0.51	0.43	0.39
				US 24	SBIL	0.51	0.42	0.38
				Sibley Rd.	EB	0.54	0.39	0.36
				Sibley Rd.	WB	0.52	0.41	0.39
11031	M 139 at Napier Rd., Benton Harbor	Oct.	80-lb 3NS (P-4) + Trinidad sheet asphalt	M 139	NBOL	0.51	0.46	0.37
				M 139	NBIL	0.44	0.36	0.35
				M 139	SBOL	0.47	0.37	0.36
				M 139	SBIL	0.46	0.37	0.34
				Napier Rd.	EBOL	0.43	0.39	0.38
				Napier Rd.	EBIL	0.47	0.43	0.38
				Napier Rd.	WBOL	0.45	0.41	0.38
				Napier Rd.	WBIL	0.48	0.42	0.38
11031	M 139 NB at Empire Rd., Benton Harbor	Oct.	80-lb 3NS (P-4) + Synopal + asphalt	M 139	NBOL	0.44	0.40	0.39
				M 139	NBIL	0.50	0.42	0.38
11031	M 139 SB at Empire Rd., Benton Harbor	Oct.	80-lb 3NS (P-4) + asphalt	M 139	SBOL	0.45	0.38	0.40
				M 139	SBIL	0.48	0.44	0.41

TABLE 11
SAND-ASPHALT SKID-RESISTANT
RESURFACING AT INTERSECTIONS

Control Section	Location	Route	Direction and Lane	Average Coefficient of Wet Sliding Friction	
				1965	1966
13061	M 96 at Hussey Ave.	M 96	EB	0.49	0.44
		M 96	WB	0.50	0.42
25041	M 78 from I 75 to Ballenger Rd.	M 78	EBOL	0.58	0.41
		M 78	EBIL	0.61	0.44
		M 78	WBOL	0.58	0.39
		M 78	WBIL	0.63	0.44
25072	M 54 at Mt. Morris Rd.	M 54	NBOL	0.63	0.40
		M 54	NBIL	0.70	0.42
		M 54	SB R. Turn	0.72	0.43
		M 54	SBIL	0.71	0.47
25081	M 21 at Graham Rd.	M 21	EBOL	0.61	0.36
		M 21	EBIL	0.61	0.40
		M 21	WBOL	0.57	0.37
		M 21	WBIL	0.61	0.41
25091	M 15 at Lapeer Rd.	M 15	NB	0.56	0.40
		M 15	SB	0.59	0.41
33042	M 43 WB (Grand River Ave.) at Foster St.	M 43	WBOL	0.50	0.37
		M 43	WB#3	0.52	0.40
		M 43	WB#2	0.49	0.40
		M 43	WBIL	0.53	0.39
39042	M 96 at River St.	M 96	EBOL	0.50	0.46
		M 96	EBIL	0.50	0.44
		M 96	WBOL	0.48	0.50
		M 96	WBIL	0.50	0.38
41051	M 44 at Cascade Rd.	M 44	NBOL	0.44	0.37
		M 44	NBIL	0.48	0.41
		M 44	NBLT	Not Tested	0.41
		M 44	SBOL	0.45	0.42
		M 44	SBIL	0.45	0.42
		M 44	SBLT	Not Tested	0.44
		Cascade Rd.	EBOL	0.49	0.43
		Cascade Rd.	EBIL	0.54	0.45
		Cascade Rd.	WBOL	0.52	0.38
		Cascade Rd.	WBIL	0.55	0.42
47082	M 59 at Old US 23	M 59	EB	0.72	0.41
		M 59	WB	0.72	0.42
81081	M 17 at Carpenter Rd.	M 17	EBOL	0.53	0.39
		M 17	EBIL	0.50	0.36
		M 17	WBOL	0.52	0.34
		M 17	WBIL	Not Tested	0.38
		Carpenter Rd.	NB	0.53	0.36

Section 3
HIGH ACCIDENT LOCATIONS

HIGH ACCIDENT LOCATIONS

This section reports the Department's continuing program to reduce skidding accidents on wet pavement at critical locations. High accident locations selected by the Traffic Division are skid-tested to indicate priorities for resurfacing. In some cases, these locations are used for testing of experimental skid-resistant resurfacing mixtures.

Selection of this year's high accident locations is based on 1964 accident data furnished by the Traffic Division. Skid tests yielded average wsf values below 0.40 at 80 percent of these locations. Friction levels for 32 percent of the locations averaged below 0.30, including two District 3 locations where coefficients averaged 0.18 and 0.19. Table 12 summarizes the 1966 tests for 80 high accident locations, dispersed throughout the 10 districts and in 41 of the 83 Michigan counties.

