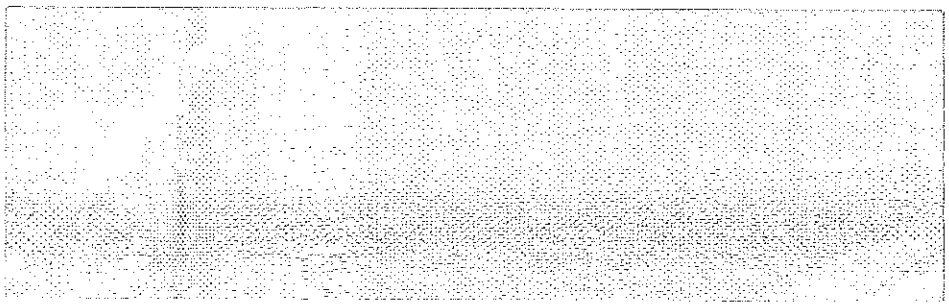
SUMMARIES OF MICHIGAN PAVEMENT SKID RESISTANCE 1975 Test Program

MDSHT REPORT NO. 249

MICHIGAN DEPARTMENT OF STATE HIGHWAYS AND TRANSPORTATION



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Summaries of Michigan
pavement skid resistance :
1975 test program

SUMMARIES OF MICHIGAN PAVEMENT SKID RESISTANCE 1975 Test Program

MDSHT REPORT NO. 249

Research Laboratory Section
Testing and Research Division
Research Project 54 G-74
Research Report No. R-1049

Michigan State Highway Commission
Peter B. Fletcher, Chairman; Carl V. Pellonpaa,
Vice-Chairman, Hannes Meyers, Jr., Weston E. Vivian
John P. Woodford, Director
Lansing, February 1977

CONTENTS

LEGEND

Wsf = Wet sliding friction coefficient

Direction of Test Vehicle

NB, SB, EB, WB, etc. = Northbound, Southbound, etc.

Lane Tested (noted following direction of test vehicle)

RT = right turn lane
LT = left turn lane
OL = outer lane
CL = center lane
IL = inner lane
DL = deceleration lane
ML = merging lane
TL = truck lane
RL = ramp lane

3 or 2 = third or second lane from centerline or median

INTRODUCTION

During the 1975 calendar year, over 11,300 skid tests were conducted throughout Michigan. These tests are summarized in this report according to the annual reporting procedure initiated in 1965. Skid levels for seven basic categories are included.

I Initial Skid Test Results for Concrete and Bituminous Pavements
II Five-Year Skid Test Results for Concrete and Bituminous Pavements
III Ten-Year Skid Test Results for Concrete and Bituminous Pavements
IV Experimental Features in Pavement Surfaces
V High-Accident Locations
VI Special Request Tests
VII Special Attention Locations

Explanatory remarks are presented at the beginning of each category. All High-Accident Location tests, Special Request tests and Special Attention Location tests have been previously reported to interested agencies within the Department.

All skid test values are expressed as 40 mph coefficients of wet sliding friction (Wsf). A Wsf value determined from a highly textured concrete pavement would be expected to be 0.60 or higher. Surfaces with coefficients of 0.20 might be as slippery as packed snow[1] and Wsf values below 0.07 will be representative of a glare ice condition.

Reference should be made to Research Report No. R-585 ("Summaries of Michigan Pavement Skid Resistance: 1965 Test Program") and Research Report No. R-747 ("MDSH Equipment for Measuring Pavement Skid Resistance," February 1971) for information regarding operation of the skid-test device, selection of test areas, and verification of retests.

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[1] Moyer, Ralph A., "A Review of the Variables Affecting Pavement Slipperiness," Proceedings of First International Skid Prevention Conference, 1959.

SECTION I

INITIAL SKID TEST RESULTS FOR CONCRETE AND BITUMINOUS PAVEMENTS

Initial Skid Test Results For Concrete and Bituminous Pavements

Section 1 summarizes skid tests representing 2,706.759 lane miles of trunkline surfaces tested during 1975.

Table 1 - Concrete Pavements Constructed in 1973, 1974, and 1975

1973 Construction

Initial skid test values were obtained on only two 1973 construction projects during the 1975 test year (six lanes, 23.864 lane miles). Friction levels determined, after a two-year service period, ranged from 0.54 to 0.61 and averaged 0.56.

1974 Construction

After one service year, 117 lanes (328.308 lane miles) from 26 projects were tested. Friction levels ranged from 0.27 to 0.78 and averaged 0.61. Eleven of the 117 lanes tested, representing 4.7 percent of the total lane mileage, yielded Wsf values lower than 0.40. All lanes tested on project MU 63525-05505A, located in Oakland County on M 150 between M 59 and a point north of Hamlin Rd, had friction levels lower than 0.40.

1975 Construction

Only three of the concrete projects, which were constructed during 1975, had initial skid tests conducted. None of the 14 lanes (36.434 lane miles) had coefficients below 0.40; friction levels ranged from 0.40 to 0.72 and averaged 0.61.

Table 2 - Bituminous Concrete Pavements (4.12) Constructed in 1972, 1973, 1974, and 1975

1972 Construction

Project Mb 82211-01807A was the only 1972 construction project tested during 1975. Wsf values determined on this 10.912 lane miles of bituminous concrete ranged from 0.39 to 0.44 and averaged 0.42.

1973 Construction

Five bituminous concrete projects were tested after a two-year service period. Wsf values on the 24 lanes ranged from 0.37 to 0.65 and averaged 0.55. Two coefficients below the 0.40 mark were determined. These

two lanes represent 2.4 percent of the 88.984 lane miles tested and were both on project Mbr 63071-04948A, located in Oakland County on M 15 north of Cranberry Lake Rd.

1974 Construction

Seventy projects (832.545 lane miles) were skid tested at the one-year service level. Coefficients on 257 lanes tested ranged from 0.27 to 0.71 and averaged 0.46. Forty-eight of the lanes, representing 9.3 percent of the total lane miles, yielded Wsf values averaging lower than 0.40. Two lanes averaged as low as 0.29, i.e., the eastbound lane of 59045-06782, located on M 46 from the C&O RR tracks east to east city limits of Edmore, and the southbound outer lane of 98004-04607 located on M 84 between Deindorfer St and Shattuck Rd in Saginaw County.

1975 Construction

During the initial service year 25 projects were tested. Friction levels ranged from 0.25 to 0.66 and averaged 0.46. Fourteen of the 76 lanes, 20.2 percent of the 294.716 total lane miles, yielded Wsf values averaging below 0.40. The southbound inner lane of 37011-07794, located on US 27 BR between Broomfield Rd and Preston St in Mt. Pleasant, had an average Wsf of 0.29 and was the only lane that averaged lower than 0.30.

Table 3 - Bituminous Aggregate Pavements (4.11) Constructed in 1973, 1974, and 1975

1973 Construction

One project, 1.626 lane miles, was tested after two years of service. Coefficients ranged from 0.60 to 0.64 and averaged 0.62 for the two lanes.

1974 Construction

During the 1975 test year, 35 bituminous aggregate projects (88 lanes) were skid tested. Coefficients ranged from 0.30 to 0.73 and averaged 0.52. Only 2.2 percent of the 745.638 lane miles (five lanes) had Wsf values lower than 0.40.

1975 Construction

Seventeen projects were tested during the initial service year. Wsf values ranged from 0.16 to 0.69 and averaged 0.44. Sixteen of the 46 lanes tested, representing 37.2 percent of the 335.764 lane miles, had coefficients averaging below 0.40. Four lanes, 7.5 percent of the lane mileage, averaged lower than 0.30.

Table 4 - Miscellaneous Bituminous Surfaces Constructed in 1975

Open-Graded Plant Mix Seal

Two open-graded plant mix seal projects were tested in their initial service year. Friction levels ranged from 0.34 to 0.48 and averaged 0.41. Three lanes, 28.6 percent of the lane miles, had Wsf values averaging below 0.40.

TABLE 1
CONCRETE PAVEMENTS CONSTRUCTED IN 1973, 1974, AND 1975

	Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Coefficient of Wet Sliding Friction		
				Coarse	Fine		Low	High	Avg
1973	I 25032-04991A (part)	I 75 from Pasadena Rd northerly to 1,375 ft south of M 57	Eisenhour Construction Co.	Pit 75-5	Pit 25-8	NBIL	0.54	0.57	0.55
						SBIL	0.55	0.57	0.56
	F 61075-01462A	US 31 relocation from 0.4 mi north of Fruitvale Rd northerly to 100 ft south of Skeels Rd	Sargent Construction Co.	Pit 75-5	Pit 70-9	NBOL	0.59	0.61	0.60
						NBIL	0.58	0.59	0.58
						SBOL	0.59	0.59	0.59
						SBIL	0.57	0.61	0.59
1974	I 03035-00023A	I 196 from north of 142nd St northeasterly to southwest of 144th Ave	L. W. Edison Co.	Pit 70-9	Pit 70-52	NBOL	0.57	0.63	0.59
						NBIL	0.65	0.66	0.66
						SBOL	0.53	0.59	0.56
						SBIL	0.64	0.66	0.65
	I 03035-00024A	I 196 from southwest of 144th Ave northeasterly to 1,100 ft southwest of Allegan-Ottawa County Line	Carl Goodwin and Sons, Inc.	Pits 70-9 and 70-5	Pits 70-9 and 70-39	NBOL	0.56	0.61	0.59
						NBIL	0.72	0.73	0.73
						SBOL	0.63	0.64	0.63
						SBIL	0.73	0.75	0.74
	I 09034-01464A FM 09034-05683A IS 09034-06606A	I 75 from I 675 north to M 13 connector (widening on northbound only from US 10 northerly)	Sargent Construction Co.	Pits 71-47 and 75-05	Pit 63-54	NBIL	0.60	0.71	0.65
						SBIL	0.61	0.64	0.64
	F 18024-00233A	US 10 relocation from 0.5 mi east of Old State Rd easterly to US 27	Eisenhour Construction Co.	Pits 37-26 and 67-02	Pits 18-71 and 67-02	EBOL	0.59	0.64	0.62
						EBIL	0.59	0.73	0.66
						WBOL	0.57	0.67	0.61
						WBIL	0.65	0.72	0.68
	F 19081-00250A	US 127 from Clinton-Ingham County Line northerly to north of State Rd	Eisenhour Construction Co.	Pits 19-18 and 19-24	Pit 19-4	NBOL	0.42	0.47	0.45
						NBIL	0.58	0.63	0.61
						SBOL	0.50	0.53	0.52
						SBIL	0.59	0.63	0.61
	FM 30032-00406A	M 99 relocation from 50 ft southeast of north limits of Hillsdale northwesterly to US 12	Denton Construction Co.	Pits 13-84, 30-35, France Stone, Waterville, Ohio	Pit 30-35	NB	0.46	0.48	0.47
						SB	0.45	0.48	0.47
						NBOL	0.50	0.52	0.51
						NBIL	0.59	0.65	0.62
						SBOL	0.53	0.58	0.55
						SBIL	0.57	0.59	0.58
	I 41029-00574A	I 196 from 277 ft southwest of Kent-Ottawa County Line northerly to 1,455 ft north of M 21	Davco, Inc.	Pit 41-16	Pit 70-45	NBOL	0.57	0.62	0.60
						NBIL	0.66	0.68	0.67
						SBOL	0.49	0.53	0.51
						SBIL	0.66	0.68	0.67
	F 58171-00801A	I 275 from I 75 northwesterly to 3,442 ft north of Labo Rd	Denton Construction Co.	E.C. Levy (Trenton Yard)	Pit 81-57	NBOL	0.69	0.71	0.70
						NBIL	0.69	0.72	0.70
						SBOL	0.60	0.64	0.62
						SBIL	0.58	0.66	0.62

TABLE 1 (Cont.)
CONCRETE PAVEMENTS CONSTRUCTED IN 1973, 1974, AND 1975

1974 CONT.

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Coefficient of Wet Sliding Friction		
			Coarse	Fine		Low	High	Avg
I 58171-00802A	I 275 from 1,980 ft south of Sigler Rd northerly to 2,929 ft south of Carlton-Rockwood Rd	L. W. Edison Co.	E.C. Levy Pit 81-1 (Trenton Yard)		NBOL	0.67	0.70	0.68
					NBCL	0.63	0.67	0.65
					NBIL	0.60	0.63	0.61
					SBOL	0.59	0.61	0.60
					SBCL	0.55	0.61	0.58
					SBIL	0.59	0.64	0.61
M 63132-05442A	M 150 from 486 ft north of Hamlin Rd, northerly to 630 ft north of Avon Rd	The Cooke Contracting Co.	E.C. Levy Pit 63-47 (Trenton Yard)		NBOL	0.41	0.44	0.43
					NBIL	0.47	0.51	0.48
					SBOL	0.35	0.38	0.37
					SBIL	0.38	0.42	0.40
I 63191-03586A	I 96 from Novi Rd interchange southeasterly to 850 ft south of 9 Mile Rd	Denton Construction Co.	E.C. Levy Pit 63-7 (Dix Yard)		NBOL	0.71	0.73	0.72
					NB #3	0.72	0.74	0.73
					NB #2	0.66	0.71	0.69
					NBIL	0.69	0.73	0.71
					SBOL	0.67	0.69	0.68
					SB #3	0.73	0.76	0.74
					SB #2	0.74	0.78	0.76
					SBIL	0.71	0.77	0.75
MU 63525-05505A	M 150 from M 59 northerly to 486 ft north of Hamlin Rd	The Cooke Contracting Co.	E.C. Levy Pit 63-54 (Dix Yard)		NBOL	0.27	0.32	0.30
					NBIL	0.34	0.39	0.37
					SBOL	0.28	0.33	0.30
					SBIL	0.38	0.39	0.38
F 70024-00983A	I 196 from 3,200 ft south of Byron Rd northeasterly to 300 ft east of 56th Ave	Carl Goodwin and Sons, Inc.	Pits 70-9 and 75-5	Pits 70-27 and 70-39	NBOL	0.59	0.63	0.61
					NBIL	0.64	0.68	0.66
					SBOL	0.58	0.60	0.59
					SBIL	0.65	0.69	0.67
I 70024-00984A	I 196 from south of the Ottawa-Allegan County Line northeasterly to south of Byron Rd	Carl Goodwin and Sons, Inc.	Pits 70-9 and 75-5	Pits 70-9 and 70-39	NBOL	0.61	0.64	0.63
					NBIL	0.67	0.67	0.67
					SBOL	0.59	0.62	0.61
					SBIL	0.71	0.73	0.72
I 70024-00985A	I 196 from 300 ft east of 56th Ave northeasterly to east of 32nd St	L. W. Edison Co.	Pit 41-16	Pit 70-45	NBOL	0.58	0.59	0.58
					NBIL	0.62	0.64	0.63
					SBOL	0.54	0.56	0.55
					SBIL	0.67	0.70	0.68
FM 73111-05721A	I 75 - US 10 - US 23 from 3,065 ft north of Dixie Hwy northerly to 830 ft north of Wadsworth Rd	W. F. McNally	Pits 17-66 and 75-5	Pit 25-29	NBIL	0.64	0.70	0.67
					SBIL	0.59	0.69	0.65

TABLE 1 (Cont.)
CONCRETE PAVEMENTS CONSTRUCTED IN 1973, 1974, AND 1975

1974 CONT.

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Coefficient of Wet Sliding Friction		
			Coarse	Fine		Low	High	Avg
FM 73171-05681A	I 75 from 2,694 ft north of Birch Run Rd northerly to 3,065 ft north of Dixie Hwy	L. W. Edison Co.	Pit 71-47	Pit 63-54	NBIL	0.63	0.69	0.65
					SBIL	0.61	0.65	0.64
I 82022-04280A	I 94 from 435 ft east of Haggerty Rd easterly to 1,664 ft east of Ozgo Rd	The Cooke Contracting Co.	E.C. Levy (Dix Yard)	Pit 81-1	EBOL	0.35	0.40	0.38
					EBCL	0.48	0.48	0.48
					EBIL	0.55	0.58	0.57
					WBOL	0.42	0.45	0.43
					WBCL	0.46	0.52	0.50
					WBIL	0.51	0.54	0.53
M 82081-03107A	M 153 from 750 ft west of Beech-Daly Rd easterly to 1,030 ft west of northbound US 24	Chas. J. Rogers, Inc.	Pit 71-47	Pit 63-7	EBOL	0.40	0.42	0.41
					EBCL	0.37	0.42	0.40
					EBIL	0.48	0.50	0.49
					WBOL	0.34	0.40	0.38
					WBCL	0.46	0.52	0.48
					WBIL	0.47	0.54	0.51
I 82122-02923A	Interchange of I 275, I 96 and M 14 (also see Project I 82293-02937A)	Denton Construction Co.	E.C. Levy (Dix Yard)	Pits 63-7 and 63-55	EBOL	0.57	0.63	0.60
					EBCL	0.63	0.63	0.63
					EBIL	0.53	0.66	0.60
					WBRT	0.51	0.55	0.53
					WBOL	0.38	0.47	0.43
					WBCL	0.57	0.64	0.60
					WBIL	0.64	0.66	0.65
BUI 82123-01284A	I 96 from Schaefer Rd easterly to Wyoming	Eisenhour Construction Co.	E.C. Levy (Dix Yard)	Pit 63-7	Inner Roadway			
					EBOL	0.66	0.69	0.68
					EBCL	0.60	0.67	0.64
					EBIL	0.69	0.77	0.72
					WBOL	0.69	0.70	0.70
					WBCL	0.70	0.71	0.71
					WBIL	0.70	0.73	0.72
					Outer Roadway			
					EBOL	0.48	0.53	0.50
					EB #3	0.37	0.42	0.39
					EB #2	0.54	0.58	0.55
					EBIL	0.63	0.64	0.64
					WBOL	0.50	0.58	0.54
					WB #3	0.52	0.53	0.53
					WB #2	0.61	0.64	0.63
					WBIL	0.66	0.69	0.67

TABLE 1 (Cont.)
CONCRETE PAVEMENTS CONSTRUCTED IN 1973, 1974, AND 1975

	Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Coefficient of Wet Sliding Friction		
				Coarse	Fine		Low	High	Avg
1974 CONT.	I 82191-02800A	I 75 from Huron River northeasterly to Gibralter Rd	John Carlos, Inc.	E.C. Levy (Trenton Yard)	Pits 63-55 and 81-57	NBOL	0.42	0.48	0.46
						SBOL	0.41	0.46	0.43
	I 82293-02937A	Interchange of I 275, I 96 and M 14 (also see Project I 82122-02923A)	Denton Construction Co.	E.C. Levy (Dix Yard)	Pits 63-7 and 63-55	NBOL	0.67	0.72	0.70
						NBCL	0.69	0.74	0.71
						NBIL	0.72	0.77	0.74
						SBOL	0.70	0.74	0.72
						SBCL	0.69	0.71	0.70
						SBIL	0.71	0.78	0.74
	I 82293-04742A	I 275 from M 153 northerly to Plymouth Rd	Sargent Construction Co.	Pit 63-7	Pit 63-7	NBOL	0.42	0.47	0.44
						NBCL	0.46	0.53	0.50
						NBIL	0.65	0.66	0.66
						SBOL	0.44	0.46	0.45
						SBCL	0.54	0.57	0.56
						SBIL	0.64	0.67	0.65
1975	F 64014-06436A	US 31 from Oceana-Muskegon County Line north to McKinley Rd	Eisenhour Construction Co.	Pit 70-9	Pit 64-20	NBOL	0.66	0.72	0.70
						NBIL	0.63	0.67	0.65
						SBOL	0.63	0.65	0.64
						SBIL	0.66	0.67	0.66
	F 64014-06438A	US 31 from McKinley Rd northerly to Garfield Rd	Eisenhour Construction Co.	Pit 70-9	Pit 64-20	NBOL	0.67	0.71	0.69
						NBIL	0.69	0.72	0.70
						SBOL	0.69	0.72	0.71
						SBIL	0.58	0.65	0.61
	I 82021-05127A	I 94 from 113 ft west of Morton-Taylor Rd easterly to 542 ft east of Haggerty Rd	Eisenhour Construction Co.	E.C. Levy (Dix Yard)	Pit 81-78	EBOL	0.64	0.64	0.64
						EBCL	0.58	0.61	0.59
						EBIL	0.55	0.60	0.57
						WBOL	0.40	0.41	0.41
						WBCL	0.42	0.48	0.44
						WBIL	0.51	0.53	0.52

TABLE 2
BITUMINOUS CONCRETE PAVEMENTS (4.12) CONSTRUCTED IN 1972, 1973, 1974, AND 1975

	Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Coefficient of Wet Sliding Friction		
				Coarse	Fine		Low	High	Avg
1972	Mb 82211-01807A	M 85 from Sibley Rd northerly to I 75	Detroit Asphalt Paving Co.	Pit 47-3	Pit 47-3	NBOL	0.39	0.41	0.40
						NBIL	0.40	0.44	0.42
						SBOL	0.39	0.41	0.40
						SBIL	0.42	0.45	0.44
1973	Mb 09033-04835A	M 13 from 1,250 ft north of Beaver Rd northerly to Linwood Rd	Midland Contracting Co.	Pit 75-5	Pits 63-54 and 79-79	NBOL	0.51	0.53	0.52
						NBIL	0.60	0.65	0.63
						SBOL	0.48	0.52	0.49
						SBIL	0.61	0.64	0.63
	I 25032-04991A (part)	I 75 from Pasadena Ave northerly to 1,375 ft south of M 57	Saginaw Asphalt Paving Co.	Pit 23-4	Pit 25-27	NBOL	0.53	0.57	0.54
						NBCL	0.57	0.60	0.58
						NBIL	0.59	0.63	0.62
						SBOL	0.50	0.55	0.52
						SBCL	0.55	0.59	0.57
						SBIL	0.60	0.63	0.62
	Mbr 63071-04948A	M 15 from 614 ft south of Cranberry Lake Rd northerly	Bit Con Corp.	Pit 63-88	Pit 63-88	NB	0.37	0.40	0.39
						SB	0.38	0.40	0.39
	U 82144-01739A	M 102 from west of Brock St easterly to Keily Rd	Macomb Concrete Corp.	E.C. Levy (Trenton Yard)	Pit 50-35	EBOL	0.42	0.47	0.44
						EB#3	0.40	0.46	0.43
						EB#2	0.45	0.50	0.48
						EBIL	0.51	0.51	0.51
						WBOL	0.45	0.47	0.46
						WB#3	0.41	0.48	0.45
						WB#2	0.46	0.50	0.48
						WBIL	0.47	0.51	0.49
	Mb 82192-04787A	M 39 from 50 ft northwest of Wabash RR in Allen Park thence southeasterly intermittently, to 60 ft northwest of Fort St	The Cooke Contracting Co.	Pit 47-3	Pit 47-3	NBOL	0.33	0.37	0.35
						NB#3	0.37	0.39	0.38
						NB#2	0.39	0.41	0.40
						NBIL	0.39	0.44	0.41
1974	Mbr 01051-06118A	US 23 from 1,485 ft south of M 72 northerly to 0.475 miles north of Spruce Rd	Central Paving Co.	Pit 71-15	Pit 71-15	NB	0.51	0.61	0.56
						SB	0.51	0.61	0.57
	Mb 06072-06123A (part)	US 23 from 400 ft south of north limits of Standish northeasterly 6.193 miles to 1,500 ft northeast of west limits of Omer	Saginaw Asphalt Paving Co.	Pit 71-15	Pit 71-15	NB	0.41	0.49	0.44
						SB	0.43	0.56	0.49
	Mb 06072-06123A (part)	M 65 from 1,800 ft south of north limits of Twining northeasterly 3.261 miles to the Arenac-Iosco County Line (Control Section 06091)	Saginaw Asphalt Paving Co.	Pit 71-15	Pit 71-15	NB	0.51	0.54	0.53
						SB	0.57	0.60	0.59

TABLE 2 (Cont.)

BITUMINOUS CONCRETE PAVEMENTS (4.12) CONSTRUCTED IN 1972, 1973, 1974, AND 1975

1974 CONT

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Coefficient of Wet Sliding Friction		
			Coarse	Fine		Low	High	Avg
Mb 11021-06126A	US 12 from west limits of Three Oaks easterly to east limits of Galien	John G. Yerington	Material Service, Thornton, Ill.	Pit 11-75	EB WB	0.47 0.48	0.50 0.52	0.49 0.50
M 11051-05491A	US 31-US 33 from Fort St north to M 60 BR	Reith-Riley Construction Co., Inc.	Material Service, Thornton, Ill.	Pit 14-36	NBOL NBIL SBOL SBIL	0.39 0.39 0.31 0.37	0.39 0.40 0.33 0.37	0.39 0.40 0.32 0.37
Mb 11071-06128A (part)	M 140 from 1,050 ft north of south limits of Watervliet north 0.49 miles to Paw Paw River (Control Section 11072)	Consumers Asphalt Paving Co.	Pit 39-1	Pit 14-19	NB SB	0.35 0.39	0.37 0.40	0.36 0.40
Mb 11071-06128A (part)	US 31-US 33 from 190 ft northwest of Sunset Dr northwesterly 0.52 miles (Control Section 11052)	Consumers Asphalt Paving Co.	Pit 39-1	Pit 14-19	NB SB	0.40 0.37	0.41 0.39	0.40 0.38
Mbr 12022-06072A	US 12 from Jefferson St in Coldwater easterly to West St in Quincy, omitting from Wright St east to east of I 69	John G. Yerington	Pits 12-44 and 30-35	Pit 12-44	EB WB	0.36 0.34	0.37 0.38	0.37 0.36
Mb 13011-06073A	M 37 from 350 ft north of M 89 northerly to 1.05 miles north of Calhoun-Barry County Line, omitting from 2,272 ft north of "S" Dr north to 152 ft north of "V" Dr	Reith-Riley Construction Co., Inc.	Pit 39-1	Pit 13-41	NB SB NBOL NBIL SBOL SBIL	0.51 0.41 0.46 0.50 0.40 0.45	0.55 0.46 0.50 0.53 0.44 0.51	0.53 0.44 0.48 0.52 0.42 0.48
Mb 13022-06074A	M 60 from south branch of Kalamazoo River easterly to 400 ft west of the Calhoun-Jackson County Line	Reith-Riley Construction Co., Inc.	Pit 12-44	Pit 12-44	EB WB EBOL EBIL WBOL WBIL	0.41 0.43 0.49 0.70 0.47 0.69	0.52 0.47 0.50 0.71 0.51 0.70	0.45 0.45 0.49 0.70 0.49 0.70
Mb 14011-06130A	M 60 from M 62 easterly 1.12 miles to east limits of Cassopolis (Control Section 14062)	Reith-Riley Construction Co., Inc.	Material Service, Thornton, Ill.	Pit 14-36	EB WB	0.29 0.34	0.30 0.34	0.30 0.34
Mbr 18032-07530A	US 27 BR from M 61 in Harrison northerly to US 27	The Hicks Co.	Pit 37-26	Pit 37-26	NB SB NBOL NBIL SBOL SBIL	0.41 0.41 0.40 0.40 0.45 0.44	0.42 0.44 0.44 0.45 0.45 0.46	0.41 0.42 0.42 0.43 0.45 0.45

TABLE 2 (Cont.)

BITUMINOUS CONCRETE PAVEMENTS (4.12) CONSTRUCTED IN 1972, 1973, 1974, AND 1975

1974 CONT

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Coefficient of Wet Sliding Friction		
			Coarse	Fine		Low	High	Avg
Mbr 18041-07531A	US 27 BR from US 27 northerly to M 61 in Harrison	The Hicks Co.	Pit 37-26	Pit 37-26	NB	0.42	0.50	0.46
					SB	0.41	0.41	0.41
Mb 19062-06132A (part)	US 27 from north of Sturgis St in St. Johns northerly 0.47 miles to GTWRR (Control Section 19031)	Spartan Asphalt Paving Co.	Pit 47-3	Pit 47-43	NBOL	0.38	0.40	0.39
					NBIL	0.45	0.51	0.47
					SBOL	0.45	0.46	0.46
					SBIL	0.41	0.46	0.43
Mb 19062-06132A (part)	US 27 southbound from 1,000 ft south of Oakland Ave in St. Johns northerly 0.57 miles to north of Walker Ave (Control Section 19032)	Spartan Asphalt Paving Co.	Pit 47-3	Pit 47-43	SBOL	0.41	0.44	0.42
					SBIL	0.51	0.52	0.52
Mb 19062-06132A (part)	M 21 from 160 ft east of Scott Rd easterly to Clinton-Shiawassee County Line	Spartan Asphalt Paving Co.	Pit 47-3	Pit 47-43	EB	0.48	0.57	0.53
					WB	0.52	0.58	0.55
Mb 23051-05616A (part)	M 50 from US 27 BR in Charlotte easterly to 1,630 ft east of PCRR	Reith-Riley Construction Co., Inc.	Pit 41-38	Pit 19-33	EB	0.39	0.40	0.39
					WB	0.40	0.40	0.40
Mb 23051-05616A (part)	M 79 from Wheaton Rd easterly to M 78 in Charlotte (Control Section 23021)	Reith-Riley Construction Co., Inc.	Pit 41-38	Pit 19-33	EB	0.48	0.51	0.50
					WB	0.45	0.48	0.47
Rss 25102-00366A	M 57 from M 54 easterly to Belsay Rd	Saginaw Asphalt Paving Co.	Pit 17-40	Pit 25-29	EB	0.40	0.51	0.45
					WB	0.33	0.53	0.43
Mtb 30032-05047A	Old M 99 from north of north limits of Hillsdale northwesterly to 1,795 ft south of US 12, omitting from Taylor Rd northwest 0.75 miles	Maclean Construction Co.	France Stone, Waterville, Ohio	Pit 30-58	NB	0.58	0.62	0.60
					SB	0.52	0.56	0.54
Mb 30041-06076A	M 34 from 1,790 ft east of Pleasant Rd easterly to US 127	Ayling-Cunningham Asphalt Paving Co.	Pits 58-3 and 81-84	Pit 58-3	EB	0.44	0.58	0.51
					WB	0.44	0.56	0.49
Mb 30061-06077A	US 12 from US 127 southwesterly to 407 ft east of M 99	Ayling-Cunningham Asphalt Paving Co.	Pit 58-3	Pit 46-28	EB	0.39	0.52	0.47
					WB	0.43	0.54	0.49
Mb 33033-06079A	US 27 southbound (Cedar St) from 700 ft south of Kalamazoo St north to 200 ft south of Grand River and US 27 northbound (Larch St) from 530 ft south of Kalamazoo St north to 470 ft north of Grand River	Reith-Riley Construction Co., Inc.	Pit 41-38	Pit 19-33	NBOL	0.42	0.45	0.44
					NB#3	0.41	0.41	0.41
					NB#2	0.37	0.41	0.39
					NBIL	0.42	0.44	0.43
					SBOL	0.39	0.41	0.40
					SBCL	0.37	0.39	0.38
					SBIL	0.36	0.40	0.38
Mb 33042-05925A	M 43 (Oakland Ave) from Pennsylvania Ave east to Grand River Ave	Reith-Riley Construction Co., Inc.	Pit 41-38	Pit 19-33	WBOL	0.42	0.44	0.43
					WBCL	0.41	0.43	0.42
					WBIL	0.43	0.46	0.44
Mb 33082-06080A	M 43 from 1,000 ft east of Marsh Rd easterly to west limits of Williamston	Spartan Asphalt Paving Co.	Pit 47-3	Pit 47-43	EB	0.46	0.57	0.50
					WB	0.46	0.55	0.50

TABLE 2 (Cont.)
BITUMINOUS CONCRETE PAVEMENTS (4.12) CONSTRUCTED IN 1972, 1973, 1974, AND 1975

1974 CONT.

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Coefficient of Wet Sliding Friction		
			Coarse	Fine		Low	High	Avg
F 37021-00519A	M 20 from C&O RR, in Remus, east to Gilmore Rd	The Hicks Co.	Pit 37-26	Pit 37-26	EB	0.58	0.64	0.61
					WB	0.58	0.64	0.62
US 39081-06915A	M 43 from Sage St to Cherry Hill Rd	Reith-Riley Construction Co., Inc.	Pit 39-1	Pit 39-1	EBOL	0.38	0.41	0.40
					EBIL	0.42	0.47	0.44
					WBOL	0.35	0.37	0.36
					WBIL	0.40	0.42	0.41
Mb 41013-07545A	Old US 131 from 975 ft south of M 46 southerly 0.86 miles to 16 Mile Rd	Williams Bros. Asphalt Paving Co.	Pit 41-122	Pit 41-27	NB	0.40	0.42	0.41
					SB	0.41	0.45	0.43
US 41041-04028A	M 21 at I 96	Reith-Riley Construction Co., Inc.	Pit 41-16	Pit 41-16	EBOL	0.35	0.38	0.36
					EBIL	0.44	0.47	0.46
					WBOL	0.40	0.45	0.42
					WBIL	0.47	0.48	0.47
Ms 41061-04725A	M 45 from M 11 easterly intermittently to east of Kinney St	Reith-Riley Construction Co., Inc.	Pit 41-16	Pit 41-16	EBOL	0.37	0.40	0.39
					EBIL	0.38	0.41	0.39
					WBOL	0.34	0.39	0.37
					WBIL	0.38	0.44	0.41
Mb 43011-06134A (part)	M 37 from Lake-Newaygo County Line northerly to 204 ft south of US 10 in Baldwin	Globe Construction Co.	Pit 75-5	Pit 43-47	NB	0.38	0.50	0.44
					SB	0.42	0.50	0.46
Mb 43011-06134A (part)	US 10 at four locations between M 37 and Broadway Rd (Control Section 43022)	Globe Construction Co.	Pit 75-5	Pit 43-47	EB	0.46	0.50	0.49
					WB	0.49	0.50	0.49
Mbr 43012-06424A	Southbound M 37 truck lane from 2.5 miles north of north junction of US 10	Globe Construction Co.	Pit 75-5	Pit 67-2	SBTL	0.50	0.54	0.52
Mb 46062-06081A	US 223 from 200 ft west of Jefferson Ave in Blissfield easterly to Lenawee-Monroe County Line	Cunningham-Gooding	Pit 58-3	Pit 46-28	EB	0.36	0.57	0.50
					WB	0.41	0.60	0.53
Mbr 50012-06104A	M 53 from north end of freeway northerly to Macomb-Lapeer County Line	Bit Con Corp.	Pit 63-4	Pit 63-4	NB	0.42	0.53	0.48
					SB	0.47	0.52	0.49
Mbr 50022-06105A	M 59 from 1,300 ft east of Hayes Rd easterly to M 97	Bit Con Corp.	Pit 63-4	Pit 63-4	EB	0.41	0.45	0.44
					WB	0.47	0.53	0.51
U 50031-00670A	M 97 from M 102 northerly to 1,461 ft southwest of east limits of Warren	Cooke Contracting Co.	Pit 63-4	Pit 50-35	NBOL	0.50	0.52	0.51
					NBCL	0.47	0.51	0.49
					NBIL	0.47	0.50	0.48
					SBOL	0.46	0.47	0.47
					SBCL	0.48	0.51	0.50
					SBIL	0.50	0.52	0.51

TABLE 2 (Cont.)