TABLE 12
HIGH-ACCIDENT LOCATIONS

	Intersection	1964 Accidents Total	1964 Accidents Wet Surface	Route	Direction and Lane	Surface Type	Average Coefficient
DISTRICT 1	Dickinson County						
	US 2, Control Sections 22021, 22022 & 22031, at intersection with US 141	3	--	US 2	EBOL	BC	0.36
				US 2	EBIL	BC	0.41
				US 2	WBOL	CONC	0.45
				US 2	WBIL	CONC	0.45
				US 141	NBOL	BC	0.35
				US 141	NBIL	BC	0.34
	Dickinson and Iron Counties						
	M 69, Control Sections 22041 & 36023, spot check from 5 miles E of Crystal Falls E to M 95 Jct.	0	--	M 69	EB	BA	0.42
				M 69	WB	BA	0.42
DISTRICT 2	Delta County						
	US 2, Control Section 21024, at County Rd. 511	--	6[a]	US 2	EB	BC	0.29
			6[a]	US 2	WB	BC	0.29
	US 2, Control Section 21024, spot check from Ensign to US 41 Jct in Rapid River	--	6[a]	US 2	EB	BC	0.19
				US 2	WB	BC	0.20
	Mackinac County						
	US 2, Control Section 49023, from 500 ft E to 500 ft W of Cut River Bridge	0	--	US 2	EB	BC	0.44
				US 2	WB	BC	0.47
				US 2	EB[b]	CONC	0.18
				US 2	WB[b]	CONC	0.24
DISTRICT 3	Benzie County						
	US 31, Control Sections 10031 and 10032 through Benzonia and Beulah	--	43%	US 31	NBOL	CONC	0.40
				US 31	NBIL	BC	0.42
				US 31	SBOL	BC	0.28
				US 31	SBIL	BC	0.45
	Charlevoix County						
	M 75, Control Section 15071, from Bear Creek NE to US 131: also US 131 intersection, Control Section 15091	5	--	M 75	NB	BC	0.34
				M 75	SB	BC	0.25
				US 131	EB	BC	0.25
				US 131	WB	BC	0.22
	Grand Traverse County						
	M 113, Control Sections 28021 and 28071, at intersection with M 186	3[c]	--	M 113	NB	ST	0.50
				M 113	SB	NSST	0.32
				M 186	WB	ST	0.43
	M 113, Control Section 28021, curve area N of M 186	3[c]	--	M 113	NB	NSST	0.31
				M 113	EB	NSST	0.34
	Manistee County						
	US 31, Control Section 51011, from N limits of Manistee NE 0.5 mile	3	--	US 31	NEB	BC	0.29
				US 31	SWB	BC	0.26
	M 22, Control Section 51031, from 0.1 mile E of Farr Rd. W 0.5 mile	3	--	M 22	EB	BA	0.42
				M 22	WB	BA	0.42

	Intersection	1964 Accidents Total	1964 Accidents Wet Surface	Route	Direction and Lane	Surface Type	Average Coefficient
DISTRICT 3 (CONT.)	Manistee County (Cont.)						
	US 31, Control Section 51011, curve at N end of Memorial Bridge in Manistee	0	--	US 31	NB	BC	0.20
				US 31	SB	BC	0.18
	M 22, Control Section 51031, from 0.1 mile S of Steffins Rd. N & W around curves	3	--	M 22	EB	BA	0.51
				M 22	WB	BA	0.51
	Mason County						
	US 10, Control Section 53021, from E limits of Ludington E through intersection of US 31	6	--	US 10	EBOL	BC	0.22
				US 10	EBIL	BC	0.21
				US 10	WBOL	BC	0.23
				US 10	WBIL	BC	0.26
	US 31, Control Section 53031, from US 10 S 1 mile	5	--	US 31	NB	BC	0.29
				US 31	SB	BC	0.24
	US 10, Control Section 53032, from W US 31 intersection E 1 mile	7	--	US 10	EB	BC	0.17
				US 10	WB	BC	0.19
	Wexford County						
	M 55, Control Section 83021, intersections with Granite St. and Sunnyside in Cadillac	4	--	M 55	NB	BC	0.24
				M 55	WB	BC	0.29
DISTRICT 4	Alpena County						
	US 23, Control Section 04031, from 0.5 mile N of Pohl Rd. to Pard Rd.	10	--	US 23	NB	BC	0.29
				US 23	SB	BC	0.28
	Emmet County						
	US 31, Control Section 24011, from 0.2 mile S of N Conway Rd. NE to Main St. in Oden	5	--	US 31	NB	BC	0.33
				US 31	SB	BC	0.34
	US 31, Control Section 24011, from 0.4 mile E of M 131 E 1 mile	5	--	US 31	NB	BC	0.37
				US 31	SB	BC	0.37
	US 31, Control Section 24011, from 0.4 mile E of Petoskey E 1 mile to M 131 Jct.	5	--	US 31	NB	BC	0.34
				US 31	SB	BC	0.33

[a] A total of six accidents on wet surface within the area 1.5 miles either side of County Rd. 511.
[b] Bridge deck.
[c] Includes both Grand Traverse County location.

TABLE 12 (Cont.)
HIGH-ACCIDENT LOCATIONS

	Intersection	1964 Accidents Total	1964 Accidents Wet Surface	Route	Direction and Lane	Surface Type	Average Coefficient
DISTRICT 4 (CONT.)	Iosco County:						
	US 23, Control Section 35032, from Park St. N to Hull Island Entrance	5	--	US 23 US 23	NB SB	CONC CONC	0.30 0.30
	Roscommon County						
	M 18, Control Section 72052, from M 157 S to M 55	8	--	M 18 M 18	NB SB	ST ST	0.31 0.32
DISTRICT 5	Kent County						
	M 44, Control Section 41101, Tiffany Ave. E 0.5 mile	6	--	M 44 M 44	EB WB	ST ST	0.33 0.30
	US 131, Control Section 41012 and 41013 from S. Jct. M 44 N 1 mile	10	--	US 131 US 131 US 131 US 131 US 131 US 131 US 131 US 131	NBOL NBIL SBOL SBIL NBOL NBIL SBOL SBIL	CONC CONC CONC CONC BC BC BC BC	0.31 0.39 0.37 0.41 0.36 0.39 0.36 0.39
	M 11-M 37, Control Section 41063, Schaeffer Ave. E 1 mile	8	--	M 11-M 37 M 11-M 37 M 11-M 37 M 11-M 37	EBOL EBIL WBOL WBIL	BC BC BC BC	0.34 0.37 0.37 0.41
	M 44, Control Section 41051, Reed Lake Blvd. N 0.5 mile	4	--	M 44 M 44	NB SB	BC BC	0.39 0.40
	Mecosta County						
	US 131, Control Section 54011, Fillmore Rd. N 500 ft.	1	--	US 131 US 131	NB SB	BC BC	0.25 0.27
	US 131, Control Section 54012, from 0.5 mile N of Big Rapids N 0.5 mile	4	--	US 131 US 131	NB SB	BC BC	0.30 0.30
	US 131, Control Section 54011, from 0.5 mile N of Morley N 0.5 mile	4	--	US 131 US 131	NB SB	BC BC	0.23 0.29
	Montcalm County						
	M 91, Control Section 59032, from Spencer Rd. S 0.25 mile	3	--	M 91 M 91	NB SB	ST ST	0.28 0.28
	Muskegon County						
	M 20, Control Section 61076, from US 31BR N to M 213	30	--	M 20 M 20 M 20 M 20 Lake St.	NBOL NBIL SBOL SBIL SB	BC BC BC BC BC	0.23 0.27 0.23 0.22 0.22
DISTRICT 5 (CONT.)	Ottawa County						
	US 31BR, Control Section 70012, from Holland E limits E to US 31	8	--	US 31BR US 31BR US 31BR US 31BR	EBOL EBIL WBOL WBIL	CONC CONC CONC CONC	0.41 0.41 0.41 0.42
DISTRICT 6	Arenac County						
	US 23, Control Section 06071, reverse curves approx. 2 miles S of Standish	7	--	US 23 US 23 US 23 US 23	NBOL NBIL SBOL SBIL	BC BC CONC BC	0.23 0.33 0.31 0.31
	Bay County						
	M 13, Control Section 09032, from White Rd. N to Kiesel Rd.	61	--	M 13 M 13 M 13 M 13	NBOL NBIL SBOL SBIL	BC BC BC BC	0.29 0.29 0.26 0.28
	US 23, Control Section 09033, from Grove St. N to Old Kawkawlin Rd.	23	--	US 23 US 23 US 23	NBOL NBIL SBOL	BC BC CONC	0.18 0.23 0.31
	US 23, Control Section 09033, Tappan Grove Drain to N of Linwood	12	--	US 23 US 23	NBOL NBIL	NSST[a] NSST[a]	0.50 0.52
	Genesee County						
	M 78, Control Section 25041, from Ballenger Rd. W to I 75-US 10-US 23	7	--	M 78 M 78 M 78 M 78	EBOL EBIL WBOL WBIL	NSST[a] NSST[a] NSST[a] NSST[a]	0.46 0.43 0.42 0.43
	I 75-US 23-US 10, Control Section 25031, from Maple Rd. S to I 75-US 10 merge ramps	7	--	I 75-US 23-US 10 I 75-US 23-US 10 I 75-US 23-US 10 I 75-US 23-US 10 I 75-US 23-US 10 I 75-US 23-US 10	NBOL NBCL NBIL NBOL NBCL NBIL	BC BC BC CONC CONC CONC	0.43 0.39 0.45 0.35 0.41 0.46
	M 54, Control Section 25071, at Hill Rd.	5	--	M 54 M 54 M 54 M 54	NBOL NBIL SBOL SBIL	BC BC BC BC	0.26 0.27 0.24 0.35
DISTRICT 7	Berrien County						
	M 139, Control Section 11031, at Napier Rd.	9	--	M 139 M 139 M 139 M 139 M 139 M 139 Napier Napier Napier Napier	NBOL NBIL NBLT SBOL SBIL SBLT EBOL EBIL WBOL WBIL	SA[a] SA[a] SA[a] SA[a] SA[a] SA[a] SA[a] SA[a] SA[a] SA[a]	0.46 0.36 0.41 0.37 0.37 0.42 0.39 0.43 0.41 0.42

[a] Special treatment.

TABLE 12 (Cont.)
HIGH-ACCIDENT LOCATIONS

DISTRICT 7 (CONT.)