BITUMINOUS CONCRETE PAVEMENTS (4.12) CONSTRUCTED IN 1972, 1973, 1974, AND 1975

1974 CONT.

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Coefficient of Wet Sliding Friction		
			Coarse	Fine		Low	High	Avg
U 50031-00671A	M 97 from Hayes Rd northeasterly to 200 ft northeast of 13 Mile Rd	Asphalt Products Corp.	E.C. Levy (Dix Yard)	E.C. Levy (Dix Yard)	NBOL	0.45	0.45	0.45
					NBCL	0.47	0.50	0.48
					NBIL	0.48	0.50	0.49
					SBOL	0.45	0.51	0.48
					SBCL	0.42	0.47	0.45
					SBIL	0.52	0.55	0.53
Mbr 59045-06782A	M 46 from C&O RR near Lewis St easterly to east limits of Edmore	Reith-Riley Construction Co., Inc.	Pit 41-38	Pit 37-26	EB	0.27	0.32	0.29
					WB	0.34	0.38	0.36
F 59051-01770A	M 66 from Main St in Stanton north to M 46	Reith-Riley Construction Co., Inc.	Pit 41-38	Pit 37-26	NB	0.59	0.64	0.62
					SB	0.60	0.64	0.62
Mb 62012-06138A	M 37 from Bailey Rd in Bailey north to north of Muskegon-Newaygo County Line	Reith-Riley Construction Co., Inc.	Pit 41-38	Pit 62-33	NB	0.53	0.58	0.56
					SB	0.53	0.54	0.53
Mb 63052-07536A	US 10 (Telegraph Rd) from 290 ft southeast of Hood St north to Rockwell Ave	Cooke Contracting Co.	Pit 63-4	Pit 50-35	NBOL	0.38	0.41	0.39
					NBIL	0.41	0.47	0.44
					SBOL	0.37	0.39	0.38
					SBIL	0.41	0.46	0.44
Mb 63053-06084A	US 10 BR (Oakland St) from Cass and Montcalm Sts northwesterly, intermittently, to US 10, thence northerly to 1,723 ft south of M 15	Ann Arbor Construction Co.	Pit 63-60	Pit 63-60	NBOL	0.39	0.48	0.44
					NBIL	0.40	0.45	0.48
					SBOL	0.38	0.47	0.42
					SBIL	0.42	0.48	0.46
Mbr 63091-06106A	I 75 BL (Perry St) from 220 ft northeast of Wide Track Dr northeasterly to I 75, thence north on M 24 to 10.5 miles north of Opdyke Rd	Ajax Paving Industries, Inc.	Pit 63-4	Pit 63-4	NBOL	0.38	0.45	0.41
					NBIL	0.41	0.51	0.46
					SBOL	0.34	0.46	0.39
					SBIL	0.35	0.50	0.43
RF 64022-00931A	M 20 extension from 224 ft east of 64th and Garfield Rd east to 540 ft east of existing US 31	Reith-Riley Construction Co., Inc.	Pit 70-9	Pit 70-9	EBOL	0.60	0.60	0.60
					EBIL	0.59	0.65	0.63
					WBOL	0.58	0.59	0.59
					WBIL	0.63	0.67	0.65
Mb 70041-06085A	M 45 from 52nd Ave east 6.66 miles to the Ottawa-Kent County Line	Reith-Riley Construction Co., Inc.	Pit 41-50	Pit 41-16	EB	0.35	0.38	0.37
					WB	0.33	0.37	0.35
					EBOL	0.38	0.44	0.41
					EBIL	0.48	0.54	0.51
					WBOL	0.35	0.45	0.40
					WBIL	0.47	0.50	0.49
Mbr 70041-06107A	M 45 from US 31 east to 52nd St omitting at bridge over Bass Creek	West Shore Construction Co.	Pit 70-45	Pit 70-36	EB	0.51	0.55	0.53
					WB	0.51	0.55	0.53

TABLE 2 (Cont.)

BITUMINOUS CONCRETE PAVEMENTS (4.12) CONSTRUCTED IN 1972, 1973, 1974, AND 1975

1974 CONT

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Coefficient of Wet Sliding Friction		
			Coarse	Fine		Low	High	Avg
I 70063-06780A	I 96 from west of 68th Ave easterly intermittently to west of 16th St	Woodland Paving Co.	Pit 41-48	Pit 41-48	EBOL	0.47	0.50	0.48
					EBIL	0.59	0.60	0.60
					WBOL	0.47	0.52	0.48
					WBIL	0.59	0.63	0.61
Mb 72013-06140A	US 27 from Snowbowl Rd northerly 4.901 miles to Crossover north of M 55	Lake Construction Co.	Pit 72-5	Pit 72-5	NBOL	0.57	0.60	0.58
					NBIL	0.61	0.66	0.63
					SBOL	0.53	0.59	0.56
					SBIL	0.60	0.65	0.63
Mbr 73021-05928A	M 57 from M 52 east to Stuart Rd	Frank Strausberg and Son	Pit 63-4	Pit 76-47	EB	0.52	0.57	0.55
					WB	0.52	0.58	0.55
Ms 73063-04989A	M 46 from east of C&O RR east to Outer Dr	Saginaw Asphalt Paving Co.	Pit 63-4	Pit 63-29	EBOL	0.33	0.39	0.36
					EBIL	0.39	0.39	0.39
					WBOL	0.32	0.34	0.33
					WBIL	0.32	0.35	0.34
Mb 73063-06142A	M 46 from Towerline Rd east to 1,650 ft east of Portsmouth Rd	Saginaw Asphalt Paving Co.	Pit 71-47	Pit 63-29	EB	0.45	0.50	0.47
					WB	0.42	0.47	0.45
Mb 76062-06143A (part)	M 21 from 581 ft west of Serr Rd east to 948 ft west of M 13	Spartan Asphalt Paving Co.	Pit 63-4	Pit 63-29	EB	0.48	0.55	0.52
					WB	0.48	0.55	0.51
Mb 76062-06143A (part)	M 21 from 75 ft east of Smith Rd east to 53 ft west of Chestnut St (Control Section 76061)	Spartan Asphalt Paving Co.	Pit 63-4	Pit 63-29	EB	0.34	0.38	0.36
					WB	0.35	0.41	0.37
Mbr 77021-07539A	M 21 between Breen Rd and Knoll Rd	Molesworth Contracting Co.	Pit 63-4	Pit 74-51	EB	0.54	0.55	0.54
					WB	0.53	0.55	0.54
Mbr 77051-04849A Ms 77051-04916A	M 29 from 500 ft north of Dyke Rd southerly 3.37 miles	Howell Construction Co.	Pit 71-47	Pit 50-35	EB	0.38	0.42	0.40
					WB	0.44	0.47	0.45
Mb 77051-05929A	M 29 from 1,100 ft west of Pearl Beach Rd southeasterly and northeasterly to 350 ft north of Francis St (1 mile north of Marine City)	Howell Construction Co.	Pit 71-47	Pit 50-35	NB	0.40	0.53	0.48
					SB	0.39	0.53	0.47
Mbr 78012-06471A	US 131 from White Pigeon Rd north to the St. Joseph River	Globe Construction Co.	Pit 39-1	Pit 39-1	NB	0.39	0.44	0.41
					SB	0.39	0.39	0.39
Mb 78022-06129A (part)	US 12 from 150 ft east of Halfway Rd in St. Joseph County east 7.11 miles to west limits of Bronson	John G. Yerington	Pit 58-3	Pit 12-12	EB	0.50	0.56	0.53
					WB	0.42	0.51	0.47
Mb 78022-06129A (part)	M 66 in Sturgis from US 12 north to Lafayette St (Control Section 78052)	John G. Yerington	Pit 58-3	Pit 12-12	NBOL	0.34	0.39	0.37
					NBIL	0.36	0.37	0.36
					SBOL	0.38	0.40	0.39
					SBIL	0.37	0.41	0.39

TABLE 2 (Cont.)

BITUMINOUS CONCRETE PAVEMENTS (4.12) CONSTRUCTED IN 1972, 1973, 1974, AND 1975

1974 CONT

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Coefficient of Wet Sliding Friction		
			Coarse	Fine		Low	High	Avg
M 79062-05506A	M 81 from 600 ft west of west limits of Cass City east to east limits, omitting 0.312 miles in Center of Cass City	Frank Strausberg and Son Co.	Pit 63-4	Pit 25-29	EB	0.48	0.51	0.49
					WB	0.51	0.54	0.52
Mb 80071-06144A (part)	M 51 from 3,055 ft north of 82nd Ave north to 1,080 ft south of I 94	Klett Construction Co.	Pit 39-1	Pit 14-51	NB	0.46	0.51	0.49
					SB	0.44	0.53	0.49
Mb 80071-06144A (part)	M 43 from west limits of Bangor east 0.93 miles to east limits (Control Section 80041)	Klett Construction Co.	Pit 39-1	Pit 14-51	EB	0.44	0.47	0.46
					WB	0.44	0.46	0.45
Mb 81011-06145A	M 52 from PC RR in Chelsea northwesterly to 1,350 ft northwest of Roepke Rd	Ayling-Cunningham Asphalt Paving Co.	Pit 81-57	Pit 81-78	NB	0.47	0.63	0.54
					SB	0.48	0.57	0.53
Is 81062-03562A	I 94 from 510 ft west of Wagner Rd easterly and southerly to 130 ft south of Liberty Rd	Ann Arbor Construction Co.	Pit 47-3	Pit 47-3	EBOL	0.42	0.45	0.44
					EBIL	0.53	0.57	0.54
					WBOL	0.42	0.45	0.44
					WBIL	0.46	0.50	0.48
Mb 81063-06087A	US 12 from I 94 northeast to US 12 BR	Thompson-McCully Co.	Pit 47-3	Pit 47-3	EBOL	0.61	0.62	0.62
					EB#3	0.51	0.53	0.52
					EB#2	0.50	0.52	0.51
					EBIL	0.53	0.55	0.54
					WBOL	0.49	0.49	0.49
					WB#3	0.56	0.57	0.56
					WB#2	0.53	0.58	0.56
					WBIL	0.53	0.54	0.54
Mb 81102-07541A	M 14 from M 153 east to Napier Rd	Ann Arbor Construction Co.	Pit 47-3	Pit 47-3	EB	0.42	0.46	0.44
					WB	0.37	0.40	0.38
I 82022-04950A	I 94 from US 24 east to Rouge River	Ajax Paving Industries, Inc.	E.C. Levy (Dix Yard)	E.C. Levy (Dix Yard)	EBOL	0.42	0.50	0.49
					EBCL	0.50	0.53	0.51
					EBIL	0.51	0.54	0.52
					WBOL	0.46	0.48	0.47
					WBCL	0.48	0.52	0.51
					WBIL	0.42	0.48	0.46
I 82022-06491A	I 94 from US 24 northeasterly, intermittently to Gratiot Ave	Ajax Paving Industries, Inc.	E.C. Levy (Dix Yard)	E.C. Levy (Dix Yard)	EBOL	0.41	0.44	0.43
					EBCL	0.45	0.45	0.45
					EBIL	0.47	0.48	0.48
					WBOL	0.40	0.45	0.42
					WBCL	0.37	0.40	0.38
					WBIL	0.39	0.44	0.42
Mtb 82101-05520A	M 14 (Plymouth Ave) from Manor Ave to Grand River Ave in Detroit	Ajax Paving Industries, Inc.	E.C. Levy (Dix Yard)	E.C. Levy (Dix Yard)	EBOL	0.45	0.48	0.47
					EBIL	0.50	0.54	0.52
					WBOL	0.47	0.50	0.48
					WBIL	0.50	0.52	0.51

TABLE 2 (Cont.)

BITUMINOUS CONCRETE PAVEMENTS (4.12) CONSTRUCTED IN 1972, 1973, 1974, AND 1975

1974 CONT.

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Coefficient of Wet Sliding Friction		
			Coarse	Fine		Low	High	Avg
U 82143-01317A	M 102 from east of DeQuindre east to Veach St	Bit Con Corp.	Pit 47-3	Pit 47-3	EBOL	0.41	0.44	0.42
					EB#3	0.40	0.44	0.42
					EB#2	0.41	0.44	0.42
					EBIL	0.41	0.42	0.42
					WBOL	0.39	0.40	0.40
					WB#3	0.41	0.42	0.42
					WB#2	0.41	0.45	0.42
					WBIL	0.41	0.44	0.42
U 82143-01318A	M 102 from Veach St east to Brock St (east of M 3)	Cooke Contracting Co.	Pit 63-4	Pit 50-35	EBOL	0.41	0.44	0.42
					EB#3	0.37	0.44	0.40
					EB#2	0.35	0.40	0.37
					EBIL	0.40	0.42	0.41
					WBOL	0.38	0.41	0.40
					WB#3	0.35	0.40	0.38
					WB#2	0.39	0.41	0.40
					WBIL	0.39	0.41	0.40
Mbr 82151-04855A	M 53 from 193 ft north of I 94 northerly to south of M 102	Cooke Contracting Co.	E.C. Levy (Dix Yard)	E.C. Levy (Dix Yard)	NBOL	0.39	0.45	0.43
					NBIL	0.32	0.48	0.40
					SBOL	0.33	0.42	0.37
					SBIL	0.41	0.48	0.45
UM 82192-06593A	M 39 from southeast of I 94 southeast to Roger St in Allen Park	Ajax Paving Industries, Inc.	E.C. Levy (Dix Yard)	E.C. Levy (Dix Yard)	NBOL	0.39	0.45	0.41
					NB#3	0.39	0.44	0.42
					NB#2	0.41	0.50	0.45
					NBIL	0.42	0.52	0.46
					SBOL	0.41	0.44	0.42
					SB#3	0.41	0.44	0.42
					SB#2	0.41	0.44	0.42
					SBIL	0.44	0.51	0.47
Mb 82192-06988A	M 39 southbound from southeast of Allen Rd southeast to Dix-Toledo Hwy	Ajax Paving Industries, Inc.	E.C. Levy (Dix Yard)	E.C. Levy (Dix Yard)	SBOL	0.46	0.51	0.48
					SB#3	0.50	0.54	0.52
					SB#2	0.53	0.54	0.53
					SBIL	0.52	0.58	0.55
Mbr 83031-07542A	US 131 in Cadillac from Howard St north to the Clam River	Reith-Riley Construction Co., Inc.	Pit 45-19	Pit 67-2	NBOL	0.37	0.41	0.39
					NBIL	0.39	0.41	0.40
					SBOL	0.38	0.41	0.40
					SBIL	0.40	0.40	0.40
T 98002-04730A	M 56 (Corumma Rd) at Dye Rd (Control Section 25081)	Spartan Asphalt Paving Co.	Pit 63-4	Pit 63-29	EBOL	0.35	0.38	0.36
					EBIL	0.47	0.48	0.47
					WBOL	0.40	0.41	0.41
					WBIL	0.45	0.47	0.46

TABLE 2 (Cont.)

BITUMINOUS CONCRETE PAVEMENTS (4.12) CONSTRUCTED IN 1972, 1973, 1974, AND 1975

	Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Coefficient of Wet Sliding Friction		
				Coarse	Fine		Low	High	Avg
1974 CONT.	T 98004-04607A	M 84 from Deindorfer St north to 300 ft north of Shattuck Rd (Control Section 73033)	Spartan Asphalt Paving Co.	Pit 17-40	Pit 63-29	NBOL	0.35	0.40	0.38
						NBIL	0.32	0.35	0.33
						SBOL	0.28	0.31	0.30
						SBIL	0.28	0.29	0.29
	I 11111-05862A	I 196 from I 94 north 4.9 miles to 550 ft south of Riverside Rd	John G. Yerington	Material Service, Thornton, Ill.	Pit 11-30	NBOL	0.39	0.50	0.44
						NBIL	0.50	0.55	0.52
						SBOL	0.37	0.42	0.41
						SBIL	0.47	0.50	0.48
	Mb 12061-07641A	M 60 from 539 ft west of M 66 east 15.26 miles to 17 Mile Rd	Globe Construction Co.	Pits 12-44 and 39-1	Pit 12-44	EB	0.41	0.50	0.46
						WB	0.42	0.51	0.46
	Mb 13043-07642A (part)	M 99 (Michigan Ave) from Superior St east 0.85 miles to east of Clark St	Tom Robinson and Son, et al	Pit 30-35	Pit 30-35	EB	0.47	0.51	0.49
						WB	0.51	0.52	0.51
	Mb 13043-07642A (part)	I 94 BL (Superior St) from Vine St northerly and westerly 0.75 miles to Broadwell St	Tom Robinson and Son, et al	Pit 30-35	Pit 30-35	EBOL	0.45	0.47	0.46
						EBIL	0.48	0.53	0.51
						WBOL	0.46	0.52	0.50
						WBIL	0.51	0.52	0.52
1975	Mb 27011-07666A (part)	US 2 BR from Montreal River northeast 1.25 miles to US 2	Mathy Construction Co.	Pit 27-12	Pit 27-12	NB	0.57	0.59	0.58
						SB	0.53	0.60	0.56
	Mb 27011-07666A (part)	US 2 from M 28 in Wakefield east 0.721 miles to 165 ft east of Bedell St (Control Section 27022)	Mathy Construction Co.	Pit 27-12	Pit 27-12	EB	0.48	0.57	0.53
						WB	0.53	0.55	0.54
	Mbr 30041-07671A	M 99 from 380 ft south of south limits of Hillsdale southeast to 475 ft east of M 34	Cunningham-Gooding	Pit 81-84	Pit 30-58	NB	0.44	0.48	0.46
						SB	0.39	0.42	0.41
	Mb 33082-07677A	M 43 from west limits of Williamston (Corwin Rd) east to 100 ft east of M 52 S	Spartan Asphalt Paving Co.	Pit 34-26	Pit 34-26	EB	0.44	0.50	0.47
						WB	0.40	0.50	0.46
	Mb 34032-07678A	M 66 from 71 ft south of Grand River Ave north to the Grand River (B01 of 34032) in Ionia	Reith-Riley Construction Co., Inc.	Pit 34-26	Pit 34-26	NB	0.45	0.47	0.46
						SB	0.35	0.53	0.45
	Mb 34033-07679A	M 66 from M 21 in Ionia north to M 44	Reith-Riley Construction Co., Inc.	Pit 34-26	Pit 34-26	NB	0.45	0.46	0.46
						SB	0.38	0.44	0.41
	HBS 37011-07794A	US 27 BR (Mission St) from north of Broomfield Rd north to north of Preston St in Mt. Pleasant	The Hicks Co.	Pit 37-26	Pit 37-26	NBOL	0.32	0.35	0.33
						NBIL	0.29	0.33	0.31
						SBOL	0.29	0.34	0.32
						SBIL	0.28	0.29	0.29
	Mb 41043-07690A	M 21 from 0.75 miles east of the Grand River east to Kent-Ionia County Line	Williams Bros. Asphalt Paving Co.	Pit. 41-50	Pit 34-45	EB	0.47	0.59	0.53
						WB	0.50	0.54	0.52

TABLE 2 (Cont.)

BITUMINOUS CONCRETE PAVEMENTS (4.12) CONSTRUCTED IN 1972, 1973, 1974, AND 1975

1975 CONT.

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Coefficient of Wet Sliding Friction		
			Coarse	Fine		Low	High	Avg
Mb 41061-07691A	M 11 from Riverbend Dr north to Remembrance	Grand Rapids Asphalt Paving Co.	Pit 41-50	Pit 41-50	NB SB	0.44 0.42	0.50 0.51	0.47 0.46
Mbr 44012-06103A (part)	M 24 from north branch of the Flint River (B03 of 44012) north to Lapeer-Tuscola County Line	Howell Construction Co.	Pit 63-4	Pit 63-4	NB SB	0.25 0.29	0.37 0.39	0.32 0.35
Mbr 44012-06103A (part)	M 24 from Lapeer-Tuscola County Line north to M 46 (Control Section 79051)	Howell Construction Co.	Pit 63-4	Pit 63-4	NB SB	0.31 0.32	0.40 0.46	0.36 0.39
Mb 52032-07702A	M 35 intermittently at four locations between County Rd #492 and County Rd #480	Payne and Dolan of Wisconsin, Inc.	Pit 52-39	Pit 52-39	NB SB	0.52 0.48	0.54 0.48	0.53 0.48
Mb 52041-07703A	US 41-M 28 from 0.41 miles west of Escanaba River thence east 0.566 miles	Payne and Dolan of Wisconsin, Inc.	Pit 52-39	Pit 52-39	EB WB	0.50 0.44	0.51 0.47	0.50 0.46
Mb 58111-07535A	M 50 (Elm St) from M 125 (Monroe St) east to Dixie Hwy	Cunningham-Gooding	E.C. Levy (Dix Yard)	E.C. Levy (Dix Yard)	EB WB	0.48 0.51	0.51 0.55	0.50 0.53
Mb 62031-07709A	M 37 from 150 ft north of Penoyer Creek in Newaygo north to south limits of White Cloud	Reith-Riley Construction Co., Inc.	Pits 41-48 and 41-121	Pit 41-121	NB SB	0.46 0.45	0.53 0.53	0.49 0.48
Mb 63051-06083A	Northbound M 1 (Woodward Ave) from Bennett St northwest to Trowbridge Rd	Cooke Contracting Co.	Pit 63-4	Pit 50-35	NBOL NB#3 NB#2 NBIL	0.39 0.37 0.34 0.39	0.45 0.42 0.41 0.42	0.42 0.40 0.39 0.40
Mbr 63071-07537A	M 15 from US 10 north to I 75	Ann Arbor Construction Co.	Pit 63-88	Pit 63-88	NB SB	0.50 0.50	0.54 0.51	0.53 0.50
Mb 70013-07715A	US 31 from 350 ft south of Taylor Rd northwest to 800 ft south of Ferris St	Muskegon Asphalt Paving Co.	Pit 70-9	Pit 70-9	SBOL SBIL	0.45 0.51	0.53 0.57	0.49 0.54
Mb 77011-07720A	M 19 from 110 ft south of Emmett northerly to Sullivan Drain (B02 of 77012) located approximately 1.25 miles north of Emmett	Molesworth Contracting Co.	Pit 63-4	Pit 74-51	NB SB	0.34 0.39	0.38 0.42	0.36 0.40
Mb 78042-07722A	M 60 from Main St east and north 0.75 miles to 5th St in Three Rivers	John G. Yerington	Pit 41-38	Pit 12-44	EB WB	0.46 0.42	0.51 0.48	0.48 0.45
Mtb 81082-06529A	M 17 from US 12 BR south and east to US 12	Thompson-McCully	Pit 47-3	Pit 81-1	EBOL EBIL WBOL WBIL	0.38 0.34 0.31 0.35	0.41 0.39 0.35 0.39	0.39 0.37 0.33 0.37

TABLE 2 (Cont.)

BITUMINOUS CONCRETE PAVEMENTS (4.12) CONSTRUCTED IN 1972, 1973, 1974, AND 1975

1975 CONT.

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Coefficient of Wet Sliding Friction		
			Coarse	Fine		Low	High	Avg
Mb 82062-07727A	US 12 from 635 ft west of Wyoming Ave east to Livernois Ave; US 12 from 28th St east to Hubbard Ave	Ajax Paving Industries, Inc.	Pit 81-28	Pit 47-15	EBOL	0.54	0.65	0.59
					EBCL	0.52	0.59	0.56
					EBIL	0.52	0.64	0.57
					WBOL	0.52	0.66	0.58
					WBCL	0.55	0.63	0.60
					WBIL	0.48	0.64	0.56
Mb 82071-07730A	US 24-Connector 3 from 1,020 ft south of West Rd northeast along US 24, thence northeast on Connector 3 to 2,100 ft southwest of I 75	Asphalt Products Corp.	E.C. Levy (Dix Yard)	E.C. Levy (Dix Yard)	NBOL	0.45	0.48	0.47
					NBIL	0.51	0.54	0.52
					SBOL	0.48	0.52	0.50
					SBIL	0.58	0.63	0.60
Mb 82141-06088A	M 102 from I 96 BS (Grand River Ave) east to US 24	Bit Con Corp.	Pit 47-3	Pit 47-3	EBOL	0.47	0.47	0.47
					EBCL	0.41	0.45	0.43
					EBIL	0.45	0.48	0.46
					WBOL	0.45	0.48	0.46
					WBCL	0.45	0.47	0.46
					WBIL	0.40	0.41	0.41

TABLE 3
BITUMINOUS AGGREGATE PAVEMENTS (4.11) CONSTRUCTED IN 1973, 1974, AND 1975

	Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Coefficient of Wet Sliding Friction		
				Coarse	Fine		Low	High	Avg
1973	F 66023-02905A	M 28 from 1,862 ft west of Ontonagon River east to 2,255 ft east of Ontonagon River	Fox Valley Construction Co.	Pit 66-79	--	EB WB	0.60 0.62	0.63 0.64	0.62 0.63
1974	Mb 01011-06122A (part)	M 65 from Hale north to M 72	Central Paving Co.	Pit 35-14	--	NB SB	0.44 0.45	0.56 0.59	0.51 0.52
	Mb 01011-06122A (part)	M 33 from Mio north to Fairview (Control Section 68012)	Central Paving Co.	Pit 35-14	--	EB WB	0.45 0.44	0.54 0.57	0.49 0.50
	Mbr 02011-06023A	US 41 from 3.8 miles north of M 67 south to 10.8 miles north of US 2	Payne and Dolan of Wisconsin, Inc.	Pit 52-39	--	NB SB	0.60 0.57	0.67 0.65	0.65 0.62
	Mb 02021-06024A	M 94 from M 67 east to 3 miles southwest of M 28	Payne and Dolan of Wisconsin, Inc.	Pit 2-1	--	EB WB	0.60 0.58	0.64 0.67	0.62 0.62
	Mbr 08011-06100A	M 43 from 200 ft south of Brush St north to 2,200 ft north of Cloverdale Rd	Reith-Riley Construction Co., Inc.	Pit 8-43	--	NB SB	0.38 0.37	0.39 0.38	0.38 0.38
	Mb 08011-07635A	M 43 from 2,200 ft north of Cloverdale Rd northb 3.86 miles to 75 ft south of Schultz Rd	Williams Bros. Asphalt Paving Co.	Pit 34-45	--	NB SB	0.57 0.56	0.59 0.58	0.58 0.57
	Mb 08031-06071A (part)	M 37 from Dowling Rd northb intermittently to 500 ft south of south limits of Hastings	Reith-Riley Construction Co., Inc.	Pit 8-43	--	NB SB	0.44 0.44	0.51 0.46	0.47 0.45
	Mb 08031-06071A (part)	M 66 from Brum Dr in Nashville north 0.451 miles (Control Section 08052)	Reith-Riley Construction Co., Inc.	Pit 8-43	--	NB SB	0.44 0.42	0.46 0.48	0.45 0.44
	Mb 10042-06125A	M 115 from 520 ft northwest of Wexford-Manistee County Line northwest to US 31	Hodgkiss and Douma, Inc.	Pit 51-8	--	EB WB	0.48 0.45	0.57 0.57	0.53 0.53
	Mb 11071-06128A (part)	M 140 from M 62 north 7.46 miles to Napier Ave	Consumers Asphalt Paving Co.	Pit 14-19	--	NB SB	0.43 0.43	0.47 0.48	0.45 0.45
	Mbr 14032-05920A	M 62 from M 60 in Cassopolis northwest to east limits of Dowagiac	Reith-Riley Construction Co., Inc.	Pit 14-36	--	NB SB	0.39 0.38	0.48 0.47	0.42 0.42
	Mb 16033-07528A	US 23 from Mackinaw City to Cheboygan	Lake Construction Co.	Pit 16-69	--	NB SB	0.45 0.42	0.53 0.53	0.49 0.48
	M 17011-05021A	M 123 from Tahquamenon River, north of Emerson, north to Paradise	Fox Valley Construction Co.	Pit 17-55	--	NB SB	0.50 0.52	0.54 0.58	0.52 0.52
	Mb 17021-06131A	M 134 from Chippewa-Mackinac County Line, 6.4 miles east of Cedarville, east to Dawson St in Detour.	Lake Construction Co.	Pit 49-53	--	EB WB	0.59 0.59	0.67 0.67	0.63 0.63
	Mbr 27023-06957A (part)	US 2 from Big Presque Isle River east 8.023 miles to Gogebic Station	Fox Valley Construction Co.	Pit 27-27	--	EB WB	0.65 0.64	0.70 0.68	0.68 0.66
	Mbr 27023-06957A (part)	M 64 from 9.4 miles north of US 2 north intermittently 3.3 miles (Control Section 27032)	Fox Valley Construction Co.	Pit 27-27	--	NB SB	0.69 0.72	0.72 0.73	0.70 0.72

TABLE 3 (Cont.)

BITUMINOUS AGGREGATE PAVEMENTS (4.11) CONSTRUCTED IN 1973, 1974, AND 1975

1974 CONT.

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Coefficient of Wet Sliding Friction		
			Coarse	Fine		Low	High	Avg
Mb 28071-08051A	M 113 from M 186 south 4.208 miles to US 131	Peninsula Asphalt Paving Co.	Pit 40-18	--	NB SB	0.47 0.42	0.54 0.47	0.51 0.45
Mbr 30012-05079A (part)	M 49 from Herring Rd, south limits of Litchfield, north to M 99	Cunningham-Gooding	Pit 30-58	--	NB SB	0.36 0.41	0.41 0.45	0.38 0.42
Mbr 30012-05079A (part)	M 99 from M 49 southeast to Adam Rd, in Litchfield (Control Section 30033)	Cunningham-Gooding	Pit 30-58	--	NB SB	0.43 0.39	0.48 0.42	0.46 0.40
Mb 30012-05924A	M 49 from US 12 north to south limits of Litchfield	Cunningham-Gooding	Pit 30-58	--	NB SB	0.60 0.58	0.62 0.58	0.61 0.58
Mbr 32022-06101A	M 142 from 250 ft west of Ruth Rd northeast to M 25, thence north on M 25 to Lytle St	Williams Bros. Asphalt Paving Co.	Pit 32-48	--	EB WB	0.51 0.53	0.57 0.57	0.53 0.54
Mb 32031-06078A	M 53 from Huron-Sanilac County Line north and east to north limits of Bad Axe	Williams Bros. Asphalt Paving Co.	Pit 32-48	--	NB SB	0.48 0.50	0.60 0.59	0.54 0.54
Mbr 36031-06549A	M 189 from Michigan-Wisconsin State Line north to Division St in Stambaugh	Mathy Construction Co.	Pit 36-47	--	NB SB	0.44 0.42	0.61 0.59	0.52 0.52
Mb 41121-07533A	M 46 from M 37 east to US 131	Williams Bros. Asphalt Paving Co.	Pit 41-120	--	EB WB	0.40 0.39	0.47 0.51	0.43 0.45
Mb 43012-06135A (part)	M 37 from Little Manistee River north 19.82 miles to #28 Rd	Globe Construction Co.	Pit 51-51	--	NB SB	0.40 0.44	0.63 0.65	0.55 0.55
Mb 43012-06135A (part)	M 55 from M 37 east 9.43 miles to #21 Rd (Control Section 83021)	Globe Construction Co.	Pit 51-51	--	EB WB	0.48 0.48	0.55 0.51	0.51 0.50
Mbr 44011-05569A	M 24 from 1.31 miles north of Lapeer-Oakland County Line north to M 21	Howell Construction Co.	Pit 44-8	--	NB SB	0.47 0.48	0.54 0.58	0.52 0.53
Mb 52042-06784A	US 41-M 28 from 376 ft west of 2nd St in Ishpeming east to 344 ft east of west limits of Marquette	Payne and Dolan of Wisconsin, Inc.	Pit 52-68	--	EBOL EBIL WBOL WBIL	0.43 0.48 0.49 0.45	0.56 0.60 0.54 0.63	0.50 0.55 0.51 0.56
Mb 54032-06136A	M 66 from M 46 north to the south branch of the Chippewa River in Barryton	The Hicks Co.	Pit 54-50	--	NB SB	0.50 0.54	0.57 0.60	0.54 0.57
SS 57023-00779A	M 55 relocation from the Missaukee-Wexford County Line east to M 66	Reith-Riley Construction Co., Inc.	Pit 33-57	--	EB WB	0.54 0.54	0.65 0.69	0.59 0.61
Mb 62012-06138A	M 20 from M 37 east and north to 1,965 ft north of 6 Mile Rd	Reith-Riley Construction Co., Inc.	Pit 62-33	--	EB WB	0.58 0.58	0.65 0.61	0.61 0.60
Mb 67022-06139A (part)	US 10, east from M 66	The Hicks Co.	Pit 54-45	--	EB WB	0.42 0.46	0.44 0.47	0.43 0.46
Mb 67022-06139A (part)	M 66, intermittently from US 10 to M 115 (Control Section 67031)	The Hicks Co.	Pit 54-45	--	NB SB	0.50 0.52	0.53 0.56	0.51 0.54

TABLE 3 (Cont.)