Intersection	1964 Accidents Total	1964 Accidents Wet Surface	Route	Direction and Lane	Surface Type	Average Coefficient
Berrien County (Cont.)						
I 94, Control Sections 11014, 11015 & 11021, US 12 interchange	9	--	I 94	NBOL	BC	0.44
			I 94	NBCL	BC	0.48
			I 94	NBIL	BC	0.51
			I 94	SBOL	BC	0.41
			I 94	SBCL	BC	0.52
			I 94	SBIL	BC	0.53
			US 12	EBOL	CONC	0.37
			US 12	EBIL	CONC	0.45
			US 12	WBOL	BC	0.43
			US 12	WBIL	BC	0.62
US 31-US 33, Control Section 11052, first curve N of Red Bud Trail	0	--	US 31-US 33	NB	BC	0.18
			US 31-US 33	SB	BC	0.22
US 31-US 33, Control Section 11052, Bridge over St. Joseph River at Berrien Springs	0	--	US 31-US 33	NB[a]	CONC	0.27
			US 31-US 33	SB[a]	CONC	0.30
			US 31-US 33	NB[b]	CONC	0.11
			US 31-US 33	SB[b]	CONC	0.13
Calhoun County						
M 96, Control Section 13061, at Hussey Ave.	10	--	M 96	EB	SA[c]	0.44
			M 96	CL	SA[c]	0.47
			M 96	WB	SA[c]	0.42
			Hussey	SB	SA[c]	0.32
I 194-M 66, Control Section 13033, at Columbia Ave.	5	--	I 194	EBOL	CONC	0.28
			I 194	EBIL	CONC	0.37
			I 194	WBOL	CONC	0.34
			I 194	WBIL	CONC	0.42
			Ramp	NB	CONC	0.38
			Ramp	SB	CONC	0.36
M 66, Control Section 13032, Curve at Hicks Cemetery	2	--	M 66	NB	BC	0.23
			M 66	SB	BC	0.23
Cass County						
M 40, Control Sections 14011 & 14033, Curve at W Jct. M 62	5	--	M 40	NB	BC	0.21
			M 40	SB	BC	0.21
Van Buren County						
M 43, Control Section 80041, from I 196 BL Jct. to Bangor	13	--	M 43	EB	BC	0.22
			M 43	WB	BC	0.20

DISTRICT 8

Intersection	1964 Accidents Total	1964 Accidents Wet Surface	Route	Direction and Lane	Surface Type	Average Coefficient
Hillsdale County						
M 49, Control Sections 30011 and 30012, spot check both sections	51	--	M 49	NB	ST	0.30
			M 49	SB	ST	0.28

(a) West half of deck.
(b) East half of deck.
(c) Special treatment.
(d) Concrete constructed in 1958.
(e) Concrete constructed in 1944.

DISTRICT 8 (CONT.)

Intersection	1964 Accidents Total	1964 Accidents Wet Surface	Route	Direction and Lane	Surface Type	Average Coefficient
Ingham County						
M 43, Control Section 33082, Brookfield Plaza E to Dawn Ave.	13	--	M 43	EBOL	BC	0.33
			M 43	EBIL	BC	0.31
			M 43	WBOL	BC	0.30
			M 43	WBIL	BC	0.30
M 43 (Saginaw), Control Section 33042, at Homer	7	--	M 43	EBOL	BC	0.37
			M 43	EB#3	BC	0.36
			M 43	EB#2	BC	0.35
			M 43	EBIL	BC	0.39
			Homer	NBOL	CONC	0.37
			Homer	NBCL	CONC	0.37
			Homer	NBIL	CONC	0.40
M 43 (Saginaw), Control Section 33061, at Olds Jet Plant	6	--	M 43	EBOL	CONC	0.30
			M 43	EBIL	CONC	0.32
			M 43	WBOL	CONC	0.31
			M 43	WBIL	CONC	0.32
Jackson County						
US 127, Control Section 38131, W Jct. I 94 interchange	11	--	US 127	NBOL	CONC	0.33
			US 127	NBIL	CONC	0.33
			US 127	SBOL	CONC	0.31
			US 127	SBIL	CONC	0.38
Lenawee County						
M 52, Control Section 46072, 0.25 mile N of Adrian to 300 ft N of Raisin Riven	12	--	M 52	NB	BC	0.25
			M 52	SB	BC	0.27
Livingston County						
US 23, Control Section 47014, Curve Area 0.9 mile N of Center Rd.	6	--	US 23	NBOL	CONC	0.43
			US 23	NBIL	CONC	0.49
			US 23	SBOL	CONC	0.43
			US 23	SBIL	CONC	0.52
Washtenaw County						
US 12BR, Control Section 81032 from Ypsilanti E limits E to Ford Blvd.	28	--	US 12BR	EBOL	BC	0.34
			US 12BR	EBIL	BC	0.33
			US 12BR	WBOL	BC	0.31
			US 12BR	WBIL	BC	0.33
			US 12BR	EBOL	SA	0.41
			US 12BR	EBIL	SA	0.43
			US 12BR	WBOL	SA	0.39
			US 12BR	WBIL	SA	0.44
I 94, Control Section 81041, from US 12 S 0.3 mile	8	--	I 94	EBOL	CONC	0.33
			I 94	EBIL	CONC	0.41
			I 94	WBOL	CONC	0.32
			I 94	WBIL	CONC	0.43
US 12, Control Section 81063, Curve Area at E Jct. I 94	6	--	I 94	EBOL	CONC[d]	0.42
			I 94	EBIL	CONC[d]	0.45
			I 94	WBOL	BC	0.40
			I 94	WBIL	BC	0.44
			I 94	EBOL	CONC[e]	0.35
			I 94	EBIL	CONC[e]	0.44
I 94, Control Section 81041, Curve Area E of Wiard Rd.	7	--	I 94	EBOL	CONC	0.35
			I 94	EBIL	CONC	0.41
			I 94	WBOL	CONC	0.32
			I 94	WBIL	CONC	0.39