BITUMINOUS AGGREGATE PAVEMENTS (4.11) CONSTRUCTED IN 1973, 1974, AND 1975

	Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Coefficient of Wet Sliding Friction		
				Coarse	Fine		Low	High	Avg
1974 CONT.	Mb 67022-06139A (part)	M 115, 1.0 miles east of M 66 (Control Section 67051)	The Hicks Co.	Pit 54-45	--	EB	0.44	0.47	0.46
						WB	0.44	0.49	0.47
	SS 67062-00969A	M 61 relocation from M 115 east to the Muskegon River	The Hicks Co.	Pit 54-45	--	EB	0.57	0.62	0.59
						WB	0.58	0.65	0.61
	Mbr 69021-05919A	M 32 from 0.25 miles west of west limits of Gaylord west and north to US 131	Lake Construction Co.	Pit 69-46	--	EB	0.48	0.55	0.51
						WB	0.47	0.57	0.52
	Mb 72041-06141A	M 144 from 1,000 ft northeast of AuSable River northeast 6.837 miles to 0.9 northeast of Roscommon-Crawford County Line	Lake Construction Co.	Pit 72-12	--	NB	0.50	0.59	0.53
						SB	0.45	0.54	0.50
	Mb 74012-06086A	M 53 from M 46 north to M 81	Frank Strausberg and Son	Pit 74-10	--	NB	0.44	0.54	0.51
						SB	0.52	0.55	0.53
	Mbr 79011-05930A	M 138 from 35 ft north of Akron Rd north to 1,050 ft north of Ackerman Rd	Frank Strausberg and Son	Pit 79-49	--	NB	0.52	0.55	0.54
						SB	0.54	0.55	0.55
	Mb 79061-06124A (part)	M 81 from 380 ft west of Vassar Rd east to 100 ft west of Handy Rd	Midland Contracting Co.	Pits 25-30 and 25-54	--	EB	0.50	0.51	0.50
						WB	0.51	0.54	0.52
	Mb 79061-06124A (part)	M 138 from M 15 east to the Bay-Tuscola County Line (Control Section 09021)	Midland Contracting Co.	Pits 25-30 and 25-54	--	EB	0.50	0.60	0.54
						WB	0.41	0.57	0.50
	Mb 80071-06144A	M 40 from north of VanBuren St in Gobles north to 40 ft south of VanBuren-Allegan County Line	Klett Construction Co.	Pit 80-26	--	NB	0.31	0.36	0.34
						SB	0.30	0.33	0.32
	Mb 81013-06146A	M 52 from 100 ft north of US 12 north to 25 ft south of Duncan St in Manchester	Cunningham-Gooding	Pit 81-84	--	NB	0.45	0.48	0.46
						SB	0.42	0.46	0.44
1975	Mb 02031-07625A	M 67 from 2.88 miles east of US 41 north 9.091 miles to M 94	Payne and Dolan of Wisconsin, Inc.	Pit 2-45	--	NB	0.50	0.59	0.55
						SB	0.54	0.61	0.59
	DPF 02041-00012A	M 28 from 3.3 miles east of Alger-Marquette County Line east to 1,500 ft east of Deer Lake	Payne and Dolan of Wisconsin, Inc.	Pit 2-45	--	EBTL	0.61	0.65	0.63
						EB	0.64	0.69	0.66
						WBTL	0.59	0.60	0.59
						WB	0.59	0.66	0.63
	Mb 07011-07632A (part)	US 141 from old US 141 south 2.197 miles	Mathy Construction Co.	Pits 31-4 and 31-72	--	NB	0.48	0.54	0.52
						SB	0.55	0.58	0.57
	Mb 07011-07632A (part)	M 28 from Baraga-Houghton County Line east 6.41 miles (Control Section 07021)	Mathy Construction Co.	Pits 31-4 and 31-72	--	EB	0.29	0.38	0.34
						WB	0.27	0.37	0.32
	Mb 07011-07632A (part)	M 38 from Baraga-Houghton County Line east 0.94 miles (Control Section 07041)	Mathy Construction Co.	Pits 31-4 and 31-72	--	EB	0.48	0.51	0.50
						WB	0.42	0.46	0.45
	Mb 07011-07632A (part)	M 26 from CR RR crossing (G01 of 31011) east of Houghton-Ontonagon County Line east 3.772 miles to Lake Roland (Control Section 31011)	Mathy Construction Co.	Pits 31-4 and 31-72	--	NB	0.38	0.39	0.39
						SB	0.34	0.37	0.35

TABLE 3 (Cont.)

BITUMINOUS AGGREGATE PAVEMENTS (4.11) CONSTRUCTED IN 1973, 1974, AND 1975

1975 CONT.

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Coefficient of Wet Sliding Friction		
			Coarse	Fine		Low	High	Avg
Mb 07011-07632A (part)	M 28 from Sidnaw east to Houghton-Baraga County Line (Control Section 31021)	Mathy Construction Co.	Pits 31-4 and 31-72	--	EB WB	0.50 0.51	0.52 0.54	0.51 0.53
Mb 14051-07647A	M 40 from M 60 north to curb and gutter in Marcellus	Klett Construction Co.	Pit 14-51	--	NB SB	0.42 0.44	0.45 0.50	0.44 0.47
Mb 14051-07648A	M 40 from Section St in Marcellus north to 4th St in Lawton	Klett Construction Co.	Pits 14-51 and 80-20	--	NB SB	0.39 0.41	0.52 0.47	0.44 0.44
Mb 27051-07667A	US 45 from US 2 at Watersmeet north 4.856 miles to Gogebic-Ontonagon County Line	Mathy Construction Co.	Pit 27-20	--	NB SB	0.45 0.45	0.50 0.47	0.47 0.46
Mbr 30033-07670A	M 99 from US 12 north to north limits of Jonesville	Cunningham-Gooding	Pit 30-58	--	NB SB	0.39 0.32	0.41 0.38	0.40 0.34
Mb 31031-07674A	M 203 from 0.6 miles south of Swedetown Creek north to a point near the entrance to Portage Canal	George Hocking Construction Co.	Pit 31-66 and Mason Stamp Sand	--	NB SB	0.55 0.58	0.63 0.61	0.59 0.60
Mb 38073-07686A	M 50 from Clinton Rd northwest to M 99	Richardson Asphalt Corp.	Pit 37-78	--	NB SB	0.34 0.37	0.55 0.48	0.45 0.43
Mbr 40022-07687A	M 72 from 550 ft east of M 66 east to Kalkaska-Crawford County Line	Reith-Riley Construction Co.,	Pit 40-15	--	EB WBTL WB	0.23 0.33 0.21	0.31 0.37 0.37	0.25 0.36 0.30
Mbr 44012-06103A (part)	M 24 from Columbiaville Rd north to the north branch of the Flint River (B03 of 44012)	Howell Construction Co.	Pit 44-8	--	NB SB	0.19 0.22	0.26 0.29	0.23 0.26
Mb 47121-07698A	M 155 from Howell State Hospital northeast to 800 ft east of I 96	Howell Construction Co.	Pit 47-26	--	EB WB	0.39 0.40	0.41 0.46	0.40 0.43
Mb 55031-07706A	M 35 from 16.1 miles northeast of US 41 northeast 18.51 miles to 1.415 miles northeast of Menominee-Delta County Line omitting 2.536 miles of concrete pavement at the Cedar River	Payne and Dolan of Wisconsin, Inc.	Pit 55-105	--	NB SB	0.40 0.42	0.57 0.55	0.47 0.49
Mb 59041-07708A	M 82 from 300 ft west of the Montcalm-Newaygo County Line east to US 131	Woodland Paving Co.	Pit 41-70	--	EB WB	0.35 0.16	0.40 0.33	0.38 0.26
Mbr 65051-07714A	M 33 from 381 ft south of Maple Ridge Rd north to M 55	Central Paving Co.	Pit 65-7	--	NB SB	0.31 0.32	0.40 0.41	0.35 0.38
Mb 79011-07723A	M 138 from Tuscola-Bay County Line east and north to 200 ft south of Oakley Rd	Frank Strausberg and Son	Pit 79-10	--	EB WB	0.39 0.40	0.55 0.53	0.48 0.47
Mb 83013-07669A	M 37 from M 115 north to M 113	Peninsula Asphalt Corp.	Pit 45-19	--	NBTL NB SB	0.41 0.25 0.23	0.41 0.37 0.41	0.41 0.31 0.32

TABLE 4
MISCELLANEOUS BITUMINOUS SURFACES CONSTRUCTED IN 1975

	Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Coefficient of Wet Sliding Friction		
				Coarse	Fine		Low	High	Avg
1975	Open Graded Plant Mix Seal								
	Ms 73112-09446A	I 75 from 120 ft south of M 13 northwesterly to 100 ft south of Adam St	Saginaw Asphalt	Pit 47-3	--	NBOL	0.46	0.48	0.47
						NBIL	0.40	0.44	0.43
						SBOL	0.46	0.47	0.46
						SBIL	0.42	0.45	0.44
	T 98058-08773A	M 53 from Red Run Drain north to 14 Mile Rd (Control Section 50011)	Ajax Paving Industries, Inc.	Pit 63-5	--	NBOL	0.41	0.42	0.41
						NBCL	0.41	0.42	0.42
						NBIL	0.40	0.41	0.40
						SBOL	0.34	0.35	0.35
						SBCL	0.35	0.38	0.37
						SBIL	0.38	0.40	0.39

TABLE 5
CONVENTIONAL CONCRETE AND BITUMINOUS PAVEMENT
SUMMARY FOR THE 1975 TEST YEAR

Surface Type	Service Year When Tested	Total Lanes Tested	Total Lane Miles Tested	Average Friction Level
Concrete	Initial	14	36.434	0.61
	1	117	328.308	0.61
	2	6	23.864	0.56
Bituminous Concrete	Initial	76	294.716	0.46
	1	257	832.545	0.46
	2	24	88.984	0.55
	3	4	10.912	0.42
Bituminous Aggregate	Initial	46	335.764	0.44
	1	88	745.638	0.52
	2	2	1.626	0.62
Open Graded Plant Mix	Initial	10	7.968	0.41

SECTION II

FIVE-YEAR SKID TEST RESULTS FOR CONCRETE AND BITUMINOUS PAVEMENTS

Five-Year Skid Test Results for Concrete and Bituminous Pavements

Table 6 - Concrete Pavements

Table 6 contains skid test results for 20 portland cement concrete projects consisting of 98 lanes (186.984 lane miles) which were constructed in 1970. Initial service year tests were conducted on six of these projects and resulting Wsf values averaged 0.54. Thirteen of the projects were first tested in 1971, after a one-year service period, and friction levels on these averaged 0.49. One project was not initially tested until 1975. All projects were retested at the five-year service level except Project Mtb 82144-018 which was no longer on a state trunkline. Five-year Wsf values for the 94 lanes tested averaged 0.41. Forty-eight lanes, 29.5 percent of the total lane mileage, had friction levels averaging below 0.41; 1.3 percent, three lanes of Project Ms 63031-01842A, averaged below 0.30. This project is located on US 24 between Exeter Dr and Shallow Brooks Dr in Oakland County.

Table 7 - Bituminous Concrete Pavements

Table 7 lists skid test results of 38 bituminous concrete (4.12) projects constructed during 1970. In all, 134 lanes (508.156 lane miles) were tested. Average coefficients of friction determined initially and after a one-year service period were 0.51 and 0.54, respectively. Skid tests were conducted again in 1975, after five service years on 36 projects. Five-year Wsf values ranged from 0.18 to 0.66 and averaged 0.48. Six lanes, representing 1.8 percent of the 490.555 five-year lane mileage, averaged lower than 0.30. These six lanes were confined to two projects, i.e., Mb 41031-00576A located on M 45 between the west limits of Grand Rapids and Bridge St and Project U 44011-003 located on M 24 from Turrill Rd north to north of Pearl St. One lane on the M 45 project had an average Wsf value of 0.18.

Table 8 - Bituminous Aggregate Pavements

Table 8 contains skid test results from 15 bituminous aggregate (4.11) projects of which 42 lanes (146.084 lane miles) were tested. Forty of the lanes were tested during their initial service year; the average Wsf value was 0.42. The remaining two lanes were tested after a one-year service period and resulting skid tests yielded an average friction level of 0.50. Eleven projects were retested after a five-year service period and Wsf values averaged 0.53. Two of the 24 lanes tested in 1975 averaged below 0.40; both lanes were from Project Mb 48032-005 located on M 123 between the south village limits of Newberry and Helen St. They represent 1.2 percent of the 133.784 lane miles tested.

Table 9 lists skid test values for five stone-filled, sand-asphalt projects (55.615 lane miles) which were constructed in 1970. Initial service year Wsf values averaged 0.52. Retests at the five-year level were made on four projects and an average friction level of 0.50 was determined. Three lanes, representing 4.2 percent of the five-year lane mileage, had Wsf values averaging below 0.40.

Figures 1 through 3 graphically show results of linear regressions on one-year (x) and five-year (y) Wsf values for construction years 1963 through 1970. Departure from a one to one relationship is indicated by the divergency of the regression line from the dashed 45° line shown. In Figure 3, no regression line has been shown for the 1970 construction year because only two lanes were tested at the one-year service level.

TABLE 6
CONCRETE PAVEMENTS CONSTRUCTED IN 1970

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Average Coefficient of Wet Sliding Friction		
			Coarse	Fine		1970	1971	1975
I 13074-001 (00166A)	I 69 from north side of I 94 interchange north to 0.5 miles north of "N Dr N"	Eisenhour Construction Co.	Pits 12-43, 12-44, 30-35, 41-46 and 41-69	Pits 12-43 and 12-44	NBOL	--	0.58	0.44
					NBIL	--	0.58	0.64
					SBOL	--	0.68	0.48
					SBIL	--	0.69	0.67
I 13074-002 (00167A)	I 69 from 0.5 miles north of "N Dr N" north to Calhoun-Eaton County Line	Eisenhour Construction Co.	Pits 12-43, 12-44, 30-35, 41-46, and 41-69	Pits 12-43 and 12-44	NBOL	--	0.65	0.46
					NBIL	--	0.70	0.66
					SBOL	--	0.67	0.36
					SBIL	--	0.71	0.60
F 23012-009	US 27-M 78 southbound from 1,000 ft northeast of east city limits of Charlotte northeast to 1,500 ft northeast of Packard Rd	Carl Goodwin and Sons, Inc.	Pit 8-80	Pit 8-80	SBOL	--	0.31	0.36
					SBIL	--	0.51	0.48
F 25084-003 (00344A)	M 78 relocation from 0.5 miles east of M 15 east to Genesee-Lapeer County Line	Sargent Contracting Co.	Pit 63-4	Pit 63-4	EBOL	--	0.51	0.40
					EBIL	--	0.61	0.57
					WBOL	--	0.64	0.33
					WBIL	--	0.66	0.55
F 32092-004	US 25 from M 53 easterly to Huron City	Sargent Contracting Co.	Pit 32-4	Pit 79-73	EB	0.54	--	0.51
					WB	0.58	--	0.61
I 33044-057 (00454A)	I 496 from 140 ft west of Jenison St east to west city limits of East Lansing	Eisenhour Construction Co.	Pits 34-53, 41-46 and 63-48	Pits 19-33, 19-48 and 76-47	EBOL	--	0.32	0.42
					EBIL	--	0.39	0.45
					WBOL	--	0.31	0.40
					WBIL	--	0.40	0.47
F 44043-001	M 78 relocation from Genesee-Lapeer County Line (Washburn Rd) easterly to 1,253 ft east of Golf Rd	L. W. Edison Co.	Pit 63-4	Pit 63-4	EBOL	0.60	--	0.40
					EBIL	0.59	--	0.55
					WBOL	0.60	--	0.35
					WBIL	0.60	--	0.51
F 44043-002 (00627A)	M 78 relocation from 1,253 ft east of Golf Rd east to 1,727 ft east of M 24	Cooke Contracting Co.	Pit 63-4	Pit 63-4	EBOL	--	0.55	0.44
					EBIL	--	0.65	0.57
					WBOL	--	0.62	0.38
					WBIL	--	0.59	0.54
Ms 63031-020	US 24 (Telegraph Rd) from approximately 1,400 ft north of 14 Mile Rd northerly to approximately 2,670 ft north of 15 Mile Rd (Maple Rd)	Anderson and Ruzzin, Inc.	E.C. Levy (Dix Yard)	Pit 63-55	NBOL	0.48	--	0.40
					NB#3	0.44	--	0.38
					NB#2	0.39	--	0.34
					NBIL	0.47	--	0.40
					SBOL	0.51	--	0.35
					SB#3	0.47	--	0.35
					SB#2	0.51	--	0.39
					SBIL	0.54	--	0.38

TABLE 6 (Cont.)
CONCRETE PAVEMENTS CONSTRUCTED IN 1970

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Average Coefficient of Wet Sliding Friction		
			Coarse	Fine		1970	1971	1975
Ms 63031-021 (01842A)	US 24 (Telegraph Rd) from 620 ft south of Exeter Dr north to north of Shallow Brooks Dr	D. J. McQuestion and Sons and Thompson-McCully Asphalt Paving Co.	Pit 63-7	Pit 63-7	NBOL	--	0.38	0.44
					NB#3	--	0.30	0.31
					NB#2	--	0.29	0.29
					NBIL	--	0.30	0.30
					SBOL	--	0.29	0.29
					SB#3	--	0.38	0.27
					SB#2	--	0.28	0.30
					SBIL	--	0.31	0.36
F 65033-001	I 75 BL from Cooke Rd, at I 75 interchange, northeasterly to M 76	Eisenhour Construction Co.	Pit 65-7	Pit 65-7	NB	0.60	--	0.35
					SB	0.58	--	0.37
I 65041-002	I 75 from south Ogemaw County Line northwesterly to southeast of Cooke Rd	Eisenhour Construction Co.	Pit 65-7	Pit 65-7	NBOL	0.54	--	0.39
					NBIL	0.59	--	0.52
					SBOL	0.66	--	0.42
					SBIL	0.62	--	0.60
I 73101-024 (01017A)	I 675 from 165 ft west of 14th St west to Washington Ave., City of Saginaw	Sargent Contracting Co.	Pit 71-47	Pit 79-73	NBOL	--	0.50	0.36
					NBIL	--	0.55	0.53
					SBOL	--	0.57	0.32
					SBIL	--	0.55	0.46
I 73101-066 (01022A) I 73101-067 (01023A)	I 675 from 250 ft south of Ash St north to 163 ft south of Schust Rd	Denton Construction Co.	Pit 71-47	Pits 63-54 and 79-73	NBOL	--	0.53	0.40
					NBIL	--	0.58	0.48
					SBOL	--	0.47	0.37
					SBIL	--	0.59	0.43
U 80033-001 (02543A) (part)	M 140 (LaGrange St) from 950 ft south of Aylworth Ave north to Phillips St	Titus Construction Co.	Pit 70-9	Pit 70-9	NBOL	--	0.47	0.38
					NBIL	--	0.37	0.34
					SBOL	--	0.42	0.36
					SBIL	--	0.30	0.35
U 80033-001 (02543A) (part)	M 43-M 140 (Phillips St) from LaGrange St northwest to Broadway St	Titus Construction Co.	Pit 70-9	Pit 70-9	NBOL	--	0.43	0.38
					NBIL	--	0.29	0.34
					SBOL	--	0.46	0.37
					SBIL	--	0.34	0.35
U 80033-001 (02543A) (part)	I 196 BL (Phoenix St) from Broadway St east to US 31	Titus Construction Co.	Pit 70-9	Pit 70-9	NBOL	--	0.40	0.45
					NBIL	--	0.41	0.35
					SBOL	--	0.43	0.43
					SBIL	--	0.43	0.35
U 81083-001 (02544A)	US 12 BR (Hamilton and Huron Sts) from Monroe St northerly to Michigan Ave	Thompson-McCully Asphalt Paving Co.	Pit 81-57	Pit 81-57	NBOL	--	0.58	0.34
					NBCL	--	0.49	0.35
					NBIL	--	0.54	0.39
					SBOL	--	0.59	0.37
					SBCL	--	0.46	0.33
					SBIL	--	0.54	0.41

TABLE 6 (Cont.)
CONCRETE PAVEMENTS CONSTRUCTED IN 1970

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Average Coefficient of Wet Sliding Friction		
			Coarse	Fine		1970	1971	1975
U 82062-013 (01185A)	US 12 (Michigan Ave) at M 39 (Southfield Rd)	Eisenhour Construction Co.	E.C. Levy (Dix Yard)	Pits 47-3 and 63-55	EBOL	--	0.46	0.30
					EB#3	--	0.45	0.33
					EB#2	--	0.51	0.35
					EBIL	--	0.54	0.42
					WBOL	--	0.55	0.38
					WB#3	--	0.50	0.35
					WB#2	--	0.45	0.34
					WBIL	--	0.46	0.33
BI 82124-001 (01298A)	I 96 from south of Warren Ave to north of Myrtle St., City of Detroit	Cooke Contracting Co.	E.C. Levy (Dix Yard)	Pit 63-7	EBRT	--	--	0.45
					EBOL	--	--	0.37
					EB#3	--	--	0.42
					EB#2	--	--	0.38
					EBIL	--	--	0.40
					WBRT	--	--	0.45
					WBOL	--	--	0.40
					WB#3	--	--	0.41
					WB#2	--	--	0.43
					WBIL	--	--	0.56
Mtb 82144-018	M 29 from Sunningdale Ave easterly to east limits of Grosse Pointe Woods	T. Angelo Cement Construction Co.	E.C. Levy (Dix Yard)	Pit 63-88	EBOL	0.57		
					EBIL	0.54	Turned back to county	
					WBOL	0.42		
					WBIL	0.43		

TABLE 7
BITUMINOUS CONCRETE (4.12) CONSTRUCTED IN 1970

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Average Coefficient of Wet Sliding Friction		
			Coarse	Fine		1970	1971	1975
RF 01051-001	US 23 from Iosco-Alcona County Line northerly to north of the south limits of Harrisville	Central Paving Co.	Pit 71-15	Pit 71-15	NB SB	0.54 0.55	-- --	0.56 0.50
Mb 03072-006	M 40 from Sherman St in the City of Allegan northwesterly to city limits of Holland, omitting from 125th Ave to 136th Ave and from 3,715 ft southeast of Holland city limits northwesterly 2,700 ft	Reith-Riley Construction Co., Inc.	Pit 39-1	Pit 03-76	NB SB	0.47 0.48	-- --	0.58 0.60
Mb 11021-012 (01714A)	US 12 from 1.75 miles east of Galien easterly 8.35 miles to west of US 12 BR	John Yerington Co.	Pit 41-38	Pit 14-36	EB WB	0.57 0.54	-- --	0.58 0.58
Mb 13031-018	M 66 from 100 ft south of "L" Dr northerly to 350 ft north of "E" Dr	Reith-Riley Construction Co., Inc.	Pit 39-1	Pit 13-38	NB SB	0.46 0.50	-- --	0.58 0.57
Mb 13071-011	Kalamazoo Ave (old US 27) from 0.5 miles south of Hughes Rd northerly to US 27 BR - I 94 BL (Michigan Ave)	Reith-Riley Construction Co., Inc.	Pit 39-1	Pit 13-38	NB SB	0.42 0.52	Turned back to county	
Mb 13072-005	US 27 BR (Kalamazoo Ave and Brewer St) from US 27 BR-I 94 BL (Michigan Ave) northerly to I 94 interchange	Reith-Riley Construction Co., Inc.	Pit 39-1	Pit 13-38	NB SB	0.50 0.50	-- --	0.52 0.53
Mb 14041-01707A	US 12 from east village limits of Edwardsburg easterly 6.88 miles to 275 ft west of M 205 intersection	Reith-Riley Construction Co., Inc.	Pit 39-1	Pit 14-36	EB WB	0.42 0.44	-- --	0.62 0.59
Mb 19031-008	US 27 from 1,350 ft south of Herbison Rd northerly to 3,125 ft north of Round Lake Rd	Spartan Asphalt Paving Co.	Pit 47-3	Pit 47-43	NBOL NBIL SBOL SBIL	0.50 0.58 0.49 0.55	-- -- -- --	0.50 0.58 0.48 0.58
Mb 19061-005 (01472A)	M 21 (State St) from 180 ft west of the west city limits of St. Johns east to 220 ft east of Scott Rd	Spartan Asphalt Paving Co.	Pit 47-3	Pit 47-43	EB WB	-- --	0.43 0.47	0.39 0.42
I 20052-001	I 75 from Roscommon-Crawford County Line (M 18-M 76) northerly to 4 Mile Rd	Lake and Howell Construction Co.	Pit 72-5	Pit 72-5	NBOL NBIL SBOL SBIL	0.60 0.58 0.60 0.61	-- -- -- --	0.64 0.64 0.60 0.64
Mb 23052-002 (00290A) (part)	M 50 from M 43 southeast to M 78 in Charlotte	Spartan Asphalt Paving Co.	Pit 41-38	Pit 34-49	NWB SEB	0.45 0.43	-- --	0.66 0.66
Mb 23052-002 (00290A) (part)	M 50 from Flanders Rd, east of Charlotte, southeasterly to M 99 in Eaton Rapids	Spartan Asphalt Paving Co.	Pit 41-38	Pit 34-49	NWB SEB	0.48 0.46	-- --	0.58 0.61

TABLE 7 (Cont.)
BITUMINOUS CONCRETE (4.12) CONSTRUCTED IN 1970

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Average Coefficient of Wet Sliding Friction		
			Coarse	Fine		1970	1971	1975
Mb 25072-014 (01764A)	M 53 (Dort Hwy) from north of Bristol Rd north to Manitou St, City of Flint	Spartan Asphalt Paving Co.	Pit 47-3	Pit 63-54	NBOL	--	0.46	0.38
					NBIL	--	0.43	0.46
					SBOL	--	0.41	0.40
					SBIL	--	0.46	0.45
Mb 33042-011 (part)	Eastbound M 43 (Saginaw St) from west of Logan St easterly to east of Capitol Ave, City of Lansing	Reith-Riley Construction Co., Inc.	Pit 47-3	Pit 23-92	EBOL	0.50	--	0.38
					EB#3	0.51	--	0.37
					EB#2	0.51	--	0.40
					EBIL	0.49	--	0.40
Mb 33042-011 (part)	Eastbound M 43-M 78 BR from Pennsylvania Ave easterly to westbound M 43-M 78 BR (Grand River Ave), City of Lansing	Reith-Riley Construction Co., Inc.	Pit 47-3	Pit 23-92	EBOL	0.44	--	0.43
					EB#3	0.42	--	0.44
					EB#2	0.44	--	0.47
					EBIL	0.43	--	0.48
Ms 33082-021 (00480A)	M 43 from 767 ft west of Okemos Rd east to 961 ft east of Marsh Rd	Spartan Asphalt Paving Co.	Pit 47-3	Pit 47-3	EBOL	--	0.59	0.47
					EBIL	--	0.54	0.47
					WBOL	--	0.64	0.46
					WBIL	--	0.59	0.46
SS 39081-010	M 43 from 0.2 miles west of US 131 easterly to Sage St in Kalamazoo	Reith-Riley Construction Co., Inc.	Pit 39-1	Pit 39-1	EBOL	0.50	--	0.61
					EBIL	0.50	--	0.59
					WBOL	0.43	--	0.53
					WBIL	0.47	--	0.60
Mb 41031-005 (00576A) (part)	M 37 from Kraft Rd northwesterly to 1,000 ft south of M 11 (28th St)	Woodland Paving Co.	Pit 41-38	Pit 41-27	NB	0.56	--	0.54
					SB	0.48	--	0.51
Mb 41031-005 (00576A) (part)	M 44 from 1,700 ft south of Burton St northerly to 514 ft south of Lake Dr	Woodland Paving Co.	Pit 41-38	Pit 41-27	NB	0.56	--	0.55
					SB	0.51	--	0.52
Mb 41031-005 (00576A) (part)	M 45 from west city limits of Grand Rapids easterly to Bridge St	Woodland Paving Co.	Pit 41-38	Pit 41-27	EBOL	0.52	--	0.18
					EBIL	0.57	--	0.21
					WBOL	0.53	--	0.21
					WBIL	0.59	--	0.24
SS 41101-002	M 44 (Belding Rd) from Ramsdell Dr easterly to 217 ft east of Lincoln Lake Ave	Reith-Riley Construction Co., Inc.	Pit 41-69	Pit 41-113	EB	0.51	--	0.58
					WB	0.52	--	0.59
Mb 43021-001 (01562A)	US 10 from 1,229 ft northwest of Campbell Rd, in Mason County, east to M 37 in Lake County	Reith-Riley Construction Co., Inc.	Pit 62-33	Pit 62-33	EB	--	0.63	0.62
					WB	--	0.65	0.61

TABLE 7 (Cont.)
BITUMINOUS CONCRETE (4.12) CONSTRUCTED IN 1970

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Average Coefficient of Wet Sliding Friction		
			Coarse	Fine		1970	1971	1975
U 44011-003	M 24 (Lapeer Rd) from Turrill Rd northerly to north of Pearl St	Cooke Contracting Co.	Pit 50-35	Pit 50-35	NBOL	0.49	--	0.29
					NBIL	0.58	--	0.41
					SBOL	0.44	--	0.27
					SBIL	0.53	--	0.41
Mtb 44041-004	M 21 (Genesee St) from Millville Rd (west city limits of Lapeer) easterly to M 24 (Main St)	Ajax Asphalt Paving, Inc.	Pit 63-4	Pit 63-4	EBOL	0.47		
					EBIL	0.51	Turned back to county	
					WBOL	0.45		
					WBIL	0.47		
Mb 44042-003	M 21 from 110 ft east of Dorrow Rd easterly to 220 ft east of Cade Rd	Molesworth Contracting Co.	Pit 63-4	Pit 74-51	EB	0.49	--	0.56
					WB	0.45	--	0.55
Mb 44042-004	M 21 at east city limits of Lapeer easterly to Dorrow Rd	Williams Bros. Asphalt Paving Co.	Pit 63-4	Pit 63-4	EB	0.58	--	0.53
					WB	0.57	--	0.52
Mb 50051-033	US 25 (Gratiot Ave) from 14 Mile Rd northeasterly to Sunnyview St	Detroit Asphalt Paving Co.	Pit 47-3	Pit 50-41	SBOL	0.43	--	0.37
					SB#3	0.46	--	0.38
					SB#2	0.47	--	0.35
					SBIL	0.50	--	0.36
Mb 50051-037 (01702A)	US 25 from 1,160 ft north of Easy St, northeast to 168 ft north of 21 Mile Rd	Ward and VanNuck, Inc.	Pits 50-35 and 63-4	Pit 50-35	NBOL	--	0.50	0.51
					NBIL	--	0.59	0.56
					SBOL	--	0.50	0.47
					SBIL	--	0.62	0.53
Mb 56021-005	M 20 from 61 ft west of Isabella-Midland County Line easterly to 76 ft east of Castor Rd	The Hicks Co.	Pit 37-26	Pit 37-26	EB	--	--	0.56
					WB	--	--	0.54
Mb 58053-003	US 24 from 50 ft south of Stoney Creek Bridge in Monroe County northeasterly to Carter Rd in Wayne County omitting at Huron River Bridge, in Flatrock and at West Rd intersection	Ayling-Cunningham Asphalt Paving Co. and Detroit Asphalt Paving Co.	E.C. Levy (Dix Yard) and Pit 47-3	E.C. Levy (Dix Yard) and Pit 47-3	NBOL	0.56	--	0.38
					NBIL	0.60	--	0.46
					SBOL	0.54	--	0.40
					SBIL	0.57	--	0.44
F 61012-002	M 120 from village limits of Holton northeasterly to M 82 junction	Paul C. Miller	Pit 70-9	Pit 70-9	NB	0.44	--	0.61
					SB	0.42	--	0.58
Mb 62031-012 (01610A)	M 37-M 46 from north of Grant north to south of 96th St	Paul C. Miller	Pit 70-9	Pit 70-9	NB	0.61	--	0.56
					SB	0.63	--	0.49
Mb 63041-017 (01623A)	M 59 from Tipico Lake Rd east to Williams Lake Rd, omitting at Duck Lake Rd	Detroit Concrete Products Corp.	Pit 47-3	Pit 63-48	EB	--	0.54	0.47
					WB	--	0.51	0.47
Mb 63051-033	Southbound US 10 (Woodward Ave) from Webster Rd (Royal Oak-Berkley city limits) southeasterly to Fielding Ave, omitting from Harrison St to Oakland Park Blvd	A and A Asphalt Paving Co., Inc.	Pit 63-4	Pit 63-4	SBOL	0.49	--	0.42
					SB#3	0.52	--	0.43
					SB#2	0.51	--	0.44
					SBIL	0.58	--	0.44

TABLE 7 (Cont.)

BITUMINOUS CONCRETE (4.12) CONSTRUCTED IN 1970

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Average Coefficient of Wet Sliding Friction		
			Coarse	Fine		1970	1971	1975
Mb 67051-002 (01613A)	M 115 from 1.51 miles northwest of M 61 southeasterly to M 66	Hodgkiss and Douma, Inc.	Pit 67-2	Pit 67-2	EB	0.39	--	0.61
					WB	0.40	--	0.61
I 72061-001 (00993A)	I 75 from 9 Mile Hill Rd north 6.17 miles to west of M 18 structure	Hodgkiss and Douma, Inc.	Pit 65-7	Pit 72-5	NBOL	--	0.66	0.61
					NBIL	--	0.65	0.64
					SBOL	--	0.60	0.60
					SBIL	--	0.65	0.63
Mb 73051-003 (01004A) (part)	M 13 from 150 ft south of East St-Washington St intersection thence northerly to 5th Ave, City of Saginaw	Saginaw Asphalt Paving Co.	Pit 47-3	Pit 63-54	NBOL	0.49	--	0.36
					NBIL	0.52	--	--
					SBOL	0.48	--	0.39
					SBIL	0.50	--	0.40
Mb 73051-003 (01004A) (part)	M 13 from 538 ft north of westbound M 81 northerly to north city limits of Saginaw	Saginaw Asphalt Paving Co.	Pit 47-3	Pit 63-54	NBOL	0.49	--	0.46
					NBIL	0.53	--	0.46
					SBOL	0.47	--	0.42
					SBIL	0.48	--	0.46
Mb 73051-003 (01004A) (part)	M 81 from 28th St easterly to 261 ft east of Outer Dr	Saginaw Asphalt Paving Co.	Pit 47-3	Pit 63-54	EB	0.44	--	0.51
					WB	0.44	--	0.52
Mb 77021-001	M 21 from east of Lapeer-St. Clair County Line easterly to east of Sheridan Rd, omitting from 130 ft west of M 21-Imlay City Dr to 190 ft east of Conners Rd	Molesworth Contracting Co.	Pit 50-35	Pit 74-51	EB	0.56	--	0.55
					WB	0.55	--	0.55
U 82081-023	M 153 (Ford Rd) from 299 ft east of Appoline St easterly to Wyoming, Cities of of Detroit and Dearborn	Ajax Asphalt Paving, Inc.	E.C. Levy (Dix Yard)	E.C. Levy (Dix Yard)	EBOL	0.52	--	0.39
					EBCL	0.55	--	0.37
					EBIL	0.59	--	0.40
					WBOL	0.64	--	0.31
					WBCL	0.60	--	0.38
					WBIL	0.62	--	0.39
M 82101-014 (02593A)	M 14 from Inkster Rd east to Telegraph Rd	A and A Asphalt Paving Co.	Pit 47-3	Pit 63-7	EBOL	--	0.45	0.47
					EBIL	--	0.48	0.47
					WBOL	--	0.40	0.48
					WBIL	--	0.47	0.48
Mtb 82144-018	M 29 from Sunningdale Ave easterly to east limits of Grosse Pointe Woods	Detroit Asphalt Paving Co.	Pits 47-3 and 50-41	Pits 47-15 and 50-41	EBOL	0.51		
					EBIL	0.53	Turned back to county	
					WBOL	0.48		
					WBIL	0.49		
Mb 82211-027	M 85 (Fort St) from 150 ft south of LeRoy St in Trenton, northerly to Peters St, City of Detroit	Asphalt Products Corp.	E.C. Levy (Dix Yard)	E.C. Levy (Dix Yard)	NBOL	0.51	--	0.32
					NBCL	0.58	--	0.37
					NBIL	0.55	--	0.35
					SBOL	0.48	--	0.36
					SBCL	0.54	--	0.38
					SBIL	0.55	--	0.36

TABLE 8
BITUMINOUS AGGREGATE (4.11) CONSTRUCTED IN 1970

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Average Coefficient of Wet Sliding Friction		
			Coarse	Fine		1970	1971	1975
Mb 11074-004	M 140 intermittently from US 31-US 33 northerly to M 62	Reith-Riley Construction Co., Inc.	Pit 14-55	--	NB SB	0.46 0.49	Resurfaced	
Mb 16023-003	M 27 in Village of Topinabee	Lake and Howell Construction Co.	Pit 16-69	--	NB SB	0.40 0.40	-- --	-- --
Mtb 20051-002	M 18-M 76 from US 27 - Proposed I 75 easterly to Proposed I 75 at Crawford-Roscommon County Line	Lake and Howell Construction Co.	Pit 20-33	--	NB SB	0.41 0.44	Turned back to county	
Mb 23052-002 (00290A)(part)	M 50 at Fawn Lane Rd (first patch west of US 127)	Spartan Asphalt Paving Co.	Pit 23-91	--	NWB SEB	0.22 0.22	-- --	0.43 0.46
Mb 23052-002 (00290A)(part)	M 50 at Blackman Rd (second patch west of US 127)	Spartan Asphalt Paving Co.	Pit 23-91	--	NWB SEB	0.25 0.29	Resurfaced	
Mb 23052-002 (00290A)(part)	M 50 at Woodard Rd (third patch west of US 127)	Spartan Asphalt Paving Co.	Pit 23-91	--	NWB SEB	0.43 0.37	Resurfaced	
Mb 23052-002 (00290A)(part)	M 50 through Thompkins Center (fourth patch west of US 127)	Spartan Asphalt Paving Co.	Pit 23-91	--	NWB SEB	0.30 0.35	Resurfaced	
Mb 32092-010 (01565A)	US 25 from Lytle St in Village of Harbor Beach, northerly to Main St in Village of Port Hope	Reith-Riley Construction Co., Inc.	Pit 32-48	--	NB SB	0.49 0.49	-- --	0.53 0.57
Mb 48032-005	M 123 from south village limits of Newberry north to Helen St	George Hocking Construction Co.	Pit 48-6	--	NB SB	0.38 0.37	-- --	0.29 0.33
Mb 62014-006	Proposed M 20 (One Mile Rd) from Croswell Ave easterly to Tulip St	Reith-Riley Construction Co., Inc.	Pit 62-34	--	EB WB	0.43 0.40	-- --	0.49 0.51
Mb 62021-002	M 82 from 647 ft north of M 120 (Muskegon-Oceana County Line) northerly to 360 ft south of Church St in Hesperia	Paul C. Miller	Pits 64-41 and 64-46	--	NB SB	0.37 0.33	-- --	0.50 0.47
Mb 66051-001 (part)	M 26 from Greenland Rd., in Ontonagon County, northeasterly to 160 ft east of of Copper Range RR crossing in Houghton County.	George Hocking Construction Co.	Pits 66-77 and 66-78	Isle Royal StampSand	NB SB	0.48 0.52	-- --	0.64 0.61
Mb 66051-001 (part)	M 28 from 1.2 miles west of Kenton easterly intermittently 5.4 miles	George Hocking Construction Co.	Pit 66-78	Isle Royal StampSand	EB WB	0.50 0.51	-- --	0.53 0.54
Mb 72051-002	M 18 from Roscommon-Gladwin County Line north intermittently to 1,454 ft south of M 55	Hodgkiss and Douma, Inc.	Pit 72-42	--	NB SB	-- --	0.52 0.49	0.57 0.60

TABLE 8 (Cont.)
BITUMINOUS AGGREGATE (4.11) CONSTRUCTED IN 1970

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Average Coefficient of Wet Sliding Friction		
			Coarse	Fine		1970	1971	1975
Mb 72093-002	M 18-M 76 from Proposed I 75 at Crawford-Roscommon County Line easterly to east of Billman Rd	Lake and Howell Construction Co.	Pit 20-33	--	NB SB	0.42 0.45	-- --	0.59 0.62
Mb 74062-002	M 46 from east limits of Carsonville easterly to 280 ft west of US 25 omitting from west limits to Church St in Port Sanilac	Frank Strausberg and Son, Co.	Pit 74-10	--	EB WB	0.60 0.50	-- --	0.54 0.52
Mb 77041-002	M 136 from 325 ft east of M 19 easterly to 950 ft east of Black River Bridge	Blue Water Asphalt Co., Inc.	Pit 17-40	Pit 74-4	EB WB	0.55 0.56	-- --	0.53 0.54
Mb 80071-005 (part)	M 43 from 0.7 miles west of M 40 westerly intermittently 5.7 miles	John Yerington Co.	Pit 80-20	--	EB WB	0.32 0.26	Resurfaced	
Mb 80071-005 (part)	M 40, five patches southwest of Decatur	John Yerington Co.	Pit 80-20	--	NB SB	0.25 0.31	Resurfaced	
Mb 80071-005 (part)	M 119 from M 216 south, the entire length of the curb and gutter section in Marcellus	John Yerington Co.	Pit 80-20	--	NB SB	0.49 0.50	-- --	-- --
Mm OBA-1A	M 28 from Soo Line RR Crossing, 0.3 miles southwest of Tula in Gogebic County easterly to Merriweather Creek Bridge, 300 ft east of M 64 in Ontonagon County.	Mathy Construction Co.	Pit 66-63	--	EB WB	0.54 0.56	-- --	0.66 0.68

TABLE 9
MISCELLANEOUS BITUMINOUS SURFACES CONSTRUCTED IN 1970

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Average Coefficient of Wet Sliding Friction		
			Coarse	Fine		1970	1971	1975
Stone Filled Sand-Asphalt and Similar Surfaces								
Mb 21021-003	US 2-US 41 from end of curb and gutter section in Escanaba westerly to Delta-Menominee County Line	Payne and Dolan of Wisconsin, Inc.	Pit 21-53	Pit 21-45	EB WB	0.55 0.54	-- --	0.47 0.48
Mb 21024-011	US 2 from Big Fishdam River, in Delta County, easterly to M 149 in Schoolcraft County	Mathy Construction Co.	Pit 75-5	Pit 70-9	EB WB	0.44 0.44	-- --	0.54 0.56
Mb 66051-001 (part)	M 26 from US 45 northeasterly to Greenland Rd.	Hocking Construction Co.	Pit 66-78	Isle Royal Stamp Sand	NB SB	0.63 0.62	-- --	0.63 0.69
Ms 77032-008	US 25 from Court St northeasterly to Glenwood Ave, City of Port Huron	Blue Water Asphalt Co., Inc.	Pit 17-40	Pit 74-4	NBOL NBIL SBOL SBIL	0.46 0.52 0.47 0.52	-- -- -- --	0.38 0.39 0.40 0.35
Mb 80071-005 (part)[1]	M 40, south from 40th Ave, 2.2 miles north of Paw-Paw	John Yerington Co.	Pit 41-38	Pit 80-20	NB SB	0.54 0.53	-- --	-- --

[1] For additional test data see 1970 Special Requests 4 and 6.

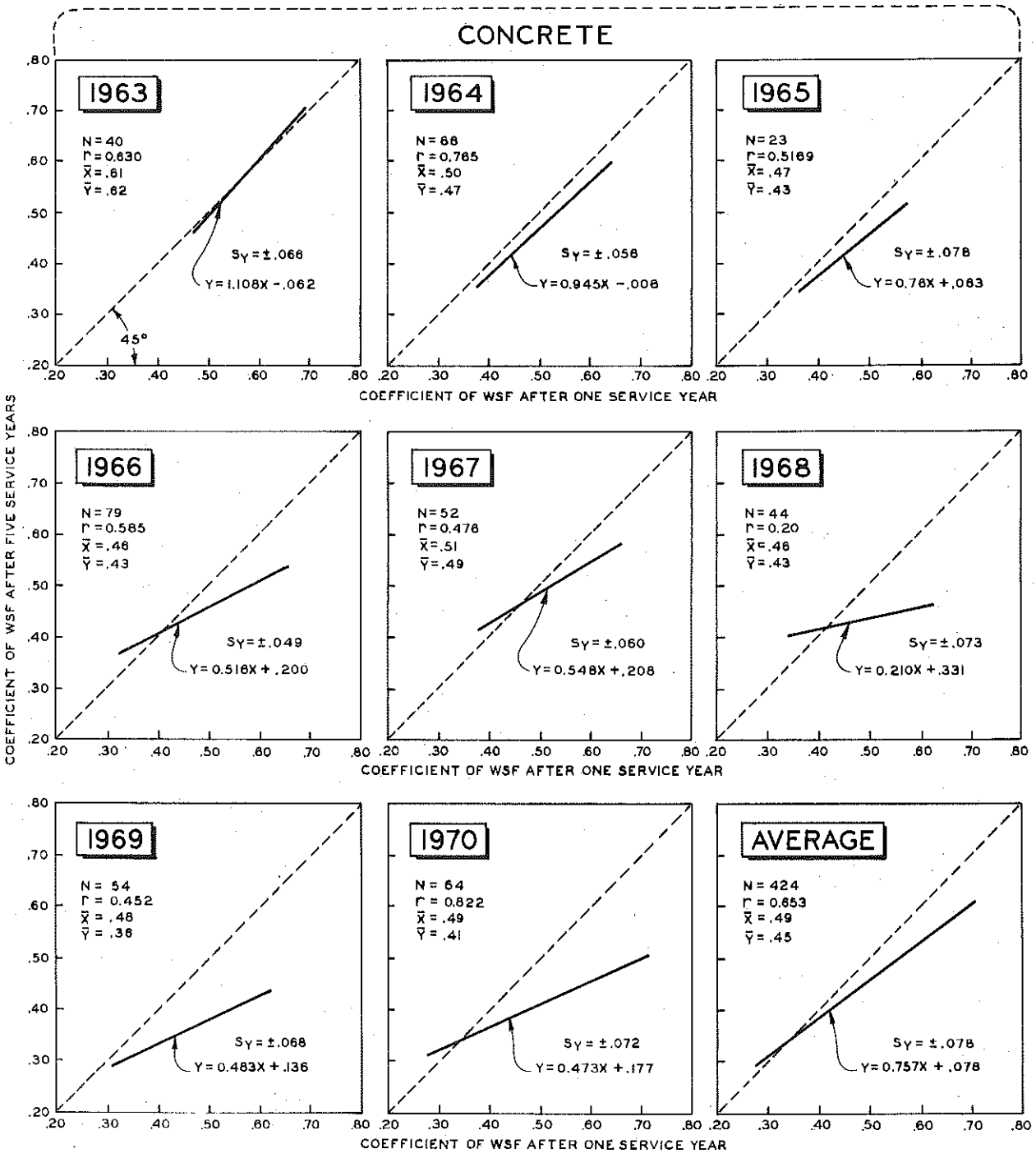


Figure 1. Relationship between one- and five-year wet sliding friction for concrete pavements.

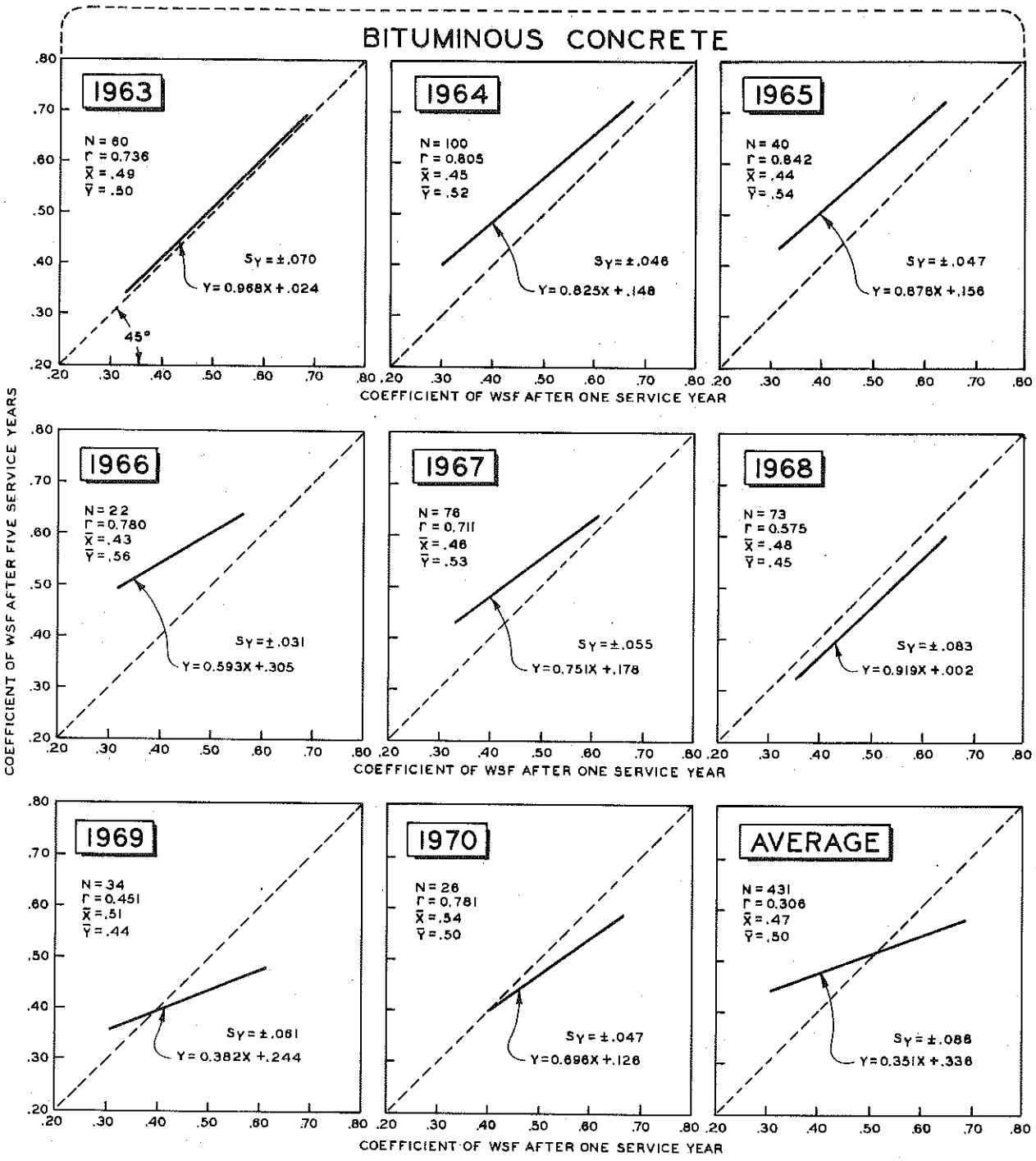


Figure 2. Relationship between one- and five-year wet sliding friction for bituminous concrete pavements.

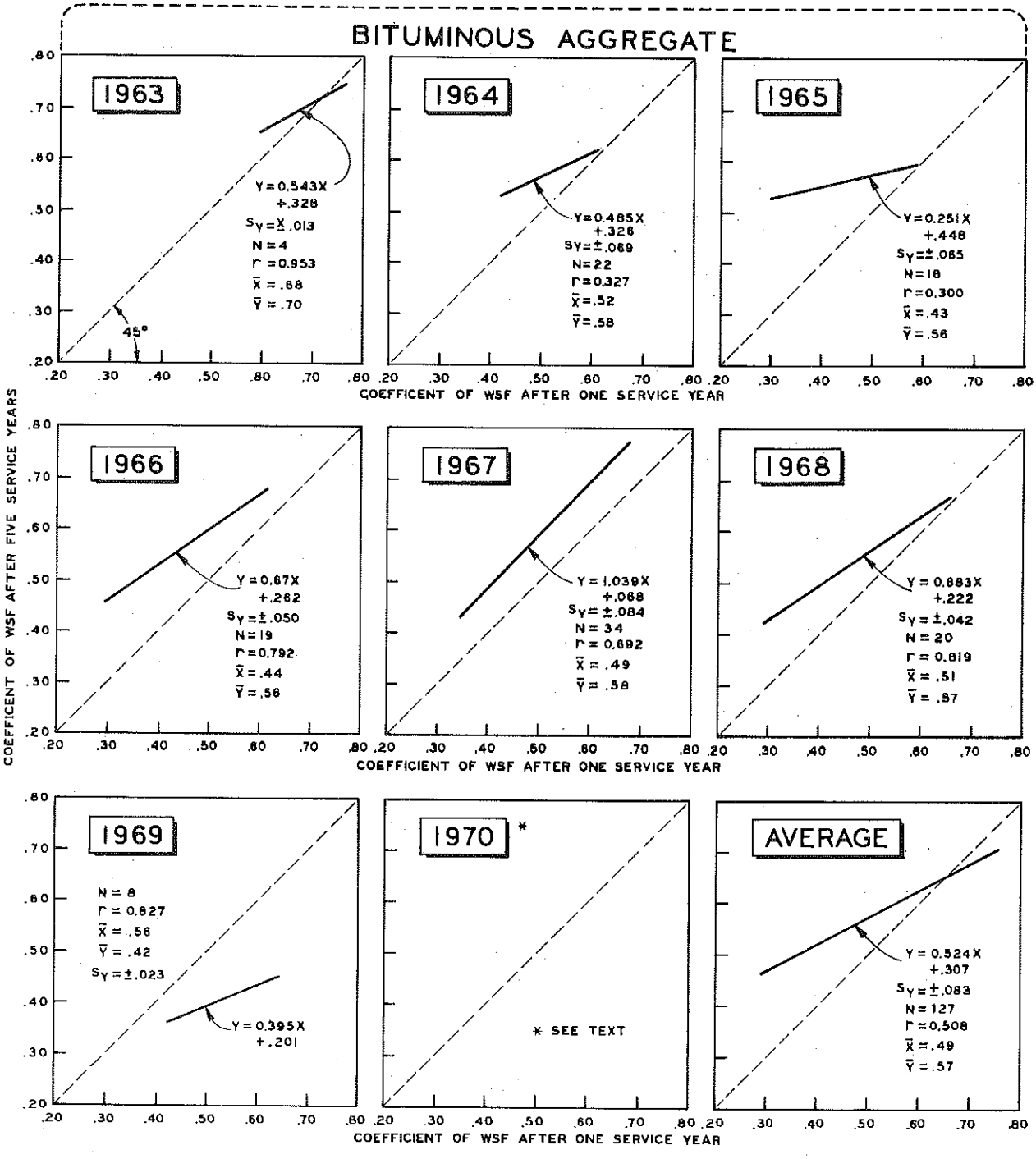


Figure 3. Relationship between one- and five-year wet sliding friction for bituminous aggregate pavements.

SECTION III

TEN-YEAR SKID TEST RESULTS FOR CONCRETE AND BITUMINOUS PAVEMENTS

Ten-Year Skid Test Results for Concrete and Bituminous Pavements

A historical review of coefficients after ten years of service has been made on 79 trunkline projects. During 1975, 716.723 lane miles of concrete and bituminous pavement were skid tested at the ten-year service level and results are contained in Tables 10 through 13.

Table 10 - Ten-Year Wsf Review for Pavements Constructed in 1965

The 85 lanes, 186.306 lane miles of concrete pavement, tested after a ten-year service period yielded friction levels which ranged from 0.24 to 0.61 and averaged 0.43. Average coefficients on 28.8 percent of the lane mileage were below 0.40. Friction levels on 1.8 percent of the lane mileage averaged lower than 0.30.

Table 11 - Ten-Year Wsf Review for Bituminous Concrete Pavements Constructed in 1965

Seventy-three lanes (252.337 lane miles) of bituminous concrete pavement were skid tested during 1975, after a ten-year service period. Average Wsf values ranged from 0.30 to 0.71 and averaged 0.48. Nineteen lanes, 19.9 percent of the lane mileage, yielded average coefficients below 0.40; the lowest average value encountered was 0.30.

Table 12 - Ten-Year Wsf Review for Bituminous Aggregate Pavements Constructed in 1965

An average Wsf of 0.54 was determined from tests made on 12 bituminous aggregate pavement projects, after ten years of service. Coefficients ranged from 0.38 to 0.66; only 1.2 percent of the 157.394 lane miles (20 lanes) had values averaging below 0.40.

Table 13 - Ten-Year Wsf Review for Miscellaneous Bituminous Surfaces Constructed in 1965

The five seal coat projects (12 lanes) which were tested during 1975, after a ten-year service period, yielded an average coefficient of 0.54 on the 120.686 lane miles. The lowest average friction level encountered was 0.42.

TABLE 10
TEN-YEAR WSF REVIEW FOR CONCRETE PAVEMENTS CONSTRUCTED IN 1965

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Average Coefficient of Wet Sliding Friction					
			Coarse	Fine		1965	1966	1967	1968	1970	1975
I 11015B, C36	I 94 from US 31-US 33 south 4 miles to bituminous concrete	Denton Construction Co.	Pits 70-9 and 75-5	Pits 14-58 and 80-20	NBIL	--	0.54	--	--	0.53	0.53
					SBIL	--	0.56	--	--	0.51	0.57
I 11016A, C17	I 94 from US 31-US 33 north to I 196	L. W. Lamb Co.	Pits 70-9 and 75-5	Pits 14-45, 14-55 and 80-20	EBIL	0.62	--	--	--	0.53	0.55
					WBIL	0.62	--	--	--	0.53	0.53
U 13121G, C6	I 94 BL from near Capital Ave east to "E" St, in Battle Creek	Carl Goodwin and Sons, Inc.	Pit 8-80	Pit 8-80	NBOL	--	0.38	--	--	0.33	0.34
					NBIL	--	0.45	--	--	0.39	0.40
					SBOL	--	0.42	--	--	0.35	0.34
					SBIL	--	0.44	--	--	0.39	0.39
SS 22051A, C2	US 8 relocation from interstate bridge over Menominee River north to existing US 8	Bacco Construction Co.	Pit 22-4	Pit 22-4	NB	--	0.52	--	--	0.56	0.49
					SB	--	0.47	--	--	0.50	0.53
U 30032A, C1	M 99 from Spring St, northwest and north to south of Hillsdale	Titus Construction Co.	Pit 30-35	Pit 30-35	NBOL	0.47	--	--	--	0.32	0.32
					SBOL	0.47	--	--	--	0.31	0.33
USS 33011A, C5	M 99 from Eaton-Ingham County Line northeast to I 96	Eisenhour Construction Co., Inc.	Pit 34-45	Pit 33-79	NBOL	0.52	--	--	--	0.42	0.41
					SBOL	0.56	--	--	--	0.46	0.44
BI 33034A, C21 F 33035B, C1	US 127 relocation from south of Holt Rd to I 96	Sargent Construction Co.	Pit 47-3	Pit 33-79	NBOL	--	--	0.53	--	0.54	0.43
					NBIL	--	--	0.57	--	0.66	0.57
					SBOL	--	--	0.51	--	0.52	0.42
					SBIL	--	--	0.55	--	0.67	0.58
I 39022C, C11	I 94 from Penn RR east to Sprinkle Rd	Carl Goodwin and Sons, Inc.	Pit 3-44	Pit 3-44	EBOL	0.48	--	--	--	0.40	0.42
					EBIL	0.55	--	--	--	0.46	0.51
					WBOL	0.42	--	--	--	0.40	0.41
					WBIL	0.50	--	--	--	0.51	0.50
I 39022C, C12	I 94 from south Westnedge Ave east to Lovers Lane	Carl Goodwin and Sons, Inc.	Pit 3-44	Pit 3-44	EBOL	0.40	--	--	--	0.39	0.37
					EBIL	0.42	--	--	--	0.44	0.46
					WBOL	0.43	--	--	--	0.46	0.41
					WBIL	0.56	--	--	--	0.47	0.46
F 50011F, C12	M 53 from 17-1/2 Mile Rd north to north of M 59, east of Utica	Sargent Construction Co.	Pit 63-4	Pit 63-4	NBOL	0.63	--	--	--	0.38	0.36
					NBIL	0.63	--	--	--	0.49	0.47
					SBOL	0.62	--	--	--	0.40	0.38
					SBIL	0.60	--	--	--	0.46	0.45
F 50013A, C1	M 53 from south of 21 Mile Rd north to south of 25 Mile Rd	Sargent Construction Co.	Pit 63-4	Pit 63-4	NBOL	0.58	--	--	--	0.39	0.36
					NBIL	0.61	--	--	--	0.52	0.40
					SBOL	0.65	--	--	--	0.36	0.33
					SBIL	0.64	--	--	--	0.50	0.44

TABLE 10 (Cont.)
TEN-YEAR WSF REVIEW FOR CONCRETE PAVEMENTS CONSTRUCTED IN 1965

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Average Coefficient of Wet Sliding Friction					
			Coarse	Fine		1965	1966	1967	1968	1970	1975
F 50013A, C2	M 53 relocation from north of 24 Mile Rd, north to existing M 53	Sargent Construction Co.	Pit 63-4	Pit 63-4	NBOL	--	--	0.53	--	0.38	0.39
					NBIL	--	--	0.58	--	0.43	0.36
					SBOL	--	--	0.43	--	0.30	0.34
					SBIL	--	--	0.55	--	0.43	0.44
F 50022A, C5	M 59 from existing M 53 in Utica east to M 53 relocation	Holloway Construction Co.	Pit 62-4	Pit 63-47	EBOL	0.50	--	--	--	0.31	0.25
					WBOL	0.49	--	--	--	0.32	0.24
Mb 58021A, C1	M 151 from east of US 23 east to US 25	L. W. Edison Co.	Maumee Stone Co., Maumee, Ohio	Pit 46-16	EB	0.64	Turned back to county				
					WB	0.56					
U 63031A, C15	US 24 from 1,287 ft north of M 102 north 2.717 miles	Cooke Contracting Co.	Pit 47-3	Pit 63-7	NBOL	--	--	0.41	--	0.38	0.37
					NB#3	--	--	0.45	--	0.41	0.39
					SBOL	--	--	0.38	--	0.35	0.39
					SB#3	--	--	0.41	--	0.40	0.40
					SB#2	--	--	0.43	--	0.45	0.40
					SBIL	--	--	0.42	--	0.42	0.40
U 63043B, C2 U 63043F, C3 BI 63172A, C13	M 59 from proposed GTW RR grade separation east to Mott Rd	L. W. Edison Co.	Pit 63-4	Pit 63-4	EBOL	0.57	--	--	--	0.36	0.41
					EBIL	0.53	--	--	--	0.43	0.52
					WBOL	0.56	--	--	--	0.38	0.44
					WBIL	0.55	--	--	--	0.47	0.54
U 70012B, C2	M 21-US 31 BR from Fairbanks Ave east and northeast to Clover St	Neil and Al Construction Co.	Pit 70-9	Pit 70-9	EBOL	--	--	0.38	--	0.32	0.38
					EBIL	--	--	0.42	--	0.35	0.39
					WBOL	--	--	0.45	--	0.35	0.39
					WBIL	--	--	0.45	--	0.35	0.42
U 73073B, C9	M 81 (Davenport St) from Carolina St east to Schaefer St in Saginaw	W. F. McNally Co.	Pit 71-47	Pits 63-54 and 79-63	WBOL	--	0.36	--	--	0.28	0.30
					WBCL	--	0.36	--	--	0.31	0.28
					WBIL	--	0.40	--	--	0.30	0.28
U 77023D, C10	M 21 relocation (eastbound) from M 146 east to US 25 (Military St) in Port Huron	Eisenhour Construction Co., Inc.	Pit 75-5	Pit 50-26	EBOL	--	--	--	--	0.55	--
					EBCL	--	--	--	0.50	0.38	0.43
					EBIL	--	--	--	0.47	0.40	0.30
SS 77052A, C3	M 29 relocation from 2,550 ft south of Marysville north to 250 ft south of Bunce Ave on existing M 29	Anderson and Buzzin, Inc.	Pit 75-5	Pit 74-51	NBOL	--	0.49	--	--	0.40	0.40
					NBIL	--	0.50	--	--	0.44	0.38
					SBOL	--	0.49	--	--	0.43	0.43
					SBIL	--	0.43	--	--	0.44	0.37
U 81105A, C1 U 81105B, C2	M 14 relocation from 0.83 miles west of Wagner Rd northeast to US 23 at the Huron River	Sargent Construction Co.	Pit 47-3	Pit 47-3	EBOL	--	0.46	--	--	0.48	0.45
					EBIL	--	0.46	--	--	0.60	0.60
					WBOL	--	0.46	--	--	0.47	0.48
					WBIL	--	0.47	--	--	0.59	0.61

TABLE 10 (Cont.)
TEN-YEAR WSF REVIEW FOR CONCRETE PAVEMENTS CONSTRUCTED IN 1965

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Average Coefficient of Wet Sliding Friction					
			Coarse	Fine		1965	1966	1967	1968	1970	1975
U 82061E, C7	US 12 eastbound (Michigan Ave) from Heywood St east to 4th St	L. A. Davidson	E.C. Levy (Dix Yard)	Pit 82-10	EBOL	0.52	--	--	--	Resurfaced	
					EB#3	0.52	--	--	--		
					EB#2	0.55	--	--	--		
					EBIL	0.58	--	--	--		
BI 82191E, C17 I 82191F, C18	I 75 (Seaway Freeway) from north of Pennsylvania Rd northeast to west of Allen Rd	Denton Construction Co.	Pit 63-4 and E.C. Levy (Trenton Yard)	Pits 47-3, 63-4, 63-7 and 82-10	NBOL	--	--	0.43	--	0.40	0.43
					NBCL	--	--	0.47	--	0.45	0.46
					NBIL	--	--	0.49	--	0.52	0.52
					SBOL	--	--	0.41	--	0.41	0.42
					SBCL	--	--	0.48	--	0.46	0.47
					SBIL	--	--	0.48	--	0.49	0.52
I 82191G, C20 I 82191H, C21	I 75 (Seaway Freeway) from west of Allen Rd to a point south of north city limits of Southgate	Denton Construction Co.	Pit 63-64 and E.C. Levy (Trenton Yard)	Pits 47-3, 63-4, 63-7, and 82-10	NBOL	--	--	0.42	--	0.39	0.44
					NBCL	--	--	0.46	--	0.44	0.46
					NBIL	--	--	0.46	--	0.48	0.50
					SBOL	--	--	0.41	--	0.41	0.41
					SBCL	--	--	0.47	--	0.44	0.44
					SBIL	--	--	0.47	--	0.47	0.49
I 82191J, C25 I 82191H, C26 I 82191I, C27 I 82191J, C28	I 75 (Seaway Freeway) from south of Goddard Rd northwest to west of US 25 (Toledo Rd)	The Kutchins Co.	E.C. Levy (Trenton Yard)	Pits 63-7, 63-55 and 82-10	NBOL	--	--	0.39	--	0.39	0.41
					NBCL	--	--	0.46	--	0.46	0.43
					NBIL	--	--	0.49	--	0.47	0.46
					SBOL	--	--	0.38	--	0.39	0.41
					SBCL	--	--	0.44	--	0.45	0.41
					SBIL	--	--	0.46	--	0.46	0.43

TABLE 11
TEN-YEAR WSF REVIEW FOR BITUMINOUS CONCRETE PAVEMENTS CONSTRUCTED IN 1965

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Average Coefficient of Wet Sliding Friction					
			Coarse	Fine		1965	1966	1967	1969	1970	1975
I 11014B, C9 I 11015A, C35	I 94 from La Porte Rd, northeast to south limits of Bridgman	Reith-Riley Construction Co., Inc.	US Steel Gary, Ind.	Pits 11-36 and 14-36	NBOL	--	0.40	--	--	0.42	0.43
					NBCL	--	0.50	--	--	0.63	0.56
					NBIL	--	0.56	--	--	0.70	0.68
					SBOL	--	0.39	--	--	0.48	0.36
					SBCL	--	0.52	--	--	0.61	0.60
					SBIL	--	0.64	--	--	0.72	0.69
I 11015B, C36	I 94 from concrete pavement, 4 miles south of US 31-US 33, south to Bridgman	Reith-Riley Construction Co., Inc.	US Steel Gary, Ind.	Pit 11-36	NBOL	--	0.38	--	--	0.36	0.34
					NBCL	--	0.55	--	--	0.59	0.53
					NBIL	--	0.61	--	--	0.71	0.71
					SBOL	--	0.39	--	--	0.38	0.35
					SBCL	--	0.51	--	--	0.60	0.52
					SBIL	--	0.62	--	--	0.71	0.70
Mb 13033C, C14	M 78 (Capital Ave) from north of Columbia Ave north and northeast intermittently to Jackson St	Reith-Riley Construction Co., Inc.	Pit 39-1	Pit 13-38	NB	0.41	--	--	--	0.45	Turned back to city
					SBOL	0.40	--	--	--	0.45	
					SBIL	0.44	--	--	--	0.44	
Mb 13121D, C12	I 94 BL (Dickman Rd) from GTW RR east to 20th St in Springfield	Reith-Riley Construction Co., Inc.	Pit 13-30	Pit 13-30	EBOL	--	0.36	--	--	0.52	0.46
					EBIL	--	0.39	--	--	0.56	0.42
					WBOL	--	0.34	--	--	0.49	0.41
					WBIL	--	0.42	--	--	0.58	0.50
Mb 18031C, C4	US 27 BR from south of Schoolcrest Rd north and east to Wilcox Parkway	The Hicks Co.	Pit 37-26	Pit 37-26	SBOL	0.57	--	--	--	0.45	Resurfaced
F 21024B, C4	US 2 from Sturgeon River east to Big Fishdam	Thornton Construction Co., Inc.	Pit 75-43	Local Pits	EB	--	0.50	--	--	0.61	0.56
					WB	--	0.51	--	--	0.54	0.58
F 24031A, C2 U 24031A, C3	US 131 from 1,500 ft south of State Police Post, south of Petoskey, north to US 31 (Charlevoix St)	Hodgkiss and Douma, Inc.	Pit 17-20	Pit 15-32	NBOL	--	0.44	--	--	0.55	0.55
					NBIL	--	0.44	--	--	0.52	0.51
					SBOL	--	0.48	--	--	0.53	0.46
					SBIL	--	0.50	--	--	0.54	0.56
F 27023B, C3	US 2 from Gogebic Station southeast 8.416 miles	Mathy Construction Co.	Pit 27-66	Pit 27-66	EB	0.53	--	--	--	0.70	0.68
					WB	0.55	--	--	--	0.71	0.66
F 27023D, C4	US 2 from 8.416 miles southeast of Gogebic Station east to 1.250 miles west of Watersmeet	Mathy Construction Co.	Pit 27-66	Pit 27-66	EB	0.54	--	--	--	0.70	0.68
					WB	0.52	--	--	--	0.70	0.69
F 28012A, C1 F 28051B, C2	M 37 from M 113 (Miller Rd) north to 4,030 ft north of Silver Lake Shore Rd	Peninsula Asphalt and Construction Co.	Pit 45-19	Pit 45-19	NB	0.50	--	--	--	0.44	0.41
					SB	0.49	--	--	--	0.47	0.46
Mb 28021C, C2	M 113 from 1,100 ft west of Knight and Townline Rd east to 1,000 ft east of Knight and Townline Rd	Peninsula Asphalt and Construction Co.	Pit 45-19	Pit 45-19	EB	0.49	--	--	--	0.60	Resurfaced
					WB	0.47	--	--	--	0.57	