TABLE 12 (Cont.)
HIGH-ACCIDENT LOCATIONS

Intersection	1964 Accidents Total	1964 Accidents Wet Surface	Route	Direction and Lane	Surface Type	Average Coefficient
DISTRICT 8 (CONT)						
Washtenaw County (Cont.)						
I 94, Control Section 81062, through US 23 interchange	7	--	I 94	EBOL	CONC	0.37
			I 94	EBIL	CONC	0.46
			I 94	WBOL	CONC	0.35
			I 94	WBIL	CONC	0.44
			Access Rd.	EBOL	CONC	0.42
			Access Rd.	EBIL	CONC	0.49
			Access Rd.	WB	CONC	0.41
DISTRICT 9						
Macomb County						
M 97, Control Section 50031, at Metro Beach Rd. (16 Mile Rd.)	14	--	M 97	NBOL	BC	0.35
			M 97	NBIL	BC	0.38
			M 97	SBOL	CONC	0.39
			M 97	SBIL	BC	0.38
			Metro	EB	CONC	0.38
			Metro	WB	CONC	0.38
US 25, Control Section 50051, at 15 Mile Rd.	13	--	US 25	NBOL	CONC	0.36
			US 25	NBIL	CONC	0.37
			US 25	SBOL	CONC	0.38
			US 25	SB#3	CONC	0.36
			US 25	SB#2	CONC	0.37
			US 25	SBIL	CONC	0.37
			15 Mile	EB	CONC	0.39
			15 Mile	WB	CONC	0.36
M 53, Control Section 50011, at 15 Mile Rd.	13	--	M 53	NBOL	BC	0.43
			M 53	NBCL	BC	0.40
			M 53	NBIL	BC	0.41
			M 53	SBOL	BC	0.46
			M 53	SBCL	BC	0.38
			M 53	SBIL	BC	0.40
			15 Mile	EBOL	BC	0.43
			15 Mile	EBIL	BC	0.44
			15 Mile	WBOL	BC	0.40
			15 Mile	WBIL	BC	0.41
Oakland County						
US 10 (Woodward), Control Section 63051, at Quarton Rd.	19	--	US 10	NBOL	BC	0.31
			US 10	NB#3	BC	0.32
			US 10	NB#2	BC	0.31
			US 10	NBIL	BC	0.34
			US 10	SBOL	BC	0.27
			US 10	SB#3	BC	0.24
			US 10	SB#2	BC	0.27
			US 10	SBIL	BC	0.28
			Quarton	EB	BC	0.32
			Big Beaver	WB	BC	0.30
US 10, (Telegraph Rd.), Control Section 63052 at US 10BR (Dixie)	16	--	US 10	EBOL	BC	0.29
			US 10	EBCL	BC	0.30
			US 10	EBIL	BC	0.33
			US 10BR	NBOL	BC	0.28
			US 10BR	NBIL	BC	0.29
			US 10BR	NBLT	BC	0.32
			US 10BR	SBOL	BC	0.28
			US 10BR	SBCL	BC	0.30
			US 10BR	SBIL	BC	0.32
US 10, Control Section 63052, Miracle Mile Area	16	--	US 10	NBOL	BC	0.31
			US 10	NBIL	BC	0.33
			US 10	SBOL	BC	0.32
			US 10	SBIL	BC	0.29