TABLE 11 (Cont.)
TEN-YEAR WSF REVIEW FOR BITUMINOUS CONCRETE PAVEMENTS CONSTRUCTED IN 1965

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Average Coefficient of Wet Sliding Friction					
			Coarse	Fine		1965	1966	1967	1969	1970	1975
SS 29021A, C2	M 57 from Gratiot-Montcalm County Line east of Carson City, east to south limits of Perrington (Luce Rd)	The Hicks Co.	Pit 63-4	Pit 59-48	EB	--	0.46	--	--	0.64	0.60
					WB	--	0.49	--	--	0.66	0.61
U 30032A, C1	M 99 from Spring St northwest and north to south of north limits of Hillsdale	Ayling-Cunningham Asphalt Paving Co.	France Stone Waterfield, Ohio	Pit 30-35	NBIL	0.55	--	--	--	0.48	0.44
					SBIL	0.59	--	--	--	0.50	0.43
U 30041A, C2	M 34 from south of north limits of Hillsdale north to Bacon St	Ayling-Cunningham Asphalt Paving Co.	Pit 47-3	Pit 30-35	EBOL	0.58	--	--	--	0.48	0.42
					EBIL	0.55	--	--	--	0.48	0.44
					WBOL	0.55	--	--	--	0.47	0.43
					WBIL	0.57	--	--	--	0.47	0.43
USS 33011A, C5	M 99 from Eaton-Ingham County Line northeast to I 96	Reith-Riley Construction Co., Inc.	Pit 47-3	Pit 33-6	NBIL	0.59	--	--	--	0.56	0.58
					SBIL	0.60	--	--	--	0.62	0.64
U 33082B, C13	M 43 from Bogue St southeast to Oakland Rd	Lake and Howell Construction Co.	Pit 47-3	Pit 33-79	EBOL	0.54	--	--	0.41	--	0.39
					EBIL	0.56	--	--	0.44	--	0.42
					WBOL	0.54	--	--	0.41	--	0.40
					WBIL	0.55	--	--	0.43	--	0.41
F 34033A, C3 F 59051B, C3 F 59051A, C4	M 66 from M 44 north to Main St (County Rd 522) in Stanton	Spartan Asphalt Paving Co.	Pit 34-53	Pits 34-26 and 41-46	NB	0.55	--	--	--	0.65	0.65
					SB	0.51	--	--	--	0.64	0.66
U 37011C, C7	US 27 BR from Broomfield Rd north to 940 ft north of Preston Rd in Mt. Pleasant	Eisenhour Construction Co., Inc.	Pit 37-26	Pit 37-26	NBOL	0.48	--	--	--	0.49	
					NBIL	0.44	--	--	--	0.43	Resur-
					SBOL	0.42	--	--	--	0.37	faced
					SBIL	0.41	--	--	--	0.42	
Mb 41062C, C7	M 11 from Clyde Park east to Division St omitting from southbound US 131 off-ramp to Buchanan Ave, City of Wyoming	Grand Rapids Asphalt Paving Co.	Pit 41-16	Pit 41-38	EBOL	--	--	0.33	--	Resurfaced	
					EBIL	--	--	0.34	--		
					WBOL	--	--	0.35	--		
					WBIL	--	--	0.37	--		
U 44012C, C2	M 24 from Second St north to north limits of Lapeer	Flint Asphalt and Paving Co.	Pits 32-4 and 63-4	Pit 63-54	NBOL	--	0.38	--	--	0.53	
					NBIL	--	0.38	--	--	0.56	Resur-
					SBOL	--	0.42	--	--	0.52	faced
					SBIL	--	0.39	--	--	0.53	
F 50022A, C5	M 59 from existing M 53 in Utica east to M 53 relocation	Thompson-McCully Co.	Pit 63-4	Pit 50-35	EBIL	0.52	--	--	--	0.45	0.31
					WBIL	0.51	--	--	--	0.49	0.33
Mb 58021A, C1	M 151 from east of US 23 east to US 25	Ayling-Cunningham Asphalt Paving Co.	Pit 47-3	Pit 46-20	EB	0.46	--	--	--	0.51	Turned
					WB	0.49	--	--	--	0.53	back to county

TABLE 11 (Cont.)
TEN-YEAR WSF REVIEW FOR BITUMINOUS CONCRETE PAVEMENTS CONSTRUCTED IN 1965

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Average Coefficient of Wet Sliding Friction					
			Coarse	Fine		1965	1966	1967	1969	1970	1975
BU 61153A, C1 BU 61153B, C2	US 31 BR from Spring St northeast to proposed US 31 relocation	Reith-Riley Construction Co., Inc.	Pit 75-5	Pit 70-9	NBOL	0.41	--	--	--	0.38	0.37
					NB#3	0.43	--	--	--	0.40	0.39
					NB#2	0.37	--	--	--	0.38	0.35
					NBIL	0.47	--	--	--	0.47	0.47
					SBOL	0.47	--	--	--	0.44	0.41
					SB#3	0.46	--	--	--	0.37	0.30
					SB#2	0.53	--	--	--	0.37	0.32
					SBIL	0.58	--	--	--	0.49	0.46
SS 73031C, C7 USS 76012A, C1 SS 76012B, C2	M 47 from M 21 in Owosso, north to 5th St in Oakley	Saginaw Asphalt Paving Co.	Pit 47-3	Local Pits	NBIL	--	0.41	--	--	0.51	0.57
					SBIL	--	0.41	--	--	0.50	0.54
U 78042A, C5	M 60-US 131 BR from US 131 east to Rocky River in Three Rivers	Globe Construction Co.	Material Services Corp., Chicago, Ill.	Pit 78-25	EBOL	--	0.37	--	--	0.47	0.48
					EBIL	--	0.38	--	--	0.48	0.48
					WBOL	--	0.34	--	--	0.47	0.47
					WBIL	--	0.35	--	--	0.46	0.48
SS 78054A, C2	M 78 from Wasepi Rd north to M 60	Reith-Riley Construction Co., Inc.	Pit 39-1 and Stone Street Pit, Brighton, Indiana	Pit 12-35	NB	0.57	--	--	--	0.71	0.59
					SB	0.57	--	--	--	0.67	0.60
I 82022A, C24	I 94 westbound (D.I.E.) from west of Beech-Daly Rd east to US 24	Thompson-McCully Co.	Pit 47-3	Pit 63-7	WBOL	0.44	--	--	--	0.47	0.45
					WBCL	0.44	--	--	--	0.49	0.46
					WBIL	0.47	--	--	--	0.51	0.49
Mns 82041C, C11	M 17 from Monroe Blvd to Pelham Rd	Detroit Asphalt Paving Co.	Pit 47-3	Pit 47-3	EBOL	--	0.31	--	--	0.44	Turned back to county
					EBIL	--	0.32	--	--	0.46	
					WBOL	--	0.34	--	--	0.42	
					WBIL	--	0.33	--	--	0.46	
Mb 82121C, C7	I 96 BR (Grand River Ave) from 6 Mile Rd (McNichols Rd) southeast to Freeland Rd	Detroit Asphalt Paving Co.	Pit 47-3	Pit 47-3	NWBOL	0.44	--	--	--	0.42	0.34
					NWBIL	0.46	--	--	--	0.44	0.34
					SEBOL	0.41	--	--	--	0.43	0.37
					SEBIL	0.45	--	--	--	0.45	0.37
Mb 82131C, C9	M 1 (Woodward Ave) from East Grand Blvd northwest to Clairmont St	Cooke Contracting Co.	Pit 63-4	Pit 63-4	NBOL	0.42	--	--	--	0.41	0.34
					NBIL	0.41	--	--	--	0.44	0.38
					SBOL	0.39	--	--	--	0.41	0.39
					SBIL	0.44	--	--	--	0.46	0.36

TABLE 12

TEN-YEAR WSF REVIEW FOR BITUMINOUS AGGREGATE PAVEMENTS CONSTRUCTED IN 1965

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Average Coefficient of Wet Sliding Friction					
			Coarse	Fine		1965	1966	1967	1968	1970	1975
FFH 01023C, C4	M 72 from 11 miles east of M 65 east to County Rd #171	S. D. Solomon and Sons	Pit 1-57	--	EB WB	0.46 0.48	--	--	--	0.64 0.65	0.62 0.65
F 04021A, C4 F 04021B, C5 Mb 60022A, C2	M 32 from Hillman east to Bean Creek Rd	Lake and Howell Construction Co.	Pit 4-42	--	EB WB	0.45 0.51	--	--	--	0.54 0.57	0.51 0.52
SS 05051A, C1	M 66 from US 131 north to County Rd #620	Hodgkiss and Douma, Inc.	Pit 5-70	--	NB SB	-- --	0.48 0.49	--	--	0.49 0.49	0.50 0.54
F 16032C, C5	M 27 from north limits of Topinabee northeast to NYC RR	Lake and Howell Construction Co.	Pit 16-64	--	NB SB	-- --	0.47 0.46	--	--	0.54 0.60	0.61 0.60
Mb 17043C, C3	M 48 from County Rd intersection in Goetzville south to Caribou Lake Rd	Hodgkiss and Douma, Inc.	Pit 17-69	--	NB SB	-- --	0.48 0.47	--	--	0.73 0.72	0.52 0.53
F 32032C, C2	M 53 from 480 ft south of M 142 north to US 25 in Port Austin	Saginaw Asphalt Paving Co.	Pits 32-9, 32-10, 32-15, 32-48, 32-59, 32-60, and 74-10	--	NB SB	-- --	0.43 0.43	--	--	0.55 0.56	0.49 0.53
Mb 52032C, C7	M 35 from south limits of Palmer north 0.906 miles	Payne and Dolan of Wisconsin, Inc.	Pit 52-9	--	NB SB	-- --	0.41 0.39	--	--	0.51 0.50	0.39 0.38
F 66021D, C5	M 28-M 64 from Merriweather Creek northeast to M 28-M 64 junction west of Bergland	Mathy Construction Co.	Pit 66-63	--	NEB SWB	-- --	0.58 0.59	--	--	0.60 0.56	0.63 0.66
F 66022B, C3	M 28 from west of Ewen to 0.7 miles east of Baltimore	Thornton Construction Co., Inc.	Pit 66-33	--	EB WB	-- --	0.34 0.33	--	--	0.58 0.53	0.55 0.56
F 66022A, C4	M 28 from M 64 (east junction) east to west branch of Ontonagon River	Thornton Construction Co., Inc.	Pits 27-27 and 66-63	--	EB WB	-- --	0.29 0.29	--	--	0.52 0.53	0.48 0.44
Mm 5BA-3D	M 66 from M 32 in East Jordan northwest to north limits of East Jordan; also on M 66 from 5.1 miles north of East Jordan northwest intermittently for 0.5 miles	Hodgkiss and Douma, Inc.	Pit 5-70	--	NB SB	-- --	0.40 0.38	--	--	-- --	-- --
Mm 6BA-3B	US 31 north from 7 miles north of Scottville in Mason County	Laman Asphalt and Paving Co.	Pit 64-41	--	NB SB	-- --	0.42 0.40	--	--	0.50 0.50	Resurfaced

TABLE 13
TEN-YEAR WSF REVIEW FOR MISCELLANEOUS BITUMINOUS SURFACES CONSTRUCTED IN 1965

Project No.	Location	Paving Contractor	Aggregate Sources		Direction and Lane	Average Coefficient of Wet Sliding Friction					
			Coarse	Fine		1965	1966	1967	1968	1970	1975
Bituminous Seal Coats (4.06)											
Mb 78053C, C6	M 78 from M 86 in Colon northeast to Branch-St. Joseph County Line	Reith-Riley Construction Co., Inc.	Pit 13-30	--	EB WB	0.35 0.29	Turned back to county				
Mm 5SC-5B	M 57 from Greenville east to M 66	Klett Construction Co.	Pit 34-51	--	EB WB	--	0.37 0.38	--	--	0.52 0.54	0.56 0.56
Mm 5SC-5C (part)	M 20 from east limits of White Cloud east to Newaygo-Mecosta County Line	Reith-Riley Construction Co., Inc.	Pit 54-27	--	NB SB	--	0.55 0.55	--	--	0.66 0.68	0.61 0.64
Mm 5SC-5C (part)	M 37 from north of White Cloud east to Newaygo-Lake County Line	Reith-Riley Construction Co., Inc.	Pit 54-27	--	NB SB	--	0.26 0.27	--	--	0.50 0.47	Resurfaced
Mm 5SC-6B	M 18 from Gladwin-Roscommon County Line south 17 miles	Gilliland Construction and Equipment Co.	Pit 67-2	--	NB SB	--	0.45 0.48	--	--	0.48 0.46	0.57 0.56
Mm 5SC-6C	M 90 from Brown City east to M 19	Thompson-McCully Co.	Pit 50-35	--	EB WB	--	0.54 0.55	--	--	Resurfaced	
Mm 5SC-7A	M 37 from north limits of Middleville north to Barry-Kent County Line	Bekman Co.	Pit 8-58	--	NB SB	--	0.46 0.43	--	--	0.63 0.61	0.49 0.50
Mm 5SC-8D	M 52 from east of Manchester south to US 12	Ann Arbor Construction Co.	Pit 81-57	--	NB SB	--	0.43 0.45	--	--	Resurfaced	
Mm 6SC-4A	M 144 from west of AuSable River east in Roscommon	Comstock Construction Co.	Pit 71-15	--	EB WB	--	0.43 0.42	--	--	0.46 0.43	Resurfaced
Mm 6SC-4B (part)	M 33 from 4 miles north of M 68 north 5.8 miles	Gilliland Construction and Equipment Co.	Pit 16-17	--	NB SB	--	0.47 0.45	--	--	0.48 0.55	0.42 0.43
Mm 6SC-4B (part)	M 33 from 12.3 miles north of M 68 north 1.4 miles	Gilliland Construction and Equipment Co.	Pit 16-17	--	NB SB	--	0.43 0.34	--	--	0.52 0.52	Resurfaced
Mm 6SC-4B (part)	M 131 from 300 ft south of Middle Village Rd north to 1.5 miles north of Robinson Rd	Gilliland Construction and Equipment Co.	Pit 16-17	--	NB SB	--	0.61 0.59	--	--	0.38 0.38	0.57 0.60
Sand Asphalt Surfaces (4.13)											
Mns 04031C, C2	US 23 at Werth Rd, 0.5 miles southwest of Alpena	Hodgkiss and Douma, Inc.	Pit 17-40	Pit 71-15	NB SB EB	--	0.38 0.39 0.37	--	--	0.65 0.58 0.62	1 1 1
Mns 33011C, C6	M 99 (Logan St) at west Mt. Hope Ave, City of Lansing	Spartan Asphalt Paving Co.	Pit 47-3	Pit 33-6	NBOL NBIL SBOL SBIL	--	--	0.43 0.43 0.45 0.45	-- -- -- --	Resurfaced	
Mns 33082C, C17	M 43 (Grand River Ave) from University Dr southeast to Hillsdale Ave, City of East Lansing	Spartan Asphalt Paving Co.	Pit 47-3	Pit 33-6	EBOL EBIL WBOL WBIL	--	--	0.44 0.42 0.40 0.42	-- -- -- --	Resurfaced	
Mm 6BC-7B	M 60 from M 66 (formerly M 78) northeast to US 27, omitting Burlington	Reith-Riley Construction Co., Inc.	---	Pit 12-35 and Local Pit	EB WB	--	0.52 0.54	--	--	0.63 0.64	Resurfaced

1 Sand asphalt surface worn off.

SECTION IV

EXPERIMENTAL FEATURES IN PAVEMENT SURFACES

Table 14 - Rubberized Sand-Asphalt; US 31, City of Charlevoix

A general six-year trend of declining friction values on this 1960 rubberized sand-asphalt surface reached a level below 0.40 with the 1974 tests. The gradually decaying friction levels are indicative of the wearing-off of the sand asphalt surface. In 1975, the surface has become almost entirely worn to the original pavement surface, consequently no skid tests were conducted and this particular test area is being dropped from our schedule of annually tested areas.

Table 15 - 3BC Sand-Asphalt Resurfacing, US 31, North and South of Alba (Project Mm 4BC-3A, Control Section 05072)

During 1975, this test area was resurfaced. The last tests were conducted in 1974. At this time, as Table 15 indicates, no significant difference in friction level performance has been established between the 150/175 penetration sand-asphalt using 6.4 percent bitumen and the 85/100 penetration sand-asphalt using 6.9 percent bitumen. Average coefficients, during the 11 years of testing, ranged from a low of 0.48 to a high of 0.68. Both sand-asphalt surfaces maintained good skid resistance values throughout their ten years of service.

Table 16 - Bituminous Concrete Interstate Projects

A representative sample of Interstate bituminous concrete projects, located on US 27 and I 75, has been under study since constructed in 1961 and 1962. Friction levels determined in 1975 ranged from 0.37 to 0.73 and averaged 0.59. Particular attention has been given to differences between inside (passing) and outside (traffic) lanes during the past 14 years of the study. Outside lane Wsf values, as tested during 1975, ranged from 0.37 to 0.67 and averaged 0.54, while the inside lanes ranged from 0.56 to 0.73 and averaged 0.65. Inside lane Wsf values have consistently been higher than those encountered in the outside lanes. The 1975 inside lane friction level averaged 20 percent higher than that of the outside lane.

Table 17 - Bridge Deck Surface Coatings

Table 17 summarizes the skid test history for five types of bridge deck surface coatings on 37 structures.

1. Rubberized Bituminous Concrete

Thirty-six lanes coated with rubberized bituminous concrete have been skid tested annually since their construction in 1967 or 1968. The 1975

tests resulted in friction levels ranging from 0.37 to 0.60 and averaging 0.48.

2. Asbestos Mixtures

Northbound lanes of X01 of 81075 (US 23BR over the Huron River, north of Ann Arbor) were coated in 1967 with an asbestos and sand-asphalt mixture. The southbound lanes of this deck were surfaced the same year with a rubberized bituminous concrete and sand-asphalt combination. Annual tests over a nine-year period on this deck indicate a slightly better skid resistance performance has been obtained on the rubberized bituminous concrete - sand-asphalt surface. Friction levels for 1975 averaged 0.46 for the northbound lanes and 0.50 for the southbound.

3. Epoxy Coatings

After six years of service, skid tests on the Creyts Rd bridge over I 96, yielded respective north half and south half Wsf values averaging 0.45 and 0.64. The surface type for the north half is a E15 Versamid 140 Epoxy and the south half has a Guard Kote 250 epoxy application.

An epoxy mortar was applied to the decks of S04 of 33083, I 96 over Cedar St - Pennsylvania Ave access road, in 1971 and to B02 of 73131, the M 83 structure over Cass River, in 1969. Skid tests conducted in 1975 on S04 of 33083 ranged from 0.43 to 0.57 and averaged 0.50; coefficients on B02 of 73131 ranged from 0.53 to 0.56 and averaged 0.54.

4. Latex Modified Mortar

Latex modified mortar is a portland cement mortar. Part of the mix water has been replaced with a latex emulsion to increase the bond and tensile strength of the resulting surface mix. Coefficients ranged from 0.34 to 0.52 and averaged 0.43 on the latex modified mortar surfaces. Twenty-four percent of the 46 lanes tested in 1975 yielded Wsf values averaging lower than 0.40.

Initial year tests have been conducted on the deck replacement of X01 of 33034, US 27 over the C&O RR and westbound I 96BL. The northbound outer lane and the east half of the northbound center lane on this structure were capped with latex concrete in 1975; the west half of the northbound center lane, the northbound inner lane and all southbound lanes were capped with latex mortar. Respective average Wsf values for the latex concrete lane, the 'half and half' lane and the latex mortar lanes were 0.47, 0.43, and 0.44.

Structure B01 of 41024, I 96 over the Thornapple River, was surfaced with latex concrete in 1974. The east half of this deck (both roadways) was

finished with a metal comb and the west half with burlap drag. One-year Wsf values averaged 0.54 on the comb finish and 0.53 on the burlap finish.

5. Latex Concrete

Latex concrete is a portland cement mix. The inclusion of a 25A aggregate in a latex concrete mix design is the basic difference between it and a latex modified mortar mix. Thirty-eight lanes of latex concrete surfacing were tested during the 1975 test year. Coefficients ranged from 0.32 to 0.54 and averaged 0.41. Forty-two percent of the lanes tested yielded average friction levels below 0.40. Considering only the lanes surfaced in 1972, 11 of the 34 lanes (32 percent) exhibit a loss in friction level since initially tested in 1973.

Table 18 - Experimental Skid Resistant Resurfacing

Skid tests were continued this year at nine experimental skid resistant resurfacing locations which were constructed in 1965. After ten years of service, Wsf values range from 0.31 to 0.68 and averaged 0.46. Fourteen percent of the lanes tested (seven lanes) produced coefficients under 0.40. Twenty-two percent of the lanes were equal to or greater than 0.50 in friction level, the remaining 64 percent averaged between 0.40 and 0.49.

In August, a 1968 surfacing of northbound US 24 between Joy Rd and West Chicago was tested after its seventh service year. Wsf values ranged from 0.45 to 0.50 and averaged 0.47.

Table 19 - Textured Concrete Pavement Surfaces on Northbound I 69 (Project 13074-001)

After a five-year service period, skid tests have been conducted again on the northbound I 69 textured concrete pavement surface and resulting Wsf values are shown in Table 19. Friction levels on all texturing methods decayed with respect to time through the four-year service level. In 1975, after five-years of service, this trend was reversed and Wsf values increased by 0.10 to 0.19. During the entire five-year service of this test area, the transverse combing texture has maintained a friction level higher than that determined on the portion finished with conventional burlap, longitudinal broom, or transverse broom texturing methods. Noticeable differences also exist between northbound outer lane and northbound inner lane coefficients. The inside lane has consistently maintained a friction level superior to the outside lane for all texturing methods.

Table 20 - Gussasphalt and Mastiphalt Surfaces on US 31, Research Project 72 C-14

In 1972, a 500-ft Gussasphalt surface was placed on US 31, north of the B3 of 53031 structure over the Pere Marquette River. Gussasphalt was

also used to resurface the deck of B2 of 64013 (US 31 over north branch of the Pentwater River). Immediately north of the 500-ft Gussasphalt surface, a 500-ft section of Mastiphalt was placed on the US 31 roadway.

Since the 1974 tests, Wsf values have increased on both the Gussasphalt and the Mastiphalt surfaces. After three service years, coefficients on the two Gussasphalt surfaces ranged from 0.48 to 0.55 and averaged 0.52; the Mastiphalt surface values ranged from 0.52 to 0.54 and averaged 0.52.

Table 21 - Spray Grip Surface, Research Project 72 NM-326

A spray grip surface was initially placed at the intersection of US 24 and 10 Mile Rd in the fall of 1972. Excellent initial friction levels, averaging 0.78, were obtained. However, in 1973, due to a bonding problem, the initial surface was replaced. The 'new' spray grip surface was first tested in 1973. Excellent results were again found; Wsf values ranged from 0.73 to 0.87 and averaged 0.81. Coefficients have declined since these skid tests were conducted. Two-year friction levels ranged from 0.64 to 0.70 and averaged 0.68.

Table 22 - Epoxy and Natural Emery Seal Coat

Low friction levels were found on B01 of 49023 (US 2 over the Cut River) through the Department's High-Accident location testing program in 1973. Friction levels at that time, on the concrete deck, ranged from 0.15 to 0.22 and averaged 0.18. An epoxy and natural emery seal coat surface was placed on the structure in July of 1974. Initial year skid test results on this surface ranged from 0.75 to 0.82 and averaged 0.78. In 1975, after a one-year service period, coefficients were lower, averaging 0.64 and ranging from 0.58 to 0.67.

Tables 23 and 24 - Lakelite Aggregate Sections

Lakelite is a lightweight, porous material and was incorporated into the mix designs of two experimental surfaces, constructed in 1972.

Project Mbr 62032-04779, located on M 37 in Newaygo County, has variations in percent bitumen, percent Lakelite, and size of material. After three years of service, outstanding friction levels continue to prevail in all areas, even those in which Lakelite was not incorporated into the mix design. Three-year Wsf values ranged from 0.62 to 0.76 and averaged 0.67 in the Lakelite areas; non-Lakelite area test results ranged from 0.60 to 0.67 and averaged 0.64. Although only by a slight margin, the test area using a mix design of 9.0 percent bitumen and 40 percent 31A Lakelite mix design has a better skid resistance performance than the other Lakelite mixtures.

Project Mm 2SC-7A (M 43 in Hastings) also had Lakelite incorporated into its mix design. Friction levels ranged from 0.52 to 0.60 and averaged 0.56 after three years of service.

Table 25 - Trinidad Asphalt Surfacing, Project Mb 72013-06140A, Research Project 73 C-16

A resurfacing project on US 27 from Snow Bowl Rd north to M 55 used a Trinidad asphalt mix design and was completed August 2, 1974. Within the limits of this project, a conventional bituminous concrete surface was also placed as a control device. Good friction levels have been obtained during the early history of this project. Average friction levels have increased in all the Trinidad and control areas since last year (typical of most bituminous projects). The one-year Wsf values range from 0.53 to 0.65 and averaged 0.60 on the Trinidad; the bituminous concrete control areas range from 0.57 to 0.66 and averaged 0.60.

Table 26 - Napoleon Sandstone Surface

A 5,000-ft experimental Napoleon Sandstone blend was placed at the south end of Project Mb 46061-04845A, located on US 223 from 1,700 ft northwest of Onsted Rd northwesterly to US 127. Five series of skid tests have been performed since construction in 1973. The highest Wsf values were obtained in April 1974 when coefficients averaged 0.54. The most recent tests were conducted in July 1975 when Wsf values ranged from 0.40 to 0.51 and averaged 0.46.

Table 27 - Bituminous Surface Using White Pine Slag, Research Project 72 NM-316

Skid tests were conducted October 2, 1973 on Halfway Rd running south and east from a point approximately seven miles west of Ontonagon. A mix design employing White Pine slag was used in the surfacing of this roadway. Initial Wsf values ranged from 0.47 to 0.58 and averaged 0.53. Skid tests conducted during 1975, at the two-year service level ranged from 0.47 to 0.66 and averaged 0.55. Because of the low traffic volumes encountered on this roadway, the effects of wear cannot effectively be evaluated yet.

Table 28 - Hot Mix Plant Seal - Project Mb 73062-05917A, Research Project 73 F-134

A Hot Plant Mix Seal and a Bituminous Concrete surface were placed in 1973 on M 46 in Saginaw as Project Mb 73062-05917. Wsf values from four series of skid tests show a gradual friction level decay with respect to time on this project. Most recent tests were conducted in September 1975. After a two-year service period, Wsf values ranged from 0.44 to 0.52 and averaged 0.47 on the Hot Plant Mix Seal; the adjacent bituminous concrete values ranged from 0.38 to 0.47 and averaged 0.43.

Table 29 - Pavement Grooving

Transverse and longitudinal grooves were cut in the concrete pavement at various statewide locations during 1974. Selection of the locations to be grooved was based on results of the Department's continuing program to skid test high-accident locations. The grooves were cut using five different specifications which varied groove width and spacing. Table 29 shows the two-year history of friction levels determined on the grooved pavement and on the adjacent nongrooved surface for each of 15 locations.

No significant difference in friction level has been determined between grooved and nongrooved pavements during the one service year under study. However, skid tests performed with a smooth (as opposed to treaded) test tire, on the grooved pavement, resulted in a higher friction level than that determined on the adjacent nongrooved surface.

TABLE 14
RUBBERIZED SAND-ASPHALT; US 31, CITY OF CHARLEVOIX

Test Year	Average Coefficient of Wet Sliding Friction	
	Firestone Tire	General Tire
1958[1]	0.19	----
1959[2]	0.48	----
1960	0.52	----
1961	0.40	----
1963	0.38	----
1964	----	0.46
1965	----	0.44
1966	----	0.40
1967	----	0.40
1968	----	0.57
1969	----	0.52
1970	----	0.51
1971	----	0.55
1972	----	0.49
1973	----	0.41
1974	----	0.37
1975[3]	----	

[1] Initial tests on polished portland cement surface.

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

[3] Sand asphalt surface worn off.

TABLE 15
3BC SAND-ASPHALT RESURFACING, US 131, 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	Aug 1967	June 1968	July 1969	Oct. 1970	Aug 1971	July 1972	June 1973	June 1974	1975
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/SB[1]	0.51	0.54	0.56	0.50	0.54	0.56	0.56	0.57	0.58	0.60	0.57	0.48	(2)
				SBIL/NB[1]	0.68	0.66	0.68	0.62	0.65	0.63	0.59	0.60	0.59	0.59	0.55	0.48	(2)
N of Alba to M32	150/175 penetration (6.4-percent bitumen)			SBOL/SB[1]	0.50	0.60	0.56	0.52	0.55	0.56	0.59	0.58	0.57	0.59	0.60	0.51	(2)
				SBIL/NB[1]	0.63	0.68	0.68	0.64	0.67	0.62	0.60	0.60	0.60	0.60	0.61	0.51	(2)

[1] Effective 11-12-68, US 131 has been returned to a two-lane roadway, with the elimination of the former NB lanes between M 66 and M 32. Consequently future traffic flow over the test area will carry north and southbound traffic.

[2] Resurfaced in 1975.

TABLE 16
BITUMINOUS CONCRETE INTERSTATE PROJECTS

Project No.	Length, mi.	Location	Date Paved (Wearing Course)	Paving Contractor	Source of Coarse Aggregate	Lane[1]	Average Coefficient of Wet Sliding Friction															
							Firestone Tire				General Tire											
							1961	1962	Apr. 1963	Aug. 1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
18034, C3	6.758	M 61 to Arnold Rd	May-June 1962	Rieth-Riley	Wallace Stone Co. (Pit 32-4)	IL	0.52[2]	----	----	----	0.58	0.64	0.56	0.59	0.60	0.65	0.57	0.59	0.63	0.62	0.60	0.66
						OL	0.51[2]	----	----	----	0.47	0.48	0.41	0.42	0.46	0.53	0.44	0.51	0.52	0.46	0.44	0.50
72014, C4 20016, C1	6.273	0.6 mi. S of Roscommon-Crawford Co. Line to M 18 - M 76	May-June 1962	Thornton Construction	Pickett, Schreur (Merrit Pit)	IL	----	0.51	----	0.58	0.68	0.63	0.56	0.64	0.64	0.72	0.72	0.72	0.73	0.73	0.62	0.73
						OL	----	0.48	----	0.53	0.59	0.53	0.49	0.54	0.59	0.66	0.63	0.65	0.68	0.65	0.54	0.67
20015, C3	4.847	Co. Rd 612 to N Crawford Co. Line	Sept. 1961	Thornton Construction	McCready Pit (Pit 60-18)	IL	0.60	0.60	0.61	0.59	0.73	0.66	0.59	0.66	0.65	0.73	0.70	0.72	0.75	0.76	0.65	0.68
						OL	0.56	0.52	0.56	0.51	0.63	0.59	0.52	0.54	0.60	0.70	0.66	0.66	0.69	0.66	0.60	0.66
69013, C1	7.665	Otsego Co. Line N	Oct. 1961	Saginaw Asphalt	Afton Quarry (Pit 20-35)	IL	----	----	0.57	0.59	0.70	0.60	0.49	0.58	0.52	0.58	0.55	0.54	0.59	0.57	0.55	0.56
						OL	----	----	0.49	0.54	0.54	0.44	0.36	0.40	0.41	0.48	0.41	0.46	0.48	0.45	0.39	0.37
		Marlette Rd to Charles Brink Rd	June 1962	Saginaw Asphalt	Afton Quarry (Pit 20-35)	IL	----	----	0.56	0.59	0.68	0.64	0.48	0.58	0.58	0.62	0.58	0.55	0.60	0.56	0.54	0.56
						OL	----	----	0.47	0.47	0.48	0.44	0.35	0.37	0.42	0.48	0.46	0.44	0.47	0.42	0.35	0.37
69013, C3, C5	5.385	Charles Brink Rd N to M 32 (Gaylord)	June 1962	Spartan Asphalt	Lewiston Pit	IL	----	----	0.59	0.63	0.71	0.66	0.60	0.70	0.66	0.73	0.72	0.72	0.74	0.72	0.61	0.68
						OL	----	----	0.54	0.57	0.62	0.57	0.50	0.56	0.58	0.67	0.66	0.66	0.67	0.63	0.56	0.64
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)	IL	----	0.62	----	0.63	0.75	0.75	0.70	0.70[3]	0.74	0.74	0.74	0.79	0.73	0.72	0.54	0.65
						OL	----	0.58	----	0.56	0.58	0.60	0.52	0.52[3]	0.58	0.62	0.63	0.66	0.64	0.59	0.46	0.54

[1] IL and OL denote passing and traffic lanes.
[2] Tested on leveling course mix.
[3] Average of 2 series of tests in 1967.