Intersection	1964 Accidents Total	1964 Accidents Wet Surface	Route	Direction and Lane	Surface Type	Average Coefficient
DISTRICT 9 (CONT.)						
Oakland County (Cont.)						
US 24, Control Section 63031, at Lone Pine Rd.	15	--	US 24	NBOL	CONC	0.33
			US 24	NBIL	BC	0.21
			US 24	SBOL	CONC	0.33
			US 24	SBIL	BC	0.21
I 96 BS (Grand River Ave), Control Sections 63022, 82121, & 82141, at M 102 (8 Mile Rd.)	13	--	I 96BS	NWBOL	SA[a]	0.40
			I 96BS	NWB#3	SA[a]	0.41
			I 96BS	NWB#2	SA[a]	0.39
			I 96BS	NWBIL	SA[a]	0.41
			I 96BS	SEBOL	SA[a]	0.38
			I 96BS	SEB#3	SA[a]	0.38
			I 96BS	SEB#2	SA[a]	0.39
			I 96BS	SEBIL	SA[a]	0.37
			8 Mile	EB	BC	0.32
			8 Mile	WBOL	SA[a]	0.40
			8 Mile	WBCL	SA[a]	0.39
			8 Mile	WBIL	SA[a]	0.41
M 59 Control Section 63041, at Elizabeth Lake Rd.	11	--	M 59	EBOL	BC	0.26
			M 59	EBIL	BC	0.27
			M 59	WBOL	BC	0.25
			M 59	WBIL	BC	0.26
			E. Lake	NBOL	CONC	0.26
			E. Lake	NBIL	CONC	0.26
			E. Lake	SB	CONC	0.26
			E. Lake	SBRT	CONC	0.27
M 59 (Huron), Control Sections 63041 & 63052, at US 10 (Telegraph)	10	--	M 59	EBOL	BC	0.26
			M 59	EBCL	BC	0.30
			M 59	EBIL	BC	0.34
			M 59	WBOL	CONC	0.33
			M 59	WBIL	CONC	0.32
			M 59	WBLT	CONC	0.33
			US 10	NBOL	BC	0.31
			US 10	NBCL	BC	0.31
			US 10	NBIL	BC	0.29
			US 10	SBOL	BC	0.30
			US 10	SBCL	BC	0.31
			US 10	SBIL	BC	0.32
DISTRICT 10						
Wayne County						
US 24, Control Section 82053, at Schoolcraft	30	--	US 24	NBOL	SA[a]	0.38
			US 24	NBCL	SA[a]	0.40
			US 24	NBIL	SA[a]	0.37
			US 24	SBOL	SA[a]	0.34
			US 24	SBCL	SA[a]	0.37
			US 24	SBIL	SA[a]	0.37
			Schoolcraft	EBRT	SA[a]	0.41
			Schoolcraft	EB#3	SA[a]	0.38
			Schoolcraft	EB#2	SA[a]	0.38
			Schoolcraft	EBIL	SA[a]	0.43
			Schoolcraft	WBRT	SA[a]	Not Tested
			Schoolcraft	WB#3	SA[a]	0.43
			Schoolcraft	WB#2	SA[a]	0.39
			Schoolcraft	WBIL	SA[a]	0.46

[a] Special treatment.

TABLE 12 (Cont.)
HIGH-ACCIDENT LOCATIONS

DISTRICT 10 (CONT.)

Intersection	1964 Accidents Total	1964 Accidents Wet Surface	Route	Direction and Lane	Surface Type	Average Coefficient
Wayne County (Cont.)						
M 14, Control Sections 82101, at Farmington Rd.	26	--	M 14	EBOL	BC	0.32
			M 14	EBIL	BC	0.29
			M 14	WBOL	BC	0.29
			M 14	WBIL	BC	0.31
			Farmington	NBOL	CONC	0.31
			Farmington	NBIL	CONC	0.31
			Farmington	SB	BC	0.30
US 24 Control Section 82053 & 82101, at Plymouth Rd. (including channels)	24	--	US 24	NBOL	SA[a]	0.36
			US 24	NB#3	SA[a]	0.37
			US 24	NB#2	SA[a]	0.40
			US 24	NBIL	SA[a]	0.40
			US 24	SBOL	SA[a]	0.37
			US 24	SB#3	SA[a]	0.39
			US 24	SB#2	SA[a]	0.39
			US 24	SBIL	SA[a]	0.42
			M 14	EBOL	SA[a]	0.40
			M 14	EBCL	SA[a]	0.39
			M 14	EBIL	SA[a]	0.39
			M 14	WBOL	SA[a]	0.40
			M 14	WBCL	SA[a]	0.41
			M 14	WBIL	SA[a]	0.40
			Channel 1[b]		CONC	0.36
			Channel 2[b]		CONC	0.36
			Channel 3[b]		CONC	0.36
			Channel 4[b]		CONC	0.35
M 14, Control Section 82101, at Middlebelt	22	--	M 14	EBOL	BC	0.33
			M 14	EBCL	BC	0.31
			M 14	EBIL	BC	0.30
			M 14	WBOL	BC	0.34
			M 14	WB#3	BC	0.29
			M 14	WB#2	BC	0.30
			M 14	WBIL	BC	0.31
			Middlebelt	NBOL	BC	0.39
			Middlebelt	NBCL	BC	0.37
			Middlebelt	NBIL	BC	0.36
			Middlebelt	SBOL	BC	0.33
			Middlebelt	SBIL	BC	0.35
M 85, Control Section 82211, at Southfield	20	--	M 85	NBOL	SA	0.36
			M 85	NBCL	SA	0.34
			M 85	NBIL	SA	0.36
			M 85	SBOL	SA	0.32
			M 85	SBCL	SA	0.33
			M 85	SBIL	SA	0.32
			Southfield	NWBOL	BC	0.38
			Southfield	NWBCL	BC	0.37
			Southfield	NWBIL	BC	0.36
			Southfield	SEBRT	BC	0.34
			Southfield	SEB#3	BC	0.34
			Southfield	SEB#2	BC	0.31
			Southfield	SEBLT	BC	0.34
M 14, Control Section 82101, at Wayne Rd.	16	--	M 14	EBOL	BC	0.30
			M 14	EBIL	BC	0.31
			M 14	WBOL	BC	0.32
			M 14	WBIL	BC	0.33
			M 14	WBLT	BC	0.31
			Wayne	NBOL	BC	0.34
			Wayne	NBIL	BC	0.33

DISTRICT 10 (CONT.)

Intersection	1964 Accidents Total	1964 Accidents Wet Surface	Route	Direction and Lane	Surface Type	Average Coefficient
Wayne County (Cont.)						
M 17, Control Section 82041, at Monroe Blvd.	15	--	M 17	EBOL	BC	0.35
			M 17	EBIL	BC	0.35
			M 17	WBOL	BC	0.38
			M 17	WBIL	BC	0.35
			Monroe	NB	CONC	0.33
			Monroe	SB	CONC	0.30
			Monroe	SBRT	CONC	0.34
US 24, Control Section 82052, at Eureka Rd.	14	--	US 24	NBOL	CONC	0.30
			US 24	NBCL	BC	0.37
			US 24	NBIL	BC	0.40
			US 24	SBOL	CONC	0.34
			US 24	SBCL	CONC	0.31
			US 24	SBIL	CONC	0.41
			Eureka	EBOL	CONC	0.36
			Eureka	EBIL	CONC	0.33
			Eureka	WBOL	CONC	0.39
			Eureka	WBIL	CONC	0.39
I 94 Control Section 82022, Curve Area at S. Huron River Drive	14	--	I 94	EBOL	BC	0.27
			I 94	EBIL	BC	0.31
			I 94	WBOL	BC	0.36
			I 94	WBIL	BC	0.36

[a] Special treatment.

[b] Channel identifications:
1. SB US 24 to EB M 14 Ramp
2. WB M 14 to NB US 24 Ramp
3. NB US 24 to WB M 14 Ramp
4. EB M 14 to SB US 24 Ramp

Section 4
SPECIAL REQUEST TESTS

SPECIAL REQUEST TESTS

During the course of any one year, many requests for skid testing of certain questionable areas are received from field personnel or through the Offices of Design, Testing and Research, and Maintenance. Such requests are generally incorporated into the Laboratory's skidometer program and the results forwarded to the person or agency making the request. Table 13 contains skid test data resulting from 11 special requests received during 1966, as well as two projects previously reported because of their low friction values.

TABLE 13
1966 "SPECIAL REQUEST" SKID TEST RESULTS

Special Request No. *	Project No.	Location	Surface Type	Route	Direction and Lane	Coefficient of Wet Sliding Friction
1	77-42, C4	US 25 from 24th Ave. N to 0.8 mi N of Myrtle Rd.	BC	US 25	NB	0.24
			BC	US 25	SB	0.25
1	77-42, C5	US 25 from S of Burtch Rd. N to St. Clair-Sanilac County Line	CONC	US 25	NB	0.46
			CONC	US 25	SB	0.46
2	--	Mackinac Bridge--16 N approach Deck Truss Spans	BC	--	NBOL	0.32
			BC	--	NBIL	0.48
			BC	--	SBOL	0.30
			BC	--	SBIL	0.44
2	--	Mackinac Bridge--3 Suspended Spans	BC	--	NBOL	0.35
			BC	--	SBOL	0.34
2	--	Mackinac Bridge--12 S approach Deck Truss Spans	BC	--	NBOL	0.33
			BC	--	NBIL	0.44
			BC	--	SBOL	0.38
			BC	--	SBIL	0.51
3	82112C, C28	I 696BS at Wyoming Ave.	Wyton	I 696BS	NBOL	0.43
			Wyton	I 696BS	NBCL	0.41
			Wyton	I 696BS	NBIL	0.42
			Wyton	I 696BS	SBOL	0.43
			Wyton	I 696BS	SBCL	0.41
			Wyton	I 696BS	SBIL	0.41
4	--	M 85 at Northline Rd.	SA	M 85	NBOL	0.37
			SA	M 85	NBCL	0.36
			SA	M 85	NBIL	0.36
			SA	M 85	SBOL	0.36
			SA	M 85	SBCL	0.34
			SA	M 85	SBIL	0.38
			SA	Northline	EBOL	0.38
			SA	Northline	EBIL	0.37
			SA	Ford	WB	0.35
5	Mb 45021C, C4	M 72 from M 22 in Traverse City W 16.1 mi.	SA	M 72	EB	0.39
			SA	M 72	WB	0.44
6	--	M 53 at 14 Mile Rd.	CONC	M 53	NBOL	0.31
			CONC	M 53	NBCL	0.31
			CONC	M 53	NBIL	0.34
			BC	M 53	SBOL	0.27
			BC	M 53	SBIL	0.30
			BC	14 Mile	EB	0.31
			BC	14 Mile	WB	0.29
6	--	M 53 at 16 Mile Rd.	BC	M 53	NBOL	0.30
			BC	M 53	NBCL	0.26
			BC	M 53	NBIL	0.27
			BC	M 53	SBOL	0.30
			BC	M 53	SBCL	0.27
			BC	M 53	SBIL	0.30
			BC	16 Mile	EBOL	0.33
			CONC	16 Mile	EBIL	0.33
			CONC	16 Mile	WBOL	0.35
			CONC	16 Mile	WBIL	0.35
6	--	M 53 at 17 Mile Rd.	BC	M 53	NBOL	0.39
			BC	M 53	NBCL	0.34
			BC	M 53	NBIL	0.36
			BC	M 53	SBOL	0.36
			BC	M 53	SBCL	0.35
			BC	M 53	SBIL	0.37
			BC	17 Mile	EB	0.31
7	Mb 13072-4 (part)	US 27 from S limits of Olivet to "L Drive N."	Hot Emulsion Sand Non-Skid Surface	US 27	NB	0.38
				US 27	SB	0.40
7	Mb 13072-4 (part)	US 27 from "L Drive N" to "G Drive N."	Hot Emulsion Sand Non-Skid Surface	US 27	NB	0.37
				US 27	SB	0.39