TABLE 17
BRIDGE DECK SURFACE COATINGS

Bridge No.	Location	Year Coated	Type of Coating	Direction and Lane	Average Coefficient of Wet Sliding Friction								
					1967	1968	1969	1970	1971	1972	1973	1974	1975
B02 of 11052	US 31-US 33 over St. Joseph River in Berrien Springs	1967	Rubberized bituminous concrete	NB	---	0.39	0.47	0.40	0.40	0.45	0.28	0.40	0.40
				SB	0.43	0.36	0.43	0.37	0.36	0.44	0.28	0.38	0.38
X01 of 19032	US 27 over GTW RR in St. Johns	1967	Rubberized bituminous concrete	NBOL	0.53	0.44	0.50	0.47	0.49	0.51	0.47	0.44	0.44
				NBIL	0.56	0.50	0.55	0.52	0.55	0.57	0.49	0.48	0.47
				SBOL	0.53	0.48	0.51	0.49	0.50	0.54	0.50	0.43	0.44
				SBIL	0.60	0.56	0.57	0.56	0.61	0.61	0.51	0.50	0.48
B01 of 79051	M 24 over Cass River in Caro	1967	Rubberized bituminous concrete	NB	0.53	0.48	0.56	0.51	0.54	0.57	0.56	0.59	0.45
				SB	0.50	0.48	0.55	0.53	0.55	0.59	0.62	0.61	0.44
B01 of 61076	M 20 over Muskegon River	1968	Rubberized bituminous concrete	NBOL	---	0.46	0.49	0.49	0.51	0.52	0.47	0.39	0.55
				NBIL	--	0.48	0.53	0.50	0.55	0.56	0.53	0.46	0.59
				SBOL	--	0.44	0.49	0.46	0.48	0.49	0.45	0.42	0.53
				SBIL	--	0.44	0.52	0.49	0.49	0.52	0.49	0.39	0.57
B02 of 61076	M 20 southbound over Cedar Creek	1968	Rubberized bituminous concrete	SBOL	--	0.44	0.50	0.48	0.46	0.53	0.50	0.44	0.53
				SBIL	--	0.44	0.55	0.50	0.53	0.58	0.52	0.48	0.57
B03 of 61076	M 20 northbound over Cedar Creek	1968	Rubberized bituminous concrete	NBOL	--	0.46	0.52	0.49	0.51	0.54	0.48	0.47	0.55
				NBIL	--	0.45	0.54	0.53	0.52	0.58	0.52	0.48	0.60
S04 of 61072	M 46 over US 31	1968	Rubberized bituminous concrete	EBOL	---	0.45	0.45	0.43	0.49	0.54	0.48	0.38	0.54
				EBCL	--	0.43	0.49	0.49	0.52	0.53	0.50	0.40	0.55
				EBIL	--	0.45	0.54	0.50	0.54	0.55	0.53	0.44	0.53
				WBOL	--	0.42	0.48	0.43	0.49	0.50	0.43	0.41	0.51
				WBCL	--	0.43	0.49	0.47	0.54	0.54	0.47	0.40	0.52
				WBIL	--	0.50	0.55	0.50	0.57	0.55	0.54	0.44	0.53
S16 of 82111	Grand River Ave (I 96 BS) over I 696 BS	1968	Rubberized bituminous concrete	EBOL	--	0.52	0.47	0.46	0.44	0.54	0.48	0.42	0.46
				EBCL	--	0.44	0.43	0.40	0.43	0.44	0.28	0.37	0.37
				EBIL	--	0.43	0.41	0.41	0.43	0.48	0.33	0.37	0.39
				WBOL	--	0.49	0.49	0.47	0.46	0.48	0.33	0.42	0.47
				WBCL	--	0.42	0.39	0.40	0.42	0.39	0.28	0.37	0.38
				WBIL	--	0.43	0.41	0.41	0.44	0.50	0.35	0.47	0.40

TABLE 17 (Cont.)
BRIDGE DECK SURFACE COATINGS

Bridge No.	Location	Year Coated	Type of Coating	Direction and Lane	Average Coefficient of Wet Sliding Friction								
					1967	1968	1969	1970	1971	1972	1973	1974	1975
S17 of 82023	Grand River Ave (I 96 BS) over I 94	1968	Rubberized bituminous concrete	EBOL	--	0.44	0.38	0.35	0.41	0.43	0.41	0.37	0.39
				EBCL	--	0.44	0.37	0.34	0.39	0.42	0.40	0.36	0.40
				EBIL	--	0.45	0.40	0.36	0.38	0.45	0.43	0.39	0.41
				WBOL	--	0.50	0.43	0.40	0.44	0.48	0.40	0.42	0.44
				WBCL	--	0.44	0.37	0.36	0.40	0.41	0.40	0.39	0.42
				WBIL	--	0.44	0.39	0.35	0.39	0.43	0.43	0.37	0.44
S05 of 58152	Newport Rd over I 75, Newport	1967	Rubberized asbestos and bituminous concrete	EB	0.46	0.50	0.51	0.49	0.46	0.51	(1)	0.38	0.52
				WB	0.47	0.50	0.51	0.52	0.49	0.57	(1)	0.43	0.49
X01 of 81075	US 23 BR over Huron River, north of Ann Arbor	1967	Asbestos mix plus sand asphalt	NBRL	0.57	0.52	0.55	0.54	0.58	0.60	0.49	0.41	0.46
				NBOL	0.58	0.53	0.57	0.56	0.66	0.62	0.51	0.45	0.39
				NBIL	0.60	0.56	0.66	0.62	0.68	0.68	0.56	0.56	0.52
			Rubberized bituminous concrete plus sand asphalt	SBRL	0.61	0.50	0.57	0.54	0.64	0.59	0.48	0.42	0.45
				SBOL	0.59	0.55	0.64	0.59	0.69	0.64	0.52	0.58	0.47
				SBIL	0.58	0.58	0.64	0.62	0.73	0.72	0.56	0.64	0.57
S05 of 23081	Creyts Rd over I 496	1969	North half of deck only E 15 Versamid 140	NB	--	--	0.67	0.54	0.37	0.35	0.39(2)	0.34(3)	0.41(4)
				SB	--	--	0.66	0.54	0.44	0.39	0.44(2)	0.38(3)	0.49(4)
			South half of deck only Guard Kote 250	NB	--	--	0.75	0.52	0.46	0.50	0.45(2)	0.41(3)	0.65(4)
				SB	--	--	0.69	0.49	0.36	0.49	0.49(2)	0.36(3)	0.64(4)
S04 of 33083	I 96 over Cedar St - Penn Ave, Access Rd	1971	Epoxy mortar	EBRL	--	--	--	--	0.68	0.48	0.36	0.63	0.49
				EBOL	--	--	--	--	0.63	0.39	0.47	0.49	0.52
				EBIL	--	--	--	--	0.68	0.46	0.47	0.52	0.57
				WBOL	--	--	--	--	0.63	0.31	0.38	0.52	0.51
				WBIL	--	--	--	--	0.57	0.47	0.29	0.42	0.43
B02 of 73131	M 83 over Cass River, Frankenmuth	1969	Epoxy mortar	NBOL	--	--	--	0.57	0.57	0.60	0.58	0.53	0.54
				NBIL	--	--	--	0.52	0.58	0.58	0.54	0.51	0.54
				SBOL	--	--	--	0.60	0.63	0.66	0.57	0.54	0.56
				SBIL	--	--	--	0.56	0.60	0.60	0.56	0.55	0.53

(1) Not tested (approaches torn up)
(2) Average of two test series
(3) Fall tests only
(4) Spring tests only

TABLE 17 (Cont.)
BRIDGE DECK SURFACE COATINGS

Bridge No.	Location	Year Coated	Type of Coating	Direction and Lane	Average Coefficient of Wet Sliding Friction								
					1967	1968	1969	1970	1971	1972	1973	1974	1975
S26 of 82195	John R over I 75	1969	Latex modified mortar	SBOL	--	--	--	--	--	0.60	0.53	0.42	0.45
				SB#3	--	--	--	--	--	0.53	0.47	0.38	0.40
				SB#2	--	--	--	--	--	0.47	0.47	0.35	0.35
				SBIL	--	--	--	--	--	0.48	0.39	--	--
S27 of 82195	Brush St over I 75	1969	Latex modified mortar	NBOL	--	--	--	--	--	0.54	0.48	0.39	0.40
				NBCL	--	--	--	--	--	0.48	0.43	0.34	0.34
				NBIL	--	--	--	--	--	0.51	0.44	0.34	0.36
S03 of 82022	Westbound I 94 over Wayne Rd	1970	Latex modified mortar	WBOL	--	--	--	--	--	0.44	0.41	0.47	0.41
				WBCL	--	--	--	--	--	0.44	0.30	0.39	0.37
				WBIL	--	--	--	--	--	0.42	0.30	0.38	0.46
X01 of 82022	Eastbound I 94 over Shook Rd and RR	1970	Latex modified mortar	EBOL	--	--	--	--	--	0.41	0.32	0.39	0.39
				EBCL	--	--	--	--	--	0.44	0.35	0.48	0.38
				EBIL	--	--	--	--	--	0.46	0.38	0.56	0.48
X02 of 82022	Westbound I 94 over Shook Rd and RR	1970	Latex modified mortar	WBOL	--	--	--	--	--	0.43	(5)	(5)	0.41
				WBCL	--	--	--	--	--	0.42	0.29	0.36	0.45
				WBIL	--	--	--	--	--	0.54	0.31	0.40	0.46
S04 of 41026	M 37 over eastbound I 96	1971	Latex modified mortar	NBOL	--	--	--	--	--	0.42	0.40	0.30	0.43
				NBIL	--	--	--	--	--	0.46	0.41	0.29	0.46
				SBOL	--	--	--	--	--	0.37	0.35	0.27	0.40
				SBIL	--	--	--	--	--	0.41	0.38	0.32	0.41
				SBRL	--	--	--	--	--	0.40	0.34	0.30	0.39
S05 of 41026	M 37 over westbound I 96	1971	Latex modified mortar	NBOL	--	--	--	--	--	0.42	0.40	0.30	0.43
				NBIL	--	--	--	--	--	0.44	0.39	0.30	0.43
				SBOL	--	--	--	--	--	0.33	0.34	0.27	0.40
				SBIL	--	--	--	--	--	0.47	0.40	0.30	0.45
				SBRL	--	--	--	--	--	0.46	0.39	0.28	0.45
S02 of 63022	I 96 over Milford Rd	1971	Latex modified mortar	EBOL	--	--	--	--	--	0.32	0.24	0.33	0.38
				EBCL	--	--	--	--	--	0.42	0.30	0.42	0.40
				EBIL	--	--	--	--	--	0.43	0.31	0.46	0.46
				WBOL	--	--	--	--	--	0.38	0.23	0.37	0.42
				WBCL	--	--	--	--	--	0.43	0.31	0.42	0.47
				WBIL	--	--	--	--	--	0.49	0.34	0.48	0.52

(5) Barricaded and unable to test

TABLE 17 (Cont.)
BRIDGE DECK SURFACE COATINGS

Bridge No.	Location	Year Coated	Type of Coating	Direction and Lane	Average Coefficient of Wet Sliding Friction								
					1967	1968	1969	1970	1971	1972	1973	1974	1975
S06 of 82022	Westbound I 94 over Middlebelt Rd	1971	Latex modified mortar	WBOL	--	--	--	--	--	0.38	0.31	0.38	0.36
				WBCL	--	--	--	--	--	0.40	0.34	0.40	0.42
				WBIL	--	--	--	--	--	0.42	0.35	0.43	0.38
S01 of 63022	I 96 over Kent Lake Rd	1972	Latex modified mortar	EBOL	--	--	--	--	--	0.50	0.33	0.41	0.47
				EBCL	--	--	--	--	--	0.45	0.34	0.42	0.46
				EBIL	--	--	--	--	--	0.53	0.41	0.51	0.49
				WBOL	--	--	--	--	--	0.46	0.35	0.43	0.46
				WBCL	--	--	--	--	--	0.48	0.34	0.42	0.44
				WBIL	--	--	--	--	--	0.52	0.39	0.50	0.50
S09 of 82022	Eastbound I 94 over Ecorse Rd	1972	Latex modified mortar	EBOL	--	--	--	--	--	0.44	0.35	0.46	0.44
				EBCL	--	--	--	--	--	0.42	0.39	0.48	0.44
				EBIL	--	--	--	--	--	0.45	0.38	0.45	0.46
S12 of 82022	Westbound I 94 over Beech-Daly Rd	1972	Latex modified mortar	WBOL	--	--	--	--	--	0.46	0.33	0.40	0.38
				WBCL	--	--	--	--	--	0.47	0.37	0.41	0.44
				WBIL	--	--	--	--	--	0.43	0.37	0.43	0.47
S06 of 25031	Grand Blanc Rd over US 23	1972	Latex concrete	EB	--	--	--	--	--	--	0.27	0.31	0.33
				WB	--	--	--	--	--	--	0.33	0.32	0.38
S02 of 25131	Baldwin Rd over I 75 (1.2 miles northwest of Oakland County Line)	1972	Latex concrete	EB	--	--	--	--	--	--	0.47	0.44	0.50
				WB	--	--	--	--	--	--	0.51	0.44	0.50
S09 of 25131	Fenton Rd over I 75 (2.4 miles southeast of US 23)	1972	Latex concrete	NBOL	--	--	--	--	--	--	0.35	0.35	0.40
				NBIL	--	--	--	--	--	--	0.39	0.38	0.46
				SBOL	--	--	--	--	--	--	0.35	0.33	0.39
				SBIL	--	--	--	--	--	--	0.38	0.36	0.46
S01 of 63082	US 24 over southbound US 10	1972	Latex concrete	SBOL	--	--	--	--	--	--	0.33	0.36	0.40
				SBIL	--	--	--	--	--	--	0.34	0.38	0.40
B02 of 73062	M 46 over Tittabawassee River	1972	Latex concrete	EBOL	--	--	--	--	--	--	0.27	0.34	0.32
				EBIL	--	--	--	--	--	--	0.30	0.32	0.34
				WBOL	--	--	--	--	--	--	0.27	0.41	0.32
				WBIL	--	--	--	--	--	--	0.32	0.37	0.39

TABLE 17 (Cont.)
BRIDGE DECK SURFACE COATINGS

Bridge No.	Location	Year Coated	Type of Coating	Direction and Lane	Average Coefficient of Wet Sliding Friction								
					1967	1968	1969	1970	1971	1972	1973	1974	1975
S02 of 82022	Eastbound I 94 over Wayne Rd	1972	Latex concrete	EBOL	--	--	--	--	--	--	0.30	0.38	0.38
				EBCL	--	--	--	--	--	--	0.33	0.39	0.42
				EBIL	--	--	--	--	--	--	0.38	0.51	0.46
X01 of 82024	I 94 over DeQuindre Yard	1972	Latex concrete	EBOL	--	--	--	--	--	--	0.39	0.31	0.32
				EBCL	--	--	--	--	--	--	0.38	0.29	0.34
				EBIL	--	--	--	--	--	--	0.44	0.28	0.35
				WBOL	--	--	--	--	--	--	0.41	0.31	0.33
				WBCL	--	--	--	--	--	--	0.40	0.31	0.35
				WBIL	--	--	--	--	--	--	0.43	0.32	0.40
S01 of 82091	Old M 39 over Gate 10 entrance to Ford Plant	1972	Latex concrete	NBOL	--	--	--	--	--	--	0.40	0.40	0.41
				NB#3	--	--	--	--	--	--	0.42	0.39	0.43
				NB#2	--	--	--	--	--	--	0.47	0.46	0.44
				NBIL	--	--	--	--	--	--	0.53	0.53	0.54
				SBOL	--	--	--	--	--	--	0.43	0.45	0.40
				SB#3	--	--	--	--	--	--	0.41	0.40	0.42
				SB#2	--	--	--	--	--	--	0.48	0.46	0.45
				SBIL	--	--	--	--	--	--	0.52	0.52	0.50
S01 of 82191	I 75 over Huron River Dr	1970	Latex concrete	NBOL	--	--	--	--	--	--	--	0.48[6]	0.43
				NBCL	--	--	--	--	--	--	--	0.41	0.34
				NBIL	--	--	--	--	--	--	--	0.47	0.49
				SBOL	--	--	--	--	--	--	--	0.41[6]	0.38
				SBCL	--	--	--	--	--	--	--	0.34	0.32
				SBIL	--	--	--	--	--	--	--	0.41	0.39
B03 of 82191	I 75 over Goddard Rd	1972	Latex concrete	NBOL	--	--	--	--	--	--	0.40	0.36	0.46
				NBCL	--	--	--	--	--	--	0.37	0.37	0.44
				NBIL	--	--	--	--	--	--	0.40	0.44	0.49
			Concrete	SBOL	--	--	--	--	--	--	0.31	0.37	0.43
				SBCL	--	--	--	--	--	--	0.35	0.41	0.45
				SBIL	--	--	--	--	--	--	0.34	0.44	0.48

[6] Conventional concrete

TABLE 17 (Cont.)
BRIDGE DECK SURFACE COATINGS

Bridge No.	Location	Year Coated	Type of Coating	Direction and Lane	Average Coefficient of Wet Sliding Friction								
					1967	1968	1969	1970	1971	1972	1973	1974	1975
B01 of 41024	I 96 over the Thornapple River, east of Grand Rapids	1974	Latex concrete	East Half of Deck[7]									
				EBOL	--	--	--	--	--	--	--	--	0.51
				WBOL	--	--	--	--	--	--	--	--	0.57
				West Half of Deck[8]									
				EBOL	--	--	--	--	--	--	--	--	0.52
				WBOL	--	--	--	--	--	--	--	--	0.54
X01 of 33034	US 27 over RR	1975	Latex concrete	NBOL	--	--	--	--	--	--	--	--	0.47
			1/2 latex concrete and 1/2 latex mortar	NBCL	--	--	--	--	--	--	--	--	0.43
			Latex mortar	NBIL	--	--	--	--	--	--	--	--	0.37
				SBOL	--	--	--	--	--	--	--	--	0.52
				SBCL	--	--	--	--	--	--	--	--	0.46
				SBIL	--	--	--	--	--	--	--	--	0.43

(7) Metal comb finish
(8) Burlap drag finish

TABLE 18
EXPERIMENTAL SKID-RESISTANT RESURFACING

Control Section	Location	Construction Months	Mixture Type	Route	Direction and Lane	Average Coefficient of Wet Sliding Friction											
						1965	1966		1967	1968	1969	1970	1971	1972	1973	1974	1975
							Spring	Fall									
09033	M 13 at Linwood Rd, north of Bay City	Oct. 1965	80-lb Sandstone + asphalt	M 13	NBOL	0.71	0.49	0.43	0.50	0.51	0.51	0.50	0.50	0.53	0.49	0.49	(3)
				M 13	NBIL	0.72	0.52	0.46	0.57	0.59	0.60	0.58	0.59	0.64	0.60	0.56	(3)
				M 13	SBOL	0.73	0.49	0.45	0.54	0.54	0.53	0.55	0.51	0.55	0.50	0.49	(3)
				M 13	SBIL	0.74	0.58	0.49	0.62	0.63	0.63	0.58	0.59	0.56	0.60	0.57	(3)
09033	M 13 at Grove St, north of Bay City	Sept.-Oct. 1965	80-lb Sandstone + asphalt	M 13	NBOL	0.73	0.53	0.49	0.59	0.55	0.56	0.55	0.53	0.55	0.53	0.51	0.59
				M 13	NBIL	0.76	0.61	0.56	0.66	0.62	0.66	0.67	0.66	0.66	0.64	0.62	0.68
				M 13	SBOL	0.75	0.51	0.44	0.40	--	0.43(1)	0.52(1)	0.45(1)	0.48(1)	0.46(1)	0.53(2)	0.42(1)
				M 13	SBIL	0.76	0.55	0.51	0.42	--	0.44(1)	0.55(1)	0.50(1)	0.55(1)	0.48(1)	0.51(2)	0.43(1)
09042	M 25 at Wagner Rd, east of Bay City	Sept. 1965	80-lb Sandstone + asphalt	M 25	EB	0.77	0.53	0.47	0.51	0.54	0.64	0.62	0.55	0.55	0.48	0.52	0.64
				M 25	WB	0.74	0.54	0.47	0.53	0.55	0.66	0.60	0.57	0.58	0.51	0.55	0.61
25072	M 54 at M 54BR (south junction) south of Flint	Oct. 1965	50-lb crushed beach pebbles + asphalt	M 54	NBOL	0.60	0.49	0.43	0.42	0.43	0.48	0.42	0.48	0.48	0.46	0.43	0.51
				M 54	NBIL	0.66	0.47	0.41	0.44	0.45	0.52	0.49	0.52	0.53	0.52	0.49	0.53
				M 54BR	SBOL	0.62	0.47	0.46	0.40	0.44	0.48	0.38	0.45	0.44	0.45	0.43	0.40
				M 54BR	SBIL	0.66	0.47	0.41	0.41	0.48	0.54	0.48	0.54	0.52	0.53	0.47	0.51
				M 54 (Dort)	WBOL	0.62	0.45	0.45	0.46	0.50	0.54	0.52	0.61	0.54	0.49	0.48	(3)
				M 54 (Dort)	WBIL	0.62	0.45	0.47	0.48	0.52	0.55	0.50	0.56	0.51	0.46	0.47	(3)
81031	US 12, west from Neblo Rd, northwest of Clinton	Sept. 1965	50-lb 3BC + hot asphalt emulsion	US 12	EB	0.60	0.49	0.49	0.49	0.52	0.51	0.52	0.48	0.55	0.38	0.48	0.45
				US 12	WB	0.62	0.47	0.45	0.49	0.55	0.52	0.50	0.47	0.53	0.38	0.48	0.45
81031	US 12, east from Lima Center Rd, northwest of Clinton	Sept. 1965	50-lb 2MS + hot asphalt emulsion	US 12	EB	0.58	0.48	0.44	0.55	0.55	0.57	0.52	0.50	0.53	0.36	0.47	0.53
				US 12	WB	0.60	0.49	0.47	0.54	0.54	0.57	0.55	0.51	0.54	0.38	0.48	0.52
82053	US 24 at Fenkell Rd, (Five Mile Rd), Detroit	Sept. 1965	50-lb 3BC + asbestos fiber + asphalt	US 24	NBOL	0.56	0.36	0.34	0.37	0.38	0.42	0.35	0.36	0.42	0.40	0.35	0.31
				US 24	NB#3	0.53	0.36	0.34	0.41	0.40	0.41	0.38	0.37	0.42	0.39	0.37	0.34
				US 24	NB#2	0.57	0.36	0.34	0.40	0.41	0.43	0.41	0.37	0.43	0.37	0.40	0.36
				US 24	NBIL	0.60	--	--	--	--	--	--	--	--	--	0.39	0.35
				US 24	SBOL	0.52	0.38	0.37	0.41	0.39	0.43	0.38	0.40	0.46	0.44	0.39	0.36
				US 24	SBCL	0.60	0.37	0.35	0.42	0.42	0.43	0.40	0.42	0.48	0.43	0.43	0.39
				US 24	SBIL	0.59	0.35	0.34	0.44	0.40	0.42	0.40	0.43	0.49	0.43	0.45	0.41
				Five Mile Rd	EBOL	0.51	0.37	0.31	0.36	0.38	0.37	0.37	0.38	0.43	0.38	0.42	0.41
				Five Mile Rd	EBIL	0.55	0.39	0.33	0.41	0.40	0.42	0.41	0.39	0.49	0.37	0.39	0.42
				Five Mile Rd	WBOL	0.55	0.37	0.33	0.39	0.40	0.44	0.41	0.39	0.49	0.37	0.41	0.40
				Five Mile Rd	WBIL	0.60	0.39	0.33	0.43	0.44	0.44	0.42	0.42	0.49	0.37	0.47	0.45

(1) Bituminous concrete, non-experimental
(2) Tested on intersection area only
(3) Resurfaced

TABLE 18 (Cont.)
EXPERIMENTAL SKID-RESISTANT RESURFACING

Control Section	Location	Construction Months	Mixture Type	Route	Direction and Lane	Average Coefficient of Wet Sliding Friction											
						1965	1966		1967	1968	1969	1970	1971	1972	1973	1974	1975
							Spring	Fall									
82053	US 24 at Plymouth Rd, Detroit	Sept.-Oct. 1965	50-lb 2MS + asbestos fiber + asphalt	US 24	NBOL	0.59	0.36	0.35	0.42	0.43	0.43	0.43	0.45	0.49	0.44	0.48	0.43
				US 24	NB#3	0.59	0.37	0.36	0.41	0.43	0.45	0.42	0.47	0.48	0.47	0.51	0.45
				US 24	NB#2	0.62	0.40	0.36	0.44	0.47	0.48	0.51	0.51	0.57	0.47	0.52	0.46
				US 24	NBIL	0.62	0.40	0.38	0.45	0.45	0.46	0.55	0.51	0.51	0.46	0.48	0.48
				US 24	SBOL	0.60	0.37	0.35	0.42	0.40	0.44	0.40	0.44	0.48	0.46	0.44	0.36
				US 24	SB#3	0.62	0.39	0.35	0.43	0.43	0.46	0.42	0.45	0.47	0.43	0.41	0.40
				US 24	SB#2	0.61	0.39	0.36	0.45	0.47	0.46	0.45	0.48	0.54	0.45	0.41	0.43
				US 24	SBIL	0.64	0.42	0.37	0.50	0.52	0.46	0.59	0.51	0.57	0.55	0.56	0.58
				Plymouth Rd	EBOL	0.62	0.40	0.36	0.41	0.41	0.46	0.48	0.45	0.45	0.46	0.46	0.42
				Plymouth Rd	EBCL	0.63	0.39	0.36	0.41	0.43	0.44	0.44	0.42	0.49	0.47	0.44	0.48
				Plymouth Rd	EBIL	0.64	0.39	0.37	0.41	0.44	0.44	0.51	0.48	0.51	0.47	0.48	0.48
				Plymouth Rd	WBOL	0.63	0.40	0.38	0.46	0.47	0.46	0.49	0.49	0.53	0.48	0.46	0.49
				Plymouth Rd	WBCL	0.61	0.41	0.37	0.44	0.44	0.46	0.45	0.42	0.50	0.48	0.46	0.44
				Plymouth Rd	WBIL	0.60	0.40	0.38	0.46	0.48	0.45	0.53	0.49	0.58	0.46	0.47	0.51
82053	US 24 at west Chicago Rd, Detroit	Oct. 1965	80-lb 2MS + 31AA + asphalt	US 24	NBOL	0.57	0.38	0.37	0.43	0.45	0.44	0.43	0.46	0.49	0.47	0.49	0.44
				US 24	NB#3	0.58	0.40	0.37	0.43	0.45	0.46	0.43	0.44	0.49	0.45	0.48	0.46
				US 24	NB#2	0.61	0.41	0.36	0.43	0.47	0.46	0.45	0.47	0.52	0.46	0.49	0.46
				US 24	NBIL	0.62	0.40	0.37	0.42	0.49	0.46	0.45	0.46	0.52	0.46	0.50	0.44
				US 24	SBOL	0.56	0.42	0.41	0.44	0.41	0.45	0.42	0.44	0.50	0.42	0.47	0.44
				US 24	SBCL	0.57	0.41	0.40	0.43	0.46	0.45	0.44	0.44	0.48	0.42	0.45	0.41
				US 24	SBIL	0.59	0.41	0.40	0.43	0.47	0.46	0.43	0.47	0.50	0.46	0.47	0.43
				W. Chicago Rd	EBRT	0.63	0.45	0.44	0.48	0.50	0.45	0.45	0.51	0.56	0.42	0.50	0.46
				W. Chicago Rd	EBIL	0.63	0.44	0.40	0.42	0.46	0.45	0.45	0.47	0.54	0.42	0.48	0.45
				W. Chicago Rd	WBRT	0.63	0.43	0.41	0.47	0.50	0.46	0.48	0.46	0.52	(4)	(4)	(4)
				W. Chicago Rd	WBIL	0.63	0.41	0.37	0.47	0.47	0.45	0.45	0.48	0.51	(4)	(4)	(4)
82052	US 24 at Sibley Rd, Detroit	Oct. 1965	80-lb 3NS + 31AA + asphalt	US 24	NBOL	0.50	0.41	0.34	0.44	0.45	0.49	0.44	0.44	0.44	0.42	0.43	0.44
				US 24	NBIL	0.52	0.42	0.38	0.47	0.47	0.50	0.48	0.49	0.48	0.51	0.45	0.49
				US 24	SBOL	0.51	0.43	0.39	0.46	0.47	0.52	0.50	0.47	0.48	0.51	0.42	0.46
				US 24	SBIL	0.51	0.42	0.38	0.46	0.46	0.50	0.48	0.50	0.48	0.49	0.42	0.48
				Sibley Rd	EB	0.54	0.39	0.36	0.42	0.43	0.45	0.48	0.47	0.44	0.47	0.42	(5)
				Sibley Rd	WB	0.52	0.41	0.39	0.45	0.44	0.44	0.43	0.49	0.43	0.48	0.43	(5)
82053	US 24 northbound (Telegraph Rd) from Joy Rd to West Chicago	Aug. 1968	80-lb crushed fine aggregate	US 24	NBOL	—	—	—	—	0.59	0.44	0.41	0.42	0.48	0.47	0.46	0.45
				US 24	NB#3	—	—	—	—	0.60	0.48	0.41	0.42	0.48	0.48	0.46	0.47
				US 24	NB#2	—	—	—	—	0.61	0.46	0.42	0.44	0.50	0.48	0.48	0.45
				US 24	NBIL	—	—	—	—	0.61	0.45	0.42	0.46	0.49	0.46	0.48	0.50

(4) Deleted by new construction
(5) Pavement broken up

TABLE 19
TEXTURED CONCRETE PAVEMENT SURFACES ON NORTHBOUND I 69
(Project I 13074-001)

Texture Method	Test Limits (Sta. to Sta.)	Direction and Lane	Average Coefficient of Wet Sliding Friction					
			1970	1971	1972	1973	1974	1975
Conventional Burlap	2232+00 to 2238+00	NBOL	0.61	0.51	0.47	0.35	0.30	0.43
		NBIL	0.65	0.63	0.61	0.52	0.46	0.65
Longitudinal Brooming	2242+00 to 2248+00	NBOL	0.69	0.56	0.49	0.33	0.32	0.43
		NBIL	0.72	0.68	0.65	0.52	0.47	0.66
Transverse Combing	2253+00 to 2259+00	NBOL	0.86	0.70	0.60	0.37	0.39	0.49
		NBIL	0.87	0.86	0.78	0.63	0.54	0.70
Transverse Brooming	2272+00 to 2278+00	NBOL	0.76	0.56	0.48	0.33	0.33	0.44
		NBIL	0.79	0.74	0.72	0.58	0.51	0.64

TABLE 20
GUSSASPHALT AND MASTIPHALT SKID TEST SUMMARY

Tested Surface	Lane	Coefficient of Wet Sliding Friction																				
		10/27/72			11/10/72			1/18/73			5/10/73			12/3/73			6/4/74			6-19-75		
		Low	High	Avg	Low	High	Avg	Low	High	Avg	Low	High	Avg	Low	High	Avg	Low	High	Avg	Low	High	Avg
Gussasphalt (C.S. 53031)	NB	0.76	0.82	0.78	--	--	--	0.57	0.62	0.60	0.60	0.61	0.61	--	--	--	0.40	0.45	0.42	0.52	0.55	0.53
	SB	0.79	0.83	0.81	--	--	--	0.63	0.68	0.66	0.55	0.59	0.58	--	--	--	0.42	0.46	0.44	0.51	0.55	0.53
Mastiphalt (C.S. 53031)	NB	0.37	0.50	0.44	--	--	--	0.48	0.49	0.48	0.56	0.58	0.57	--	--	--	0.40	0.45	0.42	0.52	0.54	0.53
	SB	0.37	0.49	0.42	--	--	--	0.54	0.56	0.55	0.55	0.60	0.57	--	--	--	0.45	0.50	0.48	0.52	0.52	0.52
Gussasphalt (B2 of 64013)	NB	--	--	--	0.73	0.76	0.74	0.64	0.68	0.66	0.60	0.64	0.62	0.49	0.53	0.51	0.37	0.41	0.39	0.49	0.52	0.51
	SB	--	--	--	Not Completed			0.63	0.66	0.64	0.58	0.63	0.60	0.45	0.50	0.48	0.38	0.41	0.40	0.48	0.52	0.51

TABLE 21
SPRAY GRIP SURFACE, US 24 (TELEGRAPH RD) AT 10 MILE RD, OAKLAND COUNTY

Test Location	Direction and Lane	Coefficient of Wet Sliding Friction																	
		Before Spray Grip			After Spray Grip						New Spray Grip Surface								
		9-19-72			11-2-72			6-10-73			10-29-73			8-11-74			7-30-75		
		Low	High	Avg	Low	High	Avg	Low	High	Avg	Low	High	Avg	Low	High	Avg	Low	High	Avg
US 24 (Telegraph Rd), Immediately north of 10 Mile Rd	SBRT	0.31	0.36	0.34	0.79	0.79	0.79	0.67	0.70	0.69	0.77	0.81	0.79	0.69	0.72	0.70	0.67	0.69	0.68
	SBOL	0.37	0.38	0.37	0.73	0.79	0.77	0.63	0.69	0.66	0.82	0.87	0.85	0.73	0.73	0.73	0.67	0.69	0.68
	SB#3	0.33	0.34	0.33	0.78	0.79	0.79	0.69	0.69	0.69	0.77	0.79	0.78	0.68	0.70	0.69	0.64	0.69	0.67
	SB#2	0.33	0.36	0.34	0.76	0.79	0.78	0.66	0.67	0.66	0.85	0.86	0.85	0.70	0.73	0.72	0.69	0.69	0.69
	SBIL	0.34	0.37	0.36	0.78	0.79	0.79	0.64	0.69	0.66	0.82	0.83	0.83	0.70	0.73	0.72	0.69	0.70	0.69
10 Mile Rd, immediately west of US 24	EB	0.33	0.41	0.38	0.77	0.78	0.78	0.65	0.71	0.68	0.73	0.78	0.75	0.66	0.69	0.67	0.66	0.66	0.66

TABLE 22

EPOXY AND NATURAL EMERY SEAL COAT; CUT RIVER BRIDGE (B01 of 49023)

Test Location	Surface Type	Lane	Coefficient of Wet Sliding Friction					
			9-23-74			7-7-75		
			Low	High	Avg	Low	High	Avg
East of Bridge	Bit	EB	0.43	0.48	0.45	--	--	--
		WB	0.56	0.60	0.58	--	--	--
On Bridge	Epoxy and Natural Emery	EB	0.75	0.81	0.77	0.60	0.67	0.65
		WB	0.78	0.82	0.80	0.58	0.64	0.62
West of Bridge	Bit	EB	0.51	0.56	0.54	--	--	--
		WB	0.58	0.61	0.59	--	--	--

TABLE 23
M 37 LAKELITE AGGREGATE SECTIONS
(Project Mbr 62032-04779A)

Section No.	Station to Station	Percent Bitumen	Lakelite Aggregate	Lane	Coefficient of Wet Sliding Friction														
					11-9-72			5-29-73			11-14-73			6-4-74			7-30-75		
					Low	High	Avg	Low	High	Avg	Low	High	Avg	Low	High	Avg	Low	High	Avg
1	240+00 to 244+75	9.0	30% 31A	NB	0.55	0.59	0.57	0.69	0.74	0.72	0.68	0.73	0.70	0.62	0.65	0.63	0.65	0.68	0.66
2	244+75 to 264+15	9.0	32% 31A	NB	0.60	0.61	0.61	0.73	0.76	0.75	0.69	0.72	0.70	0.65	0.68	0.67	0.66	0.70	0.68
3	264+15 to 290+95	8.0	16% 31A	NB	0.50	0.55	0.52	0.69	0.70	0.69	0.60	0.65	0.63	0.58	0.62	0.60	0.62	0.64	0.63
4	290+95 to 292+30	9.5	100% 31A	NB	0.92	0.94	0.93	0.76	0.83	0.79									
5	292+30 to 294+20	10.0	100% 31A	NB	0.88	0.90	0.89	0.82	0.86	0.84	Resurfaced								
6	294+20 to 295+00	8.5	28% 31A	NB	0.80	0.84	0.82	0.72	0.76	0.75									
7	295+00 to 302+50	8.0	25% 31A	NB	0.50	0.61	0.56	0.70	0.74	0.72	0.62	0.68	0.66	0.63	0.68	0.65	0.64	0.68	0.66
8	307+70 to 291+25	9.5	42% 25A	SB	0.66	0.69	0.68	0.78	0.81	0.79	0.69[1] 0.52[2]	0.73 0.62	0.71 0.57	0.71	0.73	0.72	0.70	0.72	0.71
9	291+25 to 264+65	8.0	16% 31A	SB	0.55	0.58	0.57	0.68	0.74	0.71	0.61	0.65	0.63	0.63	0.65	0.64	0.62	0.62	0.62
10	264+65 to 254+00	9.0	30% 31A	SB	0.55	0.58	0.56	0.71	0.72	0.72	0.63	0.67	0.65	0.68	0.71	0.69	0.64	0.65	0.64
11	254+00 to 242+15	9.0	35% 31A	SB	0.65	0.66	0.66	0.76	0.80	0.78	0.70	0.74	0.72	0.74	0.75	0.75	0.68	0.71	0.70
12	242+15 to 239+75	9.0	40% 31A	SB	0.66	0.70	0.68	0.84	0.87	0.86	0.79	0.80	0.79	0.76	0.81	0.78	0.73	0.76	0.75
North Control	302+50 North	---	None	NB	0.50	0.51	0.51	0.58	0.70	0.65	0.56	0.67	0.61	0.58	0.70	0.64	0.65	0.67	0.66
	307+70 North	---	None	SB	0.50	0.52	0.51												
South Control	240+00 South	---	None	NB	0.45	0.48	0.47	0.63	0.66	0.65	0.60	0.66	0.63	0.57	0.67	0.62	0.60	0.62	0.61
	239+75 South	---	None	SB	0.49	0.50	0.50												

[1] North of 14 Mile Rd
[2] South of 14 Mile Rd

TABLE 24
M 43 LAKELITE AGGREGATE SECTION
(Project Mm 2SC-7A, Control Section 08012)
Research Project 72 NM-347

Location	Surface	Lane	Coefficient of Wet Sliding Friction														
			9-6-72			5-30-73			11-14-73			5-10-74			6-30-75		
			Low	High	Avg	Low	High	Avg	Low	High	Avg	Low	High	Avg	Low	High	Avg
Coats Grove Rd South (N of Hastings)	28B Agg. Seal	NB	0.59	0.63	0.61	0.64	0.64	0.64	0.49	0.53	0.52	0.53	0.57	0.56	0.57	0.61	0.59
		SB	0.57	0.60	0.59	0.62	0.62	0.62	0.58	0.61	0.60	0.56	0.57	0.57	0.58	0.61	0.59
Coats Grove Rd N 0.5 mile	(Light wt Agg. Seal)	NB	0.87	0.88	0.87	0.80	0.85	0.83	0.58	0.69	0.65	0.58	0.62	0.60	0.52	0.53	0.53
		SB	0.90	0.91	0.91	0.78	0.85	0.82	0.56	0.70	0.67	0.58	0.64	0.61	0.58	0.60	0.59
From 0.5 Mile N of Coats Grove Rd N	28B Agg. Seal	NB	0.57	0.59	0.58	0.64	0.68	0.66	0.50	0.55	0.52	0.55	0.57	0.56	0.55	0.59	0.56
		SB	0.58	0.60	0.59	0.63	0.68	0.66	0.57	0.59	0.58	0.56	0.58	0.57	0.58	0.60	0.59

TABLE 25
TRINIDAD ASPHALT SURFACING
(Project Mb 72013-06140A)
Research Project 73 C-16

Location Station to Station	Surface Type	Direction and Lane	Coefficient of Wet Sliding Friction					
			8-19-74			9-15-75		
			Low	High	Avg	Low	High	Avg
450+00 - 482+00	6.0 Percent Trinidad Asphalt (Type C)	NBOL	0.48	0.50	0.49	0.57	0.59	0.58
		NBIL	0.56	0.59	0.58	0.61	0.63	0.62
482+00 - 514+00	6.5 Percent Trinidad Asphalt (Type C)	NBOL	--	--	--	0.57	0.58	0.58
		NBIL	--	--	--	0.63	0.65	0.64
514+00 - 563+00	6.5 Percent Trinidad Asphalt (Type M)	NBOL	0.48	0.50	0.49	0.58	0.58	0.58
		NBIL	0.54	0.57	0.56	0.63	0.64	0.64
563+00 - 612+00	6.0 Percent Trinidad Asphalt (Type M)	NBOL	0.51	0.53	0.52	0.59	0.60	0.59
		NBIL	0.58	0.59	0.59	0.63	0.64	0.63
612+00 - 706+00	Bituminous Concrete (Type M)	NBOL	0.51	0.53	0.52	0.57	0.59	0.58
		NBIL	0.58	0.59	0.59	0.64	0.66	0.65
706+00 - 659+00	6.0 Percent Trinidad Asphalt (Type M)	SBOL	0.42	0.46	0.45	0.53	0.54	0.54
		SBIL	0.53	0.56	0.54	0.64	0.65	0.64
659+00 - 612+00	6.5 Percent Trinidad Asphalt (Type M)	SBOL	0.50	0.52	0.51	0.55	0.55	0.55
		SBIL	0.58	0.63	0.60	0.60	0.64	0.62
612+00 - 514+00	Bituminous Concrete (Type M)	SBOL	0.51	0.55	0.53	0.55	0.55	0.55
		SBIL	0.58	0.62	0.60	0.61	0.64	0.63
514+00 - 450+00	Bituminous Concrete (Type C)	SBOL	--	--	--	0.58	0.59	0.58
		SBIL	--	--	--	0.63	0.63	0.63

TABLE 26
NAPOLEON SANDSTONE SURFACE
(Project Mb 46061-04845A)

Mix No.	Blend No.	Station to Station	Lane	Coefficient of Wet Sliding Friction														
				8-23-73			10-17-73			4-4-74			9-16-74			7-15-75		
				Low	High	Avg	Low	High	Avg	Low	High	Avg	Low	High	Avg	Low	High	Avg
1	II	490+88 to 496+50	NB	0.34	0.38	0.36	0.28	0.34	0.30	0.55	0.59	0.57	0.39	0.42	0.40	0.41	0.45	0.43
2	II	486-50 to 490+88	NB	0.35	0.42	0.38	0.30	0.31	0.30	0.52	0.56	0.53	0.38	0.40	0.39	0.42	0.45	0.44
2	II	492-26 to 496-50	SB	0.50	0.55	0.53	0.37	0.41	0.38	0.58	0.59	0.59	0.42	0.46	0.44	0.44	0.45	0.44
3	II	484-20 to 492-26	SB	0.41	0.45	0.43	0.28	0.33	0.31	0.55	0.59	0.58	0.40	0.43	0.42	0.44	0.46	0.45
5	I	481-10 to 486+50	NB	0.30	0.32	0.31	0.26	0.31	0.29	0.48	0.48	0.48	0.42	0.43	0.42	0.41	0.46	0.43
6	I	476-50 to 481+10	NB	0.34	0.39	0.37	0.26	0.28	0.27	0.50	0.54	0.52	0.39	0.43	0.41	0.42	0.46	0.44
6	I	474+30 to 484+20	SB	0.40	0.42	0.41	0.22	0.26	0.25	0.54	0.56	0.55	0.38	0.41	0.39	0.40	0.44	0.43
7	III	466+50 to 476+50	NB	0.40	0.42	0.41	0.31	0.35	0.32	0.47	0.49	0.48	0.42	0.45	0.44	0.48	0.51	0.49
7	III	466+50 to 474+30	SB	0.37	0.40	0.39	0.25	0.29	0.27	0.51	0.54	0.53	0.39	0.42	0.41	0.46	0.48	0.47
9	IV	456+50 to 466+50	NB	0.45	0.47	0.46	0.31	0.35	0.33	0.49	0.50	0.50	0.43	0.45	0.44	0.48	0.48	0.48
9	IV	456+40 to 466+50	SB	0.46	0.52	0.49	0.32	0.36	0.34	0.54	0.58	0.57	0.43	0.46	0.44	0.49	0.50	0.50
10	V	446+50 to 456+50	NB	0.45	0.51	0.47	0.32	0.37	0.34	0.53	0.56	0.54	0.42	0.44	0.43	0.44	0.48	0.46
10	V	446+50 to 456+40	SB	0.48	0.51	0.49	0.29	0.34	0.32	0.56	0.59	0.58	0.44	0.46	0.45	0.46	0.48	0.47

TABLE 27
WHITE PINE SLAG
Research Project 72 NM-316

Test Date	Coefficient of Wsf		
	Low	High	Avg
10-2-73	0.47	0.58	0.53
9-25-74	0.61	0.71	0.65
7-9-75	0.47	0.66	0.57
9-24-75	0.47	0.59	0.54

TABLE 28
HOT PLANT MIX SEAL
(Project Mb 73062-05917A)
Research Project 73 F-134

Test Location	Surface Type	Direction and Lane	Average Coefficient of Wsf			
			9-13-73	4-14-74	9-23-74	9-30-75
M 46 from Elm St east to RR	Bit. Conc.	EBOL	0.52	0.53	0.49	0.40
		WBOL	0.51	0.50	0.48	0.37
M 46 from RR east to Williams St	Hot Plant Mix Seal	EBOL	0.52	0.58	0.52	0.43
		WBOL	0.51	0.58	0.54	0.41

TABLE 29
PAVEMENT GROOVING

Control Section	Location	Type of Grooving	Direction and Lane	Average Coefficient of Wet Sliding Friction			
				1974		1975	
				Non-Grooved Control	Grooved Surface	Non-Grooved Control	Grooved Surface
02041	M 28 curve at Hickory St, City of Munising	Longitudinal [1]	EBOL	0.43	0.41	0.38	0.37
			EBIL	0.43	0.37	0.42	0.33
			WBOL	0.42	0.42	0.32	0.31
			WBIL	0.38	0.37	0.37	0.37
09042	Eastbound M 25 curve at Thomas St, Bay County	Longitudinal [1]	EBOL	0.38	0.36	0.37	0.42
			EBIL	0.40	0.45	0.44	0.38
50023	M 59 curve between Dequindre and Ryan Rd	Longitudinal [1]	EBOL	0.27	0.30	0.34	0.39
			EBIL	0.32	0.40	0.47	0.39
			WBOL	0.26	0.31	0.37	0.36
			WBIL	0.31	0.32	0.40	0.34
62031	M 37 from Jefferson St to River St, City of Newaygo	Longitudinal [1]	NBOL	0.35	0.36	0.34	0.36
			NBIL	0.35	0.34	0.33	0.34
			SBOL	0.36	0.33	0.31	0.38
			SBIL	0.37	0.35	0.33	0.36
			NBIL [2]	0.57	0.56	0.45	0.45
			SBIL [2]	0.55	0.52	0.51	0.50
11053	Northbound US 23 from Pleasant St to Ship St, City of St. Joseph	Transverse [1]	NBOL	0.22	0.24	0.21	0.24
			NBIL	0.31	0.34	0.29	0.33
23012 and 33041	US 27 approaches to Waverly Rd, Eaton and Ingham Counties	Transverse [3]	NEBOL	0.33	0.35	0.38	0.36
			NEBIL	0.36	0.35	0.35	0.33
			SWBOL	0.34	0.36	0.37	0.33
			SWBIL	0.31	0.30	0.38	0.36
56023	Eastbound M 20 at Ashman St, City of Midland	Transverse [4]	EBOL	0.38	0.35	0.35	0.32
			EBCL	0.40	0.37	0.33	0.32
			EBIL	0.39	0.36	0.35	0.33
56023	Eastbound M 20 at Rodd St, City of Midland	Transverse [4]	EBOL	0.33	0.40	0.32	0.33
			EBCL	0.37	0.38	0.31	0.34
			EBIL	0.36	0.36	0.32	0.32
56023	Eastbound M 20 at Cronkwright, City of Midland	Transverse [4]	EBOL	0.37	0.38	0.33	0.34
			EBCL	0.40	0.39	0.34	0.34
			EBIL	0.36	0.40	0.36	0.39
76021	Temporary Eastbound I 69 at M 52	Transverse [5]	EBOL	0.37	0.38	0.29	0.27
			EBIL	0.39	0.38	0.36	0.29
81081	M 17 at Golfside, City of Ypsilanti	Transverse [6]	EBOL	0.32	0.38	0.29	0.35
			EBIL	0.37	0.39	0.36	0.37
			WBOL	0.34	0.42	0.30	0.41
			WBIL	0.29	0.37	0.29	0.37
81081	M 17 at Hewitt St, City of Ypsilanti	Transverse [6]	EBOL	0.38	0.45	0.29	0.34
			EBIL	0.36	0.41	0.30	0.35
			WBOL	0.38	0.44	0.31	0.39
			WBIL	0.38	0.43	0.33	0.39
81081	M 17 at Mansfield, City of Ypsilanti	Transverse [6]	EBOL	0.34	0.40	0.25	0.33
			EBIL	0.37	0.40	0.26	0.35
			WBOL	0.41	0.43	0.32	0.38
			WBIL	0.42	0.45	0.32	0.36
81081	M 17 at Oakwood, City of Ypsilanti	Transverse [6]	EBOL	0.34	0.47	0.35	0.41
			EBIL	0.46	0.46	0.35	0.40
			WBOL	0.36	0.44	0.30	0.39
			WBIL	0.35	0.40	0.31	0.35
81081	Eastbound M 17 at Summit St, City of Ypsilanti	Transverse [6]	EBOL	0.35	0.35	0.32	0.31
			EBCL	0.32	0.35	0.28	0.29
			EBIL	0.30	0.33	0.31	0.33

[1] 0.095 in. wide, 3/16 in. deep, center to center spacing 3/4 in.
[2] Bituminous surface.
[3] 0.095 in. wide, 3/16 in. deep, center to center spacing 1-1/2 in.
[4] 0.095 in. wide, 3/16 in. deep, center to center spacing 1 in.
[5] 0.095 in. wide, 3/16 in. deep, center to center spacing 1-1/4 in.
[6] 1/8 in. wide, 3/16 in. deep, center to center spacing 3/4 in.

SECTION V

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 are skid tested to indicate priorities for resurfacing. In some cases, these locations are used for testing experimental skid-resistant resurfacing mixtures.

Selection of high-accident locations for this year was made by the Traffic and Safety Division and are based on 1974 accident data. Skid tests yielded average Wsf values below 0.40 at 81.5 percent of the 303 lanes tested in 1975. Average friction levels for 30.7 percent were below 0.30 while 4.3 percent averaged lower than 0.20.

During 1975, skid tests were conducted on 29 major highway routes. Testing was dispersed throughout eight districts, 17 counties, and 65 separate locations. Table 30 summarizes the high accident skid tests.

TABLE 30
HIGH-ACCIDENT LOCATION SUMMARY

	Control Section	Location and Mileage	1974 Accidents		Lane Tested	Surface Type	Coefficient of wsf		
			Total	% Wet Surface			Low	High	Avg
DISTRICT 1		Houghton County							
	31012	M 26 from 8.44 to 8.64 (US 41, 8.62), Village of Houghton	14	57	EBOL	Conc	0.23	0.26	0.25
					EBIL	Conc	0.22	0.27	0.25
					WBOL	Conc	0.25	0.26	0.26
					WBIL	Conc	0.22	0.29	0.25
					EBOL	Bit	0.37	0.46	0.41
					EBIL	Bit	0.44	0.45	0.45
	31061	US 41 from 14.71 to 14.91 (Upland-Forest Hill Rd, 14.91), Village of Houghton	13	31	NBOL	Conc	0.28	0.34	0.30
					NBIL	Conc	0.29	0.34	0.32
					SBOL	Conc	0.27	0.29	0.28
					SBIL	Conc	0.31	0.37	0.33
	31061	US 41 from 15.30 to 15.50 (Pearl St, 15.32), Village of Houghton	13	31	NB	Conc	0.27	0.32	0.29
					SB	Conc	0.31	0.34	0.33
	31061	US 41 from 15.96 to 16.15 one way eastbound (Dodge St, 16.03), Village of Houghton	13	31	EBOL	Bit	0.41	0.48	0.45
					EBIL	Bit	0.39	0.42	0.41
DISTRICT 3		Grand Traverse County							
	28013	US 31, M 72 and M 37 from 1.66 to 1.75 (Peninsula Dr., 1.68), City of Traverse City	15	40	NBOL	Conc	0.21	0.26	0.23
					NBIL	Conc	0.26	0.27	0.26
					SBOL	Conc	0.20	0.25	0.22
					SBIL	Conc	0.23	0.25	0.24
	28013	US 31, M 72 and M 37 from 1.90 to 2.10 (E Jct M 37, 2.00), City of Traverse City	33	45	NBOL	Bit	0.16	0.22	0.20
					NBIL	Bit	0.16	0.26	0.20
					SBOL	Bit	0.16	0.27	0.20
					SBIL	Bit	0.16	0.19	0.18
	28013	US 31 and M 72 from 2.14 to 2.34 (Fairground Entrance, 2.22), City of Traverse City	18	33	NBOL	Conc	0.22	0.25	0.23
					NBIL	Conc	0.20	0.22	0.21
					SBOL	Conc	0.20	0.27	0.22
					SBIL	Conc	0.21	0.28	0.25
		Manistee County							
	51011	US 31 from 6.02 to 6.22 (M 110, 6.22), City of Manistee	12	33	NBOL	Conc	0.15	0.21	0.19
					NBIL	Conc	0.25	0.33	0.28
					NBIL	Bit	0.23	0.31	0.27
					SBOL	Conc	0.28	0.29	0.28
					SBIL	Conc	0.25	0.29	0.26
	51011	US 31 from 3.49 to 3.65 (Merkey Rd, 3.57), south of Manistee	--	--	NB	Bit	0.23	0.27	0.25
					SB	Bit	0.26	0.29	0.27
DISTRICT 4		Emmet County							
	24011	US 31, M 68 from 9.76 to 9.90 (Manvel Rd, 9.89) Bear Creek Township	11	36	NBOL	Bit	0.25	0.29	0.27
					NBIL	Bit	0.25	0.31	0.28
					SB	Bit	0.35	0.41	0.37
		Ogemaw County							
	65032	M 55 from 0.50 to 0.70 (3rd St, 0.70), City of West Branch	14	36	EBOL	Bit	0.28	0.35	0.33
					EBIL	Bit	0.27	0.32	0.29
					WBOL	Bit	0.27	0.34	0.30
					WBIL	Bit	0.29	0.34	0.31

TABLE 30 (Cont.)
HIGH-ACCIDENT LOCATION SUMMARY

DISTRICT 5

Control Section	Location and Mileage	1974 Accidents		Lane Tested	Surface Type	Coefficient of wsf		
		Total	% Wet Surface			Low	High	Avg
Kent County								
41012	M 44 connector from 0.00 to 0.18 (I 96, 0.00), City of Grand Rapids	37	49	NBOL	Conc	0.33	0.34	0.34
				NBIL	Conc	0.32	0.39	0.35
				SBOL	Conc	0.35	0.37	0.36
				SBIL	Conc	0.33	0.34	0.33
41012	M 44 connector from 0.59 to 0.79 (4 Mile Rd, 0.74), City of Grand Rapids and Township	31	39	NBOL	Bit	0.45	0.50	0.47
				NBIL	Bit	0.39	0.45	0.43
				SBOL	Bit	0.42	0.46	0.43
				SBIL	Bit	0.41	0.47	0.44
41033	M 37 from 0.26 to 0.46 (I 96 ramps, 0.26), City of Walker	31	39	NBOL	Conc	0.39	0.39	0.39
				NBIL	Conc	0.34	0.35	0.34
				SBOL	Conc	0.33	0.39	0.35
				SBIL	Conc	0.34	0.36	0.35
41061	M 11 from 7.34 to 7.54 (Wilson Ave, 7.52), City of Grandville	30	53	EBOL	Conc	0.28	0.35	0.32
				EBIL	Conc	0.28	0.31	0.29
				WBOL	Conc	0.29	0.34	0.32
				WBIL	Conc	0.40	0.47	0.42
				WBLTL	Bit	0.31	0.37	0.33
41062	M 11 from 1.65 to 1.83 (Taft Ave, 1.77), City of Wyoming	31	35	EBOL	Conc	0.26	0.31	0.28
				EBIL	Conc	0.27	0.34	0.31
				WBOL	Conc	0.25	0.28	0.27
				WBIL	Bit	0.38	0.41	0.40
41062	M 11 from 2.16 to 2.35 (Burlingame Ave, 2.15), City of Wyoming	32	38	EBOL	Bit	0.27	0.32	0.30
				EBOL	Conc	0.27	0.28	0.27
				EBIL	Bit	0.32	0.34	0.33
				EBIL	Conc	0.29	0.33	0.31
				WBOL	Conc	0.21	0.26	0.23
				WBOL	Bit	0.28	0.34	0.32
				WBIL	Bit	0.31	0.34	0.32
41062	M 11 from 2.38 to 2.58 (Hook Ave, 2.45), City of Wyoming	50	44	EBOL	Conc	0.22	0.27	0.25
				EBIL	Conc	0.26	0.28	0.27
				WBOL	Bit	0.29	0.37	0.33
				WBIL	Bit	0.34	0.38	0.36
41062	M 11 from 2.59 to 2.72 (Michael-DeHoop, 2.63), City of Wyoming	78	37	EBOL	Bit	0.22	0.27	0.25
				EBIL	Bit	0.21	0.26	0.24
				WBOL	Bit	0.20	0.28	0.25
				WBIL	Bit	0.29	0.34	0.31
41062	M 11 from 2.80 to 3.00 (Riley Blvd, 3.01), City of Wyoming	42	36	EBOL	Conc	0.20	0.25	0.22
				EBIL	Conc	0.25	0.27	0.26
				WBOL	Conc	0.26	0.31	0.28
				WBIL	Bit	0.32	0.38	0.35
41062	M 11 from 3.01 to 3.21 (Clyde Park Ave, 3.15), City of Wyoming	70	39	EBOL	Bit	0.27	0.34	0.31
				EBIL	Bit	0.26	0.39	0.31
				WBOL	Bit	0.26	0.33	0.28
				WBIL	Bit	0.29	0.35	0.33
41062	M 11 from 3.71 to 3.91 (Buchanan Ave, 3.91), City of Wyoming	31	35	EBOL	Bit	0.32	0.35	0.33
				EBIL	Bit	0.26	0.33	0.28
				EBLTL	Bit	0.28	0.35	0.33
				WBOL	Bit	0.25	0.31	0.27
				WBIL	Bit	0.35	0.40	0.37
41063	M 11 from 1.84 to 2.01 (Kalamazoo Ave, 1.93), City of Grand Rapids	73	33	EBOL	Bit	0.35	0.38	0.37
				EBIL	Bit	0.37	0.41	0.39
				WBOL	Bit	0.29	0.33	0.31
				WBIL	Bit	0.28	0.34	0.32
Muskegon County								
61073	US 31 BR from 1.62 to 1.80 (Mears St, 1.78), City of Whitehall	31	39	EBOL	Bit	0.21	0.25	0.23
				EBIL	Bit	0.19	0.23	0.21
				WBOL	Bit	0.28	0.34	0.31
				WBIL	Bit	0.16	0.21	0.18

TABLE 30 (Cont.)
HIGH-ACCIDENT LOCATION SUMMARY

	Control Section	Location and Mileage	1974 Accidents Total	1974 Accidents % Wet Surface	Lane Tested	Surface Type	Coefficient of wsf Low	Coefficient of wsf High	Coefficient of wsf Avg
DISTRICT 5		Muskegon County (Cont.)							
	61151	US 31 BR and BS 96 from 0.67 to 0.87 (Laketon Ave, 0.86), City of Muskegon	34	44	NBOL	Conc	0.28	0.34	0.30
					NBIL	Conc	0.37	0.42	0.40
					SBOL	Conc	0.35	0.40	0.38
					SBIL	Conc	0.38	0.45	0.41
	61153	US 31 BR from 0.36 to 0.55 (M 46, Miller, 0.39), City of Muskegon	32	41	US 31 BR				
					NBOL	Conc	0.31	0.35	0.34
					NBCL	Conc	0.34	0.37	0.36
					NBIL	Conc	0.34	0.35	0.35
					SBOL	Conc	0.35	0.41	0.39
					SBCL	Conc	0.37	0.40	0.38
					SBIL	Conc	0.39	0.40	0.39
					M 46				
					EB	Conc	0.41	0.45	0.42
					WBOL	Conc	0.44	0.48	0.46
					WBIL	Conc	0.26	0.32	0.29
DISTRICT 6		Saginaw County							
	73073	M 58 from 2.21 to 2.41 (Warwick, 2.30), City of Saginaw	32	34	EBOL	Bit	0.18	0.19	0.18
					EBCL	Bit	0.14	0.16	0.15
					EBIL	Bit	0.12	0.14	0.13
					WBOL	Conc	0.22	0.26	0.24
					WBCL	Conc	0.26	0.29	0.27
					WBIL	Conc	0.29	0.32	0.31
	73073	M 58 from 2.89 to 3.09 (Hemmeter Rd, 3.05), Saginaw Township	30	47	EBOL	Conc	0.18	0.22	0.20
					EBIL	Conc	0.10	0.18	0.14
					WBOL	Conc	0.15	0.22	0.18
					WBCL	Conc	0.20	0.21	0.20
					WBIL	Bit	0.23	0.26	0.24
	73073	M 58 from 3.35 to 3.55 (N Center Rd, 3.55), Saginaw Township	55	35	EBOL	Dark Bit	0.20	0.25	0.22
					EBOL	Conc	0.19	0.22	0.20
					EBIL	Dark Bit	0.19	0.27	0.24
					EBIL	Conc	0.15	0.19	0.17
					WBOL	Conc	0.10	0.18	0.15
					WBOL	Dark Bit	0.15	0.22	0.19
					WBCL	Conc	0.21	0.26	0.24
					WBCL	Dark Bit	0.26	0.34	0.31
					WBIL	Dark Bit	0.19	0.20	0.20
					WBIL	Light Bit	0.27	0.32	0.30
	73073	M 58 from 4.13 to 4.32 (Weinecke Rd, 4.30), Saginaw Township	36	33	EBOL	Conc	0.21	0.25	0.23
					EBIL	Conc	0.21	0.25	0.23
					WBOL	Conc	0.22	0.32	0.27
					WBCL	Conc	0.20	0.26	0.24
					WBIL	Conc	0.38	0.45	0.41
DISTRICT 7		Berrien County							
	11031	Southbound M 139 (Fair Ave) from 64.61 to 64.78 (Britain Ave, 64.75), Benton Township	35	37	SBOL	Conc	0.25	0.27	0.26
					SBCL	Conc	0.25	0.27	0.26
					SBIL	Conc	0.31	0.35	0.33
					SBOL	Bit	0.19	0.25	0.22
					SBCL	Bit	0.18	0.19	0.18
					SBIL	Bit	0.20	0.25	0.22
		St. Joseph County							
	78022	US 12 from 12.07 to 12.27 (west Jct M 66, Centerville Rd, 12.13), City of Sturgis	31	45	US 12				
					EBOL	Bit	0.31	0.33	0.32
					EBIL	Bit	0.32	0.37	0.35
					WBOL	Bit	0.31	0.35	0.34
					WBIL	Bit	0.37	0.41	0.39
					M 66				
					NBOL	Bit	0.28	0.35	0.31
					NBIL	Bit	0.29	0.33	0.31

TABLE 30 (Cont.)
HIGH-ACCIDENT LOCATION SUMMARY

DISTRICT 8

Control Section	Location and Mileage	1974 Accidents		Lane Tested	Surface Type	Coefficient of wsf		
		Total	% Wet Surface			Low	High	Avg
Ingham County								
33032	BL 96 (Cedar) from 4.02 to 4.21 (Cavanaugh, 4.16), City of Lansing	35	40	NBOL	Bit	0.28	0.33	0.31
				NBIL	Bit	0.32	0.37	0.34
				SBOL	Bit	0.27	0.31	0.29
				SBIL	Bit	0.32	0.35	0.34
33032	BL 96 (Cedar) from 5.80 to 6.00 (Baker St, 5.98), City of Lansing	31	35	NBOL	Bit	0.35	0.37	0.36
				NBIL	Bit	0.35	0.40	0.38
				SBOL	Bit	0.35	0.39	0.37
				SBIL	Bit	0.37	0.41	0.39
33034	BL 96 (Larch St) from 0.00 to 0.20 (Saginaw St, 0.00), City of Lansing	44	36	NBOL	Bit	0.39	0.39	0.39
				NBCL	Bit	0.35	0.39	0.38
				NBIL	Bit	0.35	0.37	0.36
33042	M 43 (Grand River Ave) from 81.84 to 82.04 (Clippert, 81.86), City of Lansing	68	43	WBOL	Bit	0.32	0.37	0.35
				WB#3	Bit	0.33	0.35	0.34
				WB#2	Bit	0.28	0.36	0.32
				WBIL	Bit	0.32	0.35	0.33
33061	M 43 (Saginaw St) from 2.17 to 2.36 (Pine, 2.19), City of Lansing	50	42	EBOL	Bit	0.40	0.41	0.40
				EB#3	Bit	0.35	0.39	0.38
				EB#2	Bit	0.38	0.40	0.39
				EBIL	Bit	0.37	0.39	0.38
33061	M 43 (Oakland) from 81.82 to 81.99 (Logan, 81.82), City of Lansing	30	40	WBOL	Conc	0.33	0.38	0.36
				WBCL	Conc	0.29	0.31	0.30
				WBIL	Conc	0.32	0.32	0.32
33171	US 127 Service Dr (Howard St) from 61.26 to 61.44 (Grand River Ave, 61.44), City of Lansing	69	36	SBOL	Conc	0.22	0.26	0.23
				SBCL	Conc	0.18	0.23	0.21
				SBIL	Conc	0.14	0.20	0.17
Jackson County								
38082	BL 94 from 2.24 to 2.43 (Brown St, 2.36), City of Jackson	34	38	EBOL	Bit	0.26	0.34	0.31
				EBIL	Bit	0.27	0.35	0.31
				WBOL	Bit	0.27	0.38	0.34
				WBIL	Bit	0.38	0.39	0.38
38083	BL 94 (Washington) from 0.94 to 1.14 (southbound M 50, Otsego St, 1.14), City of Jackson	61	41	BL 94				
				EBOL	Conc	0.28	0.33	0.31
				EBCL	Conc	0.25	0.27	0.26
				EBIL	Conc	0.21	0.27	0.24
				M 50				
				NBOL	Conc	0.27	0.33	0.29
				NBIL	Conc	0.18	0.25	0.21
Washtenaw County								
81081	M 17 (Hamilton) from 3.41 to 3.59 (Pearl St, 3.55), City of Ypsilanti	40	38	SBOL	Bit	0.42	0.45	0.44
				SBCL	Bit	0.35	0.41	0.38
				SBIL	Bit	0.38	0.42	0.40
81081	Westbound M 17 (Huron and Cross) from 80.26 to 80.46 (Emmet St, 80.26 and Adams St, 80.46), City of Ypsilanti	36	36	WBOL	Conc	0.41	0.47	0.44
				WBCL	Conc	0.38	0.41	0.39
				WBIL	Conc	0.40	0.41	0.41
81082	M 17 from 1.15 to 1.33 (Harris Rd, 1.17), Ypsilanti Township	42	43	EBOL	Bit	0.29	0.33	0.31
				EBIL	Bit	0.33	0.37	0.35
				WBOL	Bit	0.32	0.45	0.38
				WBIL	Bit	0.38	0.41	0.39
81083	US 12 BR (Huron) from 0.22 to 0.39 (Harriet and Spring Sts, 0.37), City of Ypsilanti	34	41	NBOL	Conc	0.31	0.37	0.34
				NBCL	Conc	0.33	0.38	0.35
				NBIL	Conc	0.38	0.40	0.39
				SBOL	Conc	0.33	0.41	0.37
				SBCL	Conc	0.32	0.34	0.33
				SBIL	Conc	0.38	0.46	0.41

TABLE 30 (Cont.)
HIGH-ACCIDENT LOCATION SUMMARY

METRO DISTRICT

Control Section	Location and Mileage	1974 Accidents		Lane Tested	Surface Type	Coefficient of wsf		
		Total	% Wet Surface			Low	High	Avg
Macomb County								
50011	M 53 from 1.73 to 1.93 (10 Mile Rd, 2.00), City of Centerline	31	35	NBOL	Bit	0.31	0.33	0.32
				NBCL	Bit	0.29	0.32	0.31
				NBIL	Bit	0.34	0.37	0.35
				SBOL	Bit	0.31	0.35	0.33
				SBCL	Bit	0.31	0.35	0.33
				SBIL	Bit	0.32	0.37	0.34
50011	M 53 from 1.95 to 2.15 (10 Mile Rd, 2.00), City of Centerline	69	36	NBOL	Bit	0.31	0.34	0.33
				NBCL	Bit	0.29	0.31	0.30
				NBIL	Bit	0.33	0.38	0.36
				SBOL	Bit	0.31	0.35	0.33
				SBCL	Bit	0.32	0.33	0.32
				SBIL	Bit	0.31	0.33	0.32
50011	M 53 from 7.02 to 7.18 (15 Mile Rd, 7.10), Sterling Township	66	35	NBOL	Bit	0.41	0.44	0.42
				NBCL	Bit	0.33	0.35	0.34
				NBIL	Bit	0.35	0.39	0.37
				SBOL	Bit	0.38	0.50	0.42
				SBCL	Bit	0.27	0.32	0.30
				SBIL	Bit	0.39	0.41	0.40
50011	M 53 from 6.96 to 9.16 (17 Mile Rd, 9.26), Sterling Township	31	45	NBOL	Bit	0.35	0.37	0.36
				NBIL	Bit	0.34	0.38	0.37
				SBOL	Bit	0.39	0.41	0.40
				SBCL	Bit	0.37	0.39	0.38
				SBIL	Bit	0.35	0.40	0.38
50051	M 3 from 8.56 to 8.74 (Price, 8.61), Clinton Township	37	46	NBOL	Conc	0.29	0.29	0.29
				NBIL	Conc	0.27	0.31	0.29
				SBOL	Conc	0.32	0.35	0.33
				SB#3	Conc	0.32	0.37	0.34
				SB#2	Conc	0.37	0.39	0.38
				SBIL	Conc	0.33	0.35	0.34
Oakland County								
63021	BL 96 from 3.28 to 3.48 (9 Mile Rd, 3.59), City of Farmington	39	46	EBOL	Bit	0.33	0.37	0.36
				EBIL	Bit	0.28	0.33	0.31
				WBOL	Bit	0.25	0.28	0.27
				WBIL	Bit	0.31	0.32	0.31
63041	M 59 from 20.50 to 20.70 (Williams and State Sts, 20.69), City of Pontiac	33	42	EBOL	Bit	0.42	0.42	0.42
				EBIL	Bit	0.39	0.41	0.40
				WBOL	Bit	0.37	0.41	0.40
				WBIL	Bit	0.35	0.42	0.38
63052	US 10 from 3.46 to 3.61 (Orchard Lake Rd Interchange, 3.61), City of Pontiac	30	50	NBOL	Conc	0.33	0.37	0.34
				NBIL	Conc	0.35	0.41	0.39
				SBOL	Conc	0.38	0.40	0.39
				SBIL	Conc	0.41	0.46	0.43
63053	US 10 from 2.65 to 2.85 (Walton Blvd, 2.77), Independence Township	48	38	NBOL	Bit	0.31	0.35	0.33
				NBIL	Bit	0.33	0.39	0.36
				SBOL	Bit	0.34	0.37	0.35
				SBIL	Bit	0.39	0.46	0.42
63053	US 10 from 5.46 to 5.66 (Silver Lake Rd, 5.64), Independence Township	33	39	NBOL	Bit	0.35	0.38	0.37
				NBIL	Bit	0.40	0.42	0.41
				SBOL	Bit	0.34	0.35	0.35
				SBIL	Bit	0.32	0.37	0.35
63091	BL 75 from 0.85 to 1.05 (Ivy St, 1.03), City of Pontiac	32	41	NBOL	Bit	0.35	0.38	0.37
				NBIL	Bit	0.35	0.39	0.37
				SBOL	Bit	0.26	0.32	0.28
				SBIL	Bit	0.32	0.33	0.32
63091	BL 75 from 3.12 to 3.31 (Walton Blvd, 3.30), City of Pontiac and Pontiac Township	30	50	NBOL	Bit	0.40	0.41	0.41
				NBIL	Bit	0.44	0.48	0.45
				SBOL	Bit	0.34	0.40	0.38
				SBIL	Bit	0.44	0.48	0.46

TABLE 30 (Cont.)
HIGH-ACCIDENT LOCATION SUMMARY

METRO DISTRICT CONT.