* Numbered in order requests received from Traffic Division and other sources.

TABLE 13 (Cont.)
1966 "SPECIAL REQUEST" SKID TEST RESULTS

Special Request No.*	Project No.	Location	Surface Type	Route	Direction and Lane	Coefficient of Wet Sliding Friction
8	--	M 54BR (Saginaw St) from M 21 (Court St) to Water St. in Flint	Brick	M 54BR	NBOL	0.18
			Brick	M 54BR	NBIL	0.17
			Brick	M 54BR	SBOL	0.16
			Brick	M 54BR	SBIL	0.16
8	--	M 54BR (Saginaw St) from 2nd St to Parkland St in Flint	Brick	M 54BR	NBOL	0.28
			Brick	M 54BR	NBIL	0.30
			Brick	M 54BR	SBOL	0.29
			Brick	M 54BR	SBIL	0.30
8	--	M 21 (Court St) from Ann Arbor St to M 54BR (Saginaw St) in Flint	Brick	M 21	EBOL	0.26
			Brick	M 21	EBIL	0.21
			Brick	M 21	WBOL	0.27
			Brick	M 21	WBIL	0.20
8	--	I 75 from M 13 structure to Saginaw River structure	NSST	I 75	NBOL	0.40
			NSST	I 75	NBIL	0.43
			NSST	I 75	SBOL	0.38
			NSST	I 75	SBIL	0.42
			NSST	I 75	NBOL	0.20
			NSST	I 75	NBIL	0.23
			NSST	I 75	SBOL	0.20
			NSST	I 75	SBIL	0.24
9	--	US 223, immediately S of Ottawa Lake	NSST**	US 223	NB	0.48
			NSST**	US 223	SB	0.41
9	--	US 223 at Sterns Rd.	NSST**	US 223	NB	0.43
			NSST**	US 223	SB	0.42
10	Mns 88500-008 (part)	I 696 (John Lodge) at Wyoming	Special Emulsion Skid-Resistant Surface	I 696	NBOL	0.40
				I 696	NBCL	0.37
				I 696	NBIL	0.38
				I 696	SBOL	0.38
				I 696	SBCL	0.38
				I 696	SBIL	0.38
10	Mns 88500-008 (part)	M 85 (Fort St) at Sibley	Special Emulsion Skid-Resistant Surface	M 85	NBOL	0.35
				M 85	NBIL	0.37
				M 85	SBOL	0.36
				M 85	SBIL	0.37
10	Mns 88500-008 (part)	M 153 (Ford Rd.) at Middle Belt St.	Special Emulsion Skid-Resistant Surface	M 153	EBOL	0.34
				M 153	EBIL	0.35
				M 153	WBOL	0.33
				M 153	WBIL	0.34
10	Mns 88500-008 (part)	US 12 (Michigan Ave.) at Miller	Special Emulsion Skid-Resistant Surface	US 12	EBLTL	0.43
				US 12	EBIL	0.39
				US 12	WBOL	0.41
				US 12	WBCL	0.41
				US 12	WBIL	0.41
11	Mb 45021C, C4	M 72 from M 22 in Traverse City W 16.1 mi.	SA	M 72	EB	0.40
			SA	M 72	WB	0.42
--	M 25081, C2R	M 21 from east of Dye Rd. E to W limits of Flint	BC	M 21	EBOL	0.17
			BC	M 21	EBIL	0.17
			BC	M 21	WBOL	0.16
			BC	M 21	WBIL	0.17
--	F 66022A, C4 (part)	M 28 from E jct. of M 64 E 0.6 mi. to the Soo Line RR	BA	M 28	EB	0.20
			BA	M 28	WB	0.21
--	F 66022A, C4 (part)	M 28 from the Soo Line RR E to 0.7 mi. E of the W Branch of Ontonagon River	BA	M 28	EB	0.42
			BA	M 28	WB	0.41

* Numbered in order requests received from Traffic Division and other sources.
** Special treatment.