Control Section	Location and Mileage	1974 Accidents		Lane Tested	Surface Type	Coefficient of wsf		
		Total	% Wet Surface			Low	High	Avg
Oakland County (Cont.)								
63131	M 150 from 0.00 to 0.20 (I 75 Interchange, 0.00), City of Troy	65	37	NBOL	Conc	0.20	0.23	0.22
				NBIL	Conc	0.20	0.22	0.21
				SBOL	Conc	0.22	0.25	0.23
				SBIL	Conc	0.20	0.26	0.24
St. Clair County								
77091	US 25 BR from 0.17 to 0.37 (10th - Scott Ave, 0.35), City of Port Huron	48	42	NBOL	Bit	0.34	0.34	0.34
				NBIL	Bit	0.26	0.33	0.29
				SBOL	Bit	0.28	0.33	0.31
				SBIL	Bit	0.34	0.38	0.36
Wayne County								
82052	US 24 from 6.00 to 6.20 (Goddard Rd, 6.12), City of Taylor	82	37	NBOL	Bit	0.41	0.45	0.43
				NBCL	Bit	0.45	0.47	0.46
				NBIL	Bit	0.40	0.46	0.42
				SBOL	Conc	0.44	0.47	0.45
				SBCL	Conc	0.45	0.48	0.47
				SBIL	Conc	0.39	0.44	0.41
82052	US 24 from 7.31 to 7.51 (Haskell Ave, 7.37), City of Taylor	32	41	NBOL	Bit	0.39	0.42	0.41
				NBCL	Bit	0.44	0.45	0.44
				NBIL	Bit	0.39	0.41	0.40
				SBOL	Conc	0.40	0.44	0.42
				SBCL	Conc	0.44	0.45	0.44
				SBIL	Conc	0.40	0.45	0.43
82053	US 24 from 5.62 to 5.81 (Davison Rd, 5.81), Redford Township	41	37	NBOL	Conc	0.34	0.34	0.34
				NB#3	Conc	0.34	0.36	0.35
				NB#2	Conc	0.29	0.34	0.32
				NBIL	Conc	0.37	0.42	0.39
				SBOL	Conc	0.32	0.40	0.35
				SB#3	Conc	0.35	0.39	0.38
				SB#2	Conc	0.32	0.34	0.33
				SBIL	Conc	0.39	0.39	0.39
82061	US 12 from 8.40 to 8.54 (Washington St, 8.53), City of Wayne	30	43	EBOL	Conc	0.33	0.34	0.33
				EB#3	Conc	0.34	0.35	0.35
				EB#2	Conc	0.28	0.31	0.30
				EBIL	Conc	0.38	0.39	0.38
				WBOL	Bit	0.40	0.42	0.41
				WBCL	Bit	0.37	0.42	0.40
				WBIL	Bit	0.37	0.41	0.39
82081	M 153 from 13.78 to 14.00 (Vernon St, 13.83), Cities of Dearborn and Dearborn Heights	32	41	EBOL	Bit	0.46	0.47	0.47
				EBCL	Bit	0.42	0.44	0.43
				EBIL	Bit	0.45	0.50	0.47
				WBOL	Bit	0.46	0.50	0.48
				WBCL	Bit	0.46	0.47	0.46
				WBIL	Bit	0.47	0.50	0.48
82192	M 39 from 0.00 to 0.20 (I 75 ramp, 0.16), City of Lincoln Park	37	38	NBOL	Conc	0.29	0.32	0.31
				NBCL	Conc	0.27	0.28	0.28
				NBIL	Conc	0.26	0.35	0.32
				SBOL	Bit	0.34	0.39	0.37
				SB#3	Bit	0.39	0.44	0.42
				SB#2	Bit	0.37	0.39	0.38
				SBIL	Bit	0.40	0.42	0.41

SECTION VI

SPECIAL REQUEST TESTS

Special Request Tests

During the course of the year, requests for skid tests are received from field personnel or through the Design, Maintenance, Traffic and Safety, or Testing and Research Divisions. These requests receive priority considerations during scheduling of skid tests. Friction data are forwarded to the person or agency initiating the request as soon as possible after completion of field measurements.

OFFICE MEMORANDUM

July 29, 1975

TO: K. A. Allemeier
Engineer of Testing & Research

FROM: L. T. Oehler

SUBJECT: Skid Resistance Measurements - 3 Intersections in Monroe County
Research Project 54 G-74, 75 SR-1

In accord with your June 7, 1974 request, skid tests have been conducted at all three Monroe County locations. Tests were conducted July 2, 1975 on the subject open graded friction courses. Coefficients ranged from 0.48 to 0.58 and averaged 0.54. Individual locations and respective wsf values are shown below.

Location	Lane	Coefficient of wsf		
		Low	High	Avg.
US-24 from Plumb Creek S. to and including the Dunbar Rd. intersection	NB	0.52	0.55	0.53
	SB	0.54	0.56	0.55
	SBLT	0.52	0.55	0.54
M-125 at Dunbar Road	NBOL	0.54	0.55	0.55
	NBRT	0.54	0.57	0.56
	SBLT	0.53	0.55	0.54
	SB	0.53	0.55	0.54
	SBRT	0.53	0.55	0.54
M-125 N. of Plumb Creek	NBOL	0.54	0.58	0.56
	NBIL	0.53	0.55	0.54
	SBOL	0.48	0.51	0.49
	SBIL	0.53	0.55	0.54

TESTING AND RESEARCH DIVISION

L. T. Oehler

Engineer of Research
Research Laboratory Section

LTO:PMS:cgc

cc: M. N. Clyde
M. Rothstein
P. J. Serafin

OFFICE MEMORANDUM

June 5, 1975

TO: Donald E. Orne
Engineer of Traffic and Safety

FROM: L. T. Oehler

SUBJECT: Skid Tests at Intersection of US 31 BR (Seaway Dr) and M 120, City of Muskegon. Research Project 54 G-74, 75 SR-2.

In accord with your February 5, 1975 request, skid tests have been conducted at the subject location. All requested locations were tested except location 6, where the designated area was too short to test without overlapping locations 5 and 7. May 29, 1975 skid tests yielded coefficients ranging from 0.30 to 0.56 and averaging 0.41. A breakdown of friction levels are shown below and related to the attached sketch.

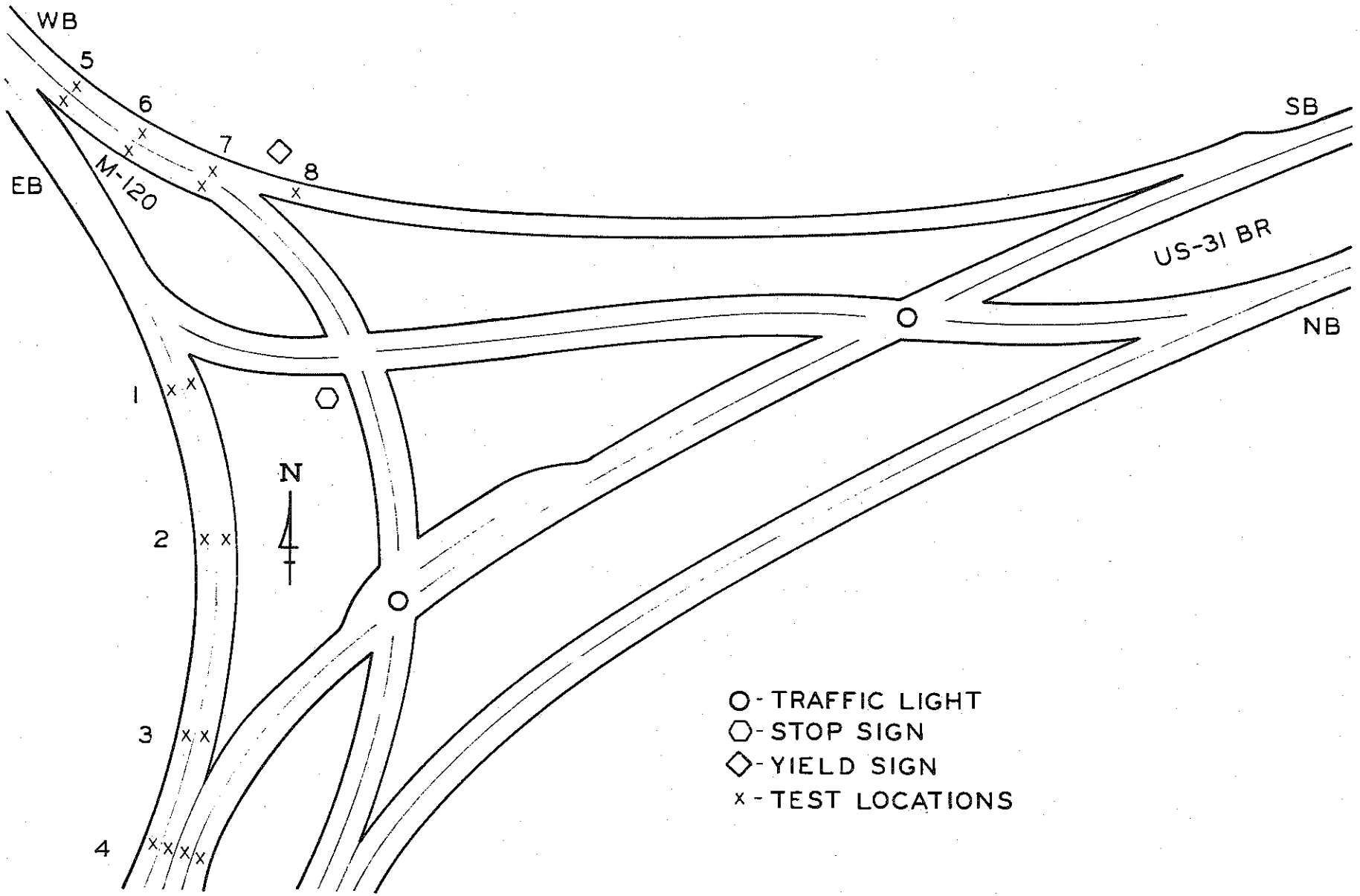
Location No.	Lane	40 mph Coefficient of Wsf		
		Low	High	Avg.
1	EBOL	0.45	0.48	0.47
	EBIL	0.54	0.56	0.55
2	EBOL	0.32	0.34	0.33
	EBIL	0.30	0.31	0.30
3	EBOL	0.37	0.38	0.38
	EBIL	0.34	0.37	0.35
4	EBOL	0.43	0.48	0.45
	EBIL	0.42	0.47	0.44
	SBOL	0.41	0.42	0.41
	SBIL	0.47	0.50	0.49
5	WBOL	0.39	0.41	0.40
	WBIL	0.36	0.38	0.37
6			Not Tested	
7	WBOL	0.42	0.44	0.43
	WBIL	0.43	0.44	0.43
8	WB	0.34	0.37	0.36

TESTING AND RESEARCH DIVISION

for Engineer of Research

LTO:PMS:bf
Attachment

cc: K. A. Allemeier
M. L. Jones



Skid test locations, US 31 BR (Seaway Drive) at M 120, City of Muskegon.
Research Project 54 G-74, 75 SR-2

OFFICE MEMORANDUM

July 29, 1975

TO: D. E. Orne
Engineer of Traffic & Safety

FROM: L. T. Oehler

SUBJECT: Skid Testing for Cities and Counties
Research Project 54 G-74, 75 SR-3

In accord with your March 3, 1975 request, skid tests have been conducted at the 31 locations specified. A wide range of friction levels were encountered. The lowest being a 0.13 value on the Wooden Pealer Street Bridge Deck in Three Rivers and the highest, 0.67, recorded at two locations in Kalamazoo County. A complete listing of skid test results is attached for your review.

TESTING AND RESEARCH DIVISION

L. T. Oehler

Engineer of Research
Research Laboratory Section

LTO:PMS:cgc
Attachment

cc: K. A. Allemeier

Location	Surface Type	Direction and Lane	Coefficient of wsf Low	High	Avg.
District #1					
Lincoln Ave. at College Ave., City of Marquette	Bit	Lincoln Ave.			
		NB	0.45	0.50	0.48
		SB	0.47	0.50	0.48
		College Ave.			
		WBOL	0.58	0.59	0.58
		WBIL	0.52	0.56	0.54
Seventh Street at Magnetic Street, City of Marquette	Bit	Magnetic St.			
		EB	0.50	0.52	0.51
		WB	0.50	0.52	0.51
		Seventh St.			
		NB	0.41	0.50	0.46
		SB	0.46	0.50	0.48
Presque Isle Ave. at Fair Ave., City of Marquette	Bit	Presque Isle Ave.			
		NBOL	0.52	0.57	0.55
		NBIL	0.51	0.55	0.53
		SBOL	0.51	0.52	0.51
		SBIL	0.44	0.48	0.46
		Fair Ave.			
		WB	0.44	0.47	0.46
Third St. at Baraga Ave., City of Marquette	Bit	Baraga Ave.			
		EB	0.44	0.50	0.47
		WB	0.51	0.52	0.52
		Third St.			
		SBOL	0.44	0.44	0.44
		SBIL	0.48	0.51	0.50
Presque Isle Ave. at Wright St., City of Marquette	Bit	Presque Isle Ave.			
		NB	0.46	0.48	0.47
		SB	0.49	0.53	0.51
		Wright St.			
		EBOL	0.44	0.49	0.47
		EBIL	0.47	0.50	0.49
District #6					
Washburn Rd. at Dodge Rd., Lapeer County	Bit	Dodge Road			
		EB	0.48	0.52	0.51
		Washburn Road			
		SB	0.46	0.48	0.47

Location	Surface Type	Direction and Lane	Coefficient of wsf Low	High	Avg.
District #7					
Michigan Ave. at Carlyle-State St., City of Battle Creek	Brick	Michigan Ave.			
		EB	0.25	0.30	0.28
		WB	0.30	0.33	0.31
	Bit	State St.			
		SBOL	0.30	0.32	0.31
		SBIL	0.26	0.30	0.28
Michigan Ave. at Kendall St., City of Battle Creek	Bit	Michigan Ave.			
		EBOL	0.27	0.30	0.28
		EBIL	0.27	0.31	0.29
		WBOL	0.33	0.37	0.35
		WBIL	0.27	0.31	0.29
		Kendall St.			
		NBOL	0.28	0.29	0.28
		NBIL	0.28	0.30	0.29
		SBOL	0.50	0.53	0.51
		SBIL	0.30	0.34	0.33
Michigan Ave. at Cass St., City of Battle Creek	Bit	Cass St.			
		NB	0.34	0.38	0.35
		SB	0.27	0.33	0.30
		Michigan Ave.			
		EB	0.27	0.27	0.27
		WB	0.26	0.28	0.27
Michigan Ave. at Washington Ave., City of Battle Creek	Bit	Michigan Ave.			
		EB	0.27	0.30	0.28
		WB	0.27	0.32	0.30
		Washington Ave.			
		NBOL	0.27	0.29	0.28
		NBIL	0.28	0.30	0.29
		SBRT	0.37	0.44	0.40
		SB	0.28	0.31	0.29
Washington Ave. at Champion St., City of Battle Creek	Bit	Washington Ave.			
		NBOL	0.34	0.36	0.35
		NBIL	0.28	0.33	0.30
		SBOL	0.26	0.28	0.27
		SBIL	0.28	0.30	0.29
		Champion St.			
		EB	0.38	0.42	0.40
		WB	0.37	0.42	0.40

Location	Surface Type	Direction and Lane	Coefficient of wsf Low	High	Avg.
North Ave. at Emmett St., City of Battle Creek	Bit	North St.			
		NBOL	0.34	0.37	0.35
		NBIL	0.34	0.39	0.37
		SBOL	0.36	0.41	0.39
		SBIL	0.36	0.41	0.38
		Emmett St.			
		EBOL	0.37	0.43	0.41
		EBIL	0.41	0.42	0.41
		WBOL	0.34	0.39	0.37
		WBIL	0.31	0.36	0.34
Cliff St. at Main St., City of Battle Creek	Brick	Main St.			
		SEB	0.30	0.35	0.33
		NWB	0.34	0.37	0.35
	Bit	Cliff St.			
		WB	0.27	0.30	0.28
Westnedge Ave. at Milham Rd., City of Portage	Bit	Westnedge Ave.			
		NBOL	0.37	0.41	0.39
		NBIL	0.39	0.44	0.41
		SBOL	0.46	0.56	0.49
		SBIL	0.42	0.44	0.43
		Milham Rd.			
		EBOL	0.43	0.44	0.43
		EBIL	0.43	0.47	0.45
		WBOL	0.41	0.47	0.45
		WBIL	0.44	0.48	0.45
Westnedge Ave. at Idaho St., City of Portage	Bit	Westnedge Ave.			
		NBOL	0.33	0.37	0.36
		NBIL	0.40	0.43	0.42
		SBOL	0.43	0.45	0.44
		SBIL	0.44	0.48	0.46
		Idaho St.			
		EB	0.51	0.57	0.53
	New Bit Pad	EB	0.66	0.67	0.66
Westnedge Ave. at Amos St., City of Portage	Bit	Westnedge Ave.			
		NBOL	0.33	0.36	0.35
		NBIL	0.34	0.38	0.36
		SBOL	0.33	0.38	0.36
		SBIL	0.34	0.37	0.36
		Amos St.			
		WB	0.51	0.54	0.53
Pealer St. Bridge, City of Three Rivers	Wood	Pealer St.			
		EB	0.13	0.17	0.15
		WB	0.15	0.17	0.16

Location	Surface Type	Direction and Lane	Coefficient of wsf Low	High	Avg.
Columbia Ave. at Riverside Drive, Calhoun County	Bit	Columbia Ave.			
		EBOL	0.37	0.41	0.39
		EBIL	0.39	0.42	0.41
		WBOL	0.37	0.40	0.39
		WBIL	0.30	0.32	0.31
		Riverside Drive			
		NB	0.41	0.42	0.41
		SB	0.39	0.41	0.40
Mosel Ave. at the Penn Central RR Crossing, Kalamazoo County	Bit	Mosel Ave.			
		EBOL	0.44	0.48	0.46
		EBIL	0.47	0.51	0.49
		WBOL	0.53	0.54	0.54
		WBIL	0.50	0.54	0.52
Portage Rd. at Milham Rd., Kalamazoo County	Bit	Portage Rd.			
		NBOL	0.61	0.64	0.62
		NBIL	0.62	0.65	0.64
		NBLT	0.61	0.66	0.63
		SBOL	0.53	0.55	0.54
		SBIL	0.55	0.59	0.58
		SBLT	0.60	0.65	0.62
		Milham Rd.			
		EB	0.50	0.55	0.53
		WB	0.50	0.54	0.52
East Main St. at Nazareth Rd., Kalamazoo County	Bit	East Main St.			
		EBOL	0.44	0.49	0.46
		EBIL	0.43	0.44	0.44
		WB	0.49	0.54	0.52
		Nazareth Rd.			
		NB	0.60	0.66	0.63
		SB	0.51	0.55	0.52
Douglas Ave. at Mosel Ave. and Barney Rd., Kalamazoo County	Bit	Douglas Ave.			
		NBOL	0.33	0.34	0.34
	New Bit Pad	NBIL	0.48	0.48	0.48
	Bit	NBIL	0.34	0.39	0.37
		SB	0.35	0.38	0.37
		Barney Rd.			
		EB	0.49	0.52	0.50
		Mosel Ave.			
		WBRT	0.61	0.67	0.64
		WB	0.48	0.53	0.51

Location	Surface Type	Direction and Lane	Coefficient of wsf Low	High	Avg.
Douglas Ave. at Edison St., Kalamazoo County	Bit	Douglas Ave.			
		NB	0.41	0.45	0.42
		SB	0.44	0.47	0.46
		Edison St.			
		EB	0.47	0.51	0.49
		WB	0.43	0.46	0.44
District #8					
Broad St. at Maumee St., City of Adrian	Bit	Broad St.			
		NBOL	0.41	0.44	0.42
		NBCL	0.46	0.47	0.47
		NBIL	0.45	0.50	0.47
		Maumee St.			
		WB	0.30	0.34	0.31
Beecher St. at Division St., City of Adrian	Bit	Division St.			
		NB	0.41	0.45	0.42
		SB	0.35	0.40	0.38
		Beecher St.			
		EB	0.37	0.41	0.39
		WB	0.39	0.39	0.39
Church St. at Tecumseh St., City of Adrian	Bit	Tecumseh St.			
		NB	0.33	0.37	0.35
		SB	0.39	0.42	0.40
		Church St.			
		EB	0.42	0.45	0.43
		WB	0.40	0.41	0.41
Ford Blvd. at Forest Ave., Washtenaw County		Forest Ave.			
	Bit	EB	0.46	0.47	0.46
	Conc	WB	0.38	0.42	0.40
		Ford Blvd.			
	Bit	NBOL	0.36	0.41	0.39
	Conc	NBLT	0.34	0.39	0.37
	Bit	SBOL	0.41	0.44	0.42
	Conc	SBLT	0.35	0.38	0.37
Metro District					
Cass Ave. at North and South Aves., City of Mt. Clemens	Conc	Cass Ave.			
		EB	0.34	0.35	0.34
		EBLT	0.36	0.39	0.38
		WB	0.32	0.36	0.34
		WBLT	0.37	0.46	0.39
		South Ave.			
	Bit	NB	0.46	0.48	0.47
		North Ave.			
		SB	0.41	0.42	0.41

Location	Surface Type	Direction and Lane	Coefficient of wsf Low	High	Avg.
24th St. at Dove St., St. Clair County	Bit	24th St.			
		NB	0.24	0.26	0.25
		SB	0.24	0.27	0.25
	Conc	Dove St.			
		EB	0.33	0.36	0.34
		WBOL	0.45	0.50	0.47
		WBIL	0.33	0.36	0.35
Wadhams Rd. at Griswold Rd., St. Clair County	Bit	Wadhams Rd.			
		NB	0.17	0.20	0.19
		SB	0.20	0.20	0.20
		Griswold Rd.			
		EB	0.20	0.26	0.22
		WB	0.27	0.28	0.28

OFFICE MEMORANDUM

May 23, 1975

TO: K. A. Allemeier
Engineer of Testing & Research

FROM: L. T. Oehler

SUBJECT: Skid Tests on Tittabawassee Road in Saginaw County
Research Project 54 G-74, 75 SR-4

In response to a March 13, 1975 letter from A. P. Chritz to P. J. Serafin, a 3-mile section of limestone aggregate seal coat, located on Tittabawassee Road, has been skid tested. Subject roadway was grooved by Pavement Specialists, Inc. in late November 1974. Longitudinal grooves 1/8 in. wide and 3/8 in. deep were cut in 2 ft wide wheel tracks from W. of Lawndale Road W'ly to W. of Hackett Road. Skid tests were conducted May 22, 1975 and a wide range of coefficients were encountered. Twenty-seven tests on the longitudinal grooving yielded wsf values ranging from 0.16 to 0.53 and averaging 0.33. Twenty-one tests were also conducted immediately adjacent to the grooved wheel tracks and wsf values from these ranged from 0.17 to 0.45 and averaged 0.31.

TESTING AND RESEARCH DIVISION

L. T. Oehler
Engineer of Research

LTO:PMS:cgc

cc: P. J. Searafin
A. P. Chritz

OFFICE MEMORANDUM

DATE: October 31, 1975

TO: K. A. Allemeier
Engineer of Testing & Research

FROM: L. T. Oehler

SUBJECT: Additional Skid Tests on Tittabawassee Road in Saginaw County
Research Project 54 G-74, 75 SR-4a

Longitudinal grooves were cut into a section of Tittabawassee Road late in November, 1974. Grooves were 1/8-inch wide, 3/8-inch deep and alligned with the wheel tracks in 2 ft wide strips. The bituminous surface in which they cut is located from W. of Lawndale to W. of Hackett Road.

Initial skid tests were conducted May 22, 1975 and reported to you in my May 23, 1975 letter (75 SR-4). Wsf values, at this time, ranged from 0.16 to 0.53 and averaged 0.33 in the grooved wheeltracks. Tests conducted out of the wheel tracks on the non-grooved bituminous ranged from 0.17 to 0.45 and averaged 0.31.

Because of our interest in the performance of grooved bituminous pavements, additional skid tests were made October 22, 1975. The grooved wheel tracks, after being subjected to five more months of traffic exhibited a significantly reduced friction level; wsf values ranged from 0.12 to 0.26 and averaged 0.17. The adjacent non-grooved area had coefficients ranging from 0.07 to 0.19 and averaging 0.12; also drastically reduced.

Field personnel indicated a noteable change in the surface had taken place during this five month period; although groove marks are clearly visable, the grooves have either been worn off by traffic or have closed up.

TESTING AND RESEARCH DIVISION

L. T. Oehler

Engineer of Research
Research Laboratory Section

LTO:PMS:cgc

cc: D. E. Orne
P. J. Serafin
A. P. Chritz

OFFICE MEMORANDUM

April 11, 1975

TO: Max N. Clyde
Assistant Deputy Director

FROM: Fred Copple

SUBJECT: I-96 Service Roads, Livonia and Redford Townships, 75 SR-5

In response to your request of April 10, pavement skid tests have been made at random locations throughout the entire length of the I-96 Service Roads (Schoolcraft Road) between Telegraph and Newburgh Roads. Testing was performed April 10, 1975 at an air temperature of 45 F and the results are tabulated below:

Test Lane	Surface Type	No. of Tests	40 mph Coefficient of Wsf		
			Low	High	Avg.
WBOL	Concrete	11	0.24	0.34	0.29
WBIL	Concrete	8	0.27	0.38	0.33
EBOL	Concrete	11	0.18	0.40	0.31
EBIL	Concrete	9	0.25	0.35	0.29
WBOL	Bituminous	1	----	----	0.40
WBIL	Bituminous	1	----	----	0.44

Observations of the test crew include the following:

1. Concrete finish texture, both longitudinal burlap drag and transverse broom, has been worn off in wheelpaths. At many locations it was difficult to determine what type finishing was applied even towards edges of the pavement which had not been subjected to wear.

2. Numerous locations appeared pock marked from rain which had fallen on the concrete when it was in a plastic state.

3. Dirt accumulated at curb is evident over the entire length of the roads. Although the pavement at present is relatively clean, this dirt, when it was on the pavement, probably accelerated removal of initial texturing.

4. Areas of greater friction demand (stopping, turning, acceleration, etc.) were noticeably discolored and darker in appearance. This darker shade continues somewhat in the heavier travelled wheelpaths. Causes of this discoloration were not determined.

5. A general polished condition was evident throughout. No macro or micro texture remains on the travelled roadway.

6. All areas of excavation parallel to service roads seem adequately protected with guardrail.

7. Traffic appears to travel at, or about 5 mph above the posted 35 mph limit. Some open areas towards the west end on the westbound roadway, could encourage drivers to travel at higher speeds. This might result in a problem at the curve transition into existing Schoolcraft Road.

8. Business entrances (drives, etc.) were more numerous on E.B. roadway.

9. There are a few areas of pronounced alignment change and numerous stoplights where demand for friction might be relatively high.

TESTING AND RESEARCH DIVISION

Fred Copple

Fred Copple - Group Supervisor
Pavement Performance Group
Research Laboratory Section

FC:bf

cc: K. A. Allemeier
L. T. Oehler

OFFICE MEMORANDUM

May 1, 1975

TO: K. A. Allemeier
Engineer of Testing & Research

FROM: F. Copple

SUBJECT: I-96 Service Roads, Livonia and Redford Townships
Research Project 75 TI-277, 75 SR-5a

Skid resistance measurements made on I-96 service roads (Schoolcraft) were described in my letter to Max N. Clyde, with a copy to you, which was dated April 11. Subsequently, you asked for information regarding sources of aggregate used in the pavement.

In response to your request, attached are, (1) a diagram which delineates construction project limits along the roads, (2) a brief description of the construction characteristics of each project, including sources of aggregates and, (3) two photographs of the pavement. According to George Gallup, earlier ests made by the Department indicate the fine aggregate to be about 30 percent carbonate. That proportion of carbonate should not be the major cause of the low skid resistance values which were observed.

The attached photographs illustrate the most likely cause of the problem. As shown in the upper photo, pavement texture as applied by transverse brushing remains between wheel tracks; texture in the wheel tracks is gone. Texture was applied lightly where brushes were used and even more lightly in other areas of the road where burlap drag finishing was used. Compounding the problem was the high quantity of soil in the gutters along the project which was used as an effective abrasive by the heavy volume of traffic. Undoubtedly, tire studs also contributed to wear.

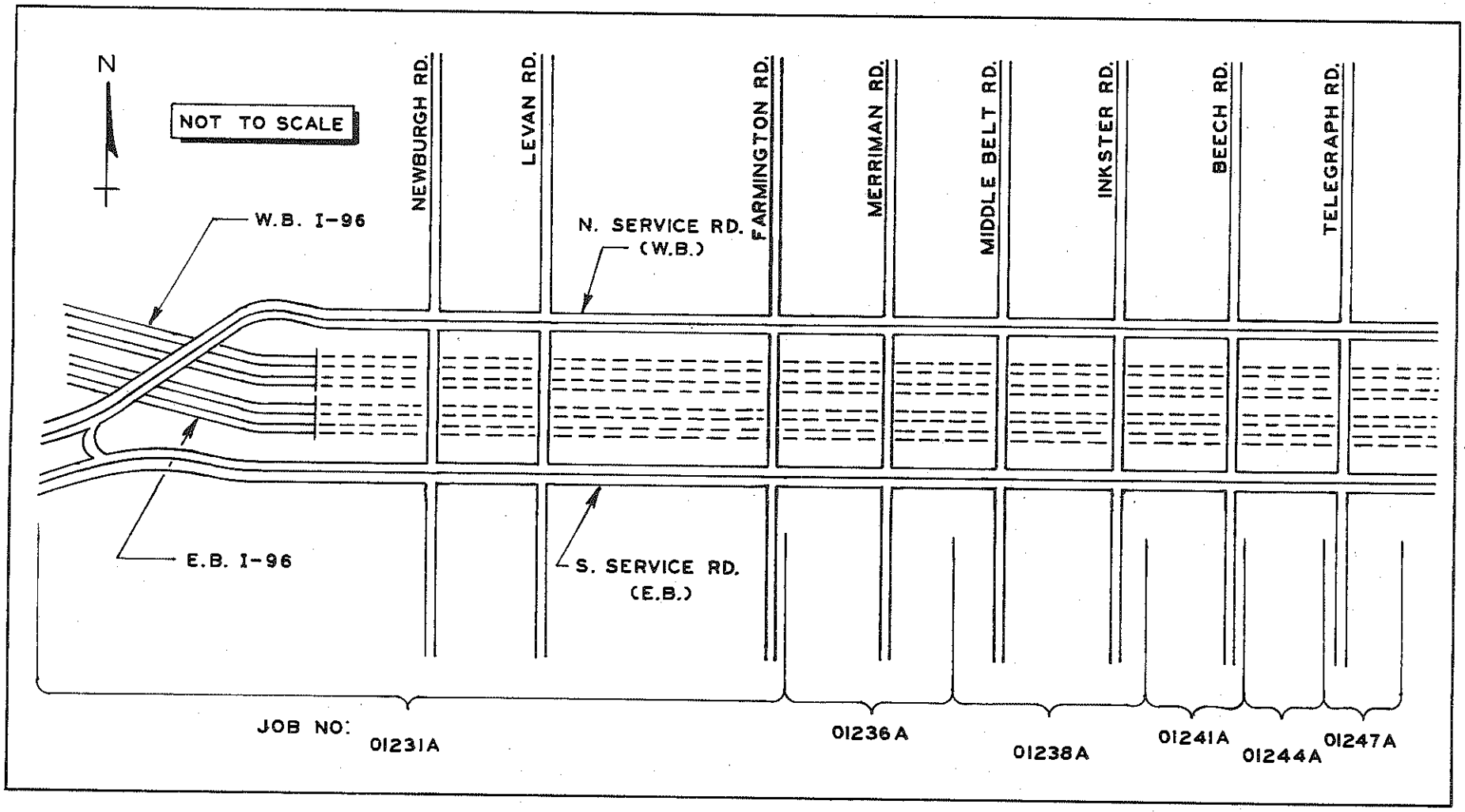
In summary, the evidence indicates that an initial light texture combined with abrasion is the source of the skid resistance problem on Schoolcraft. Premature wear of the type observed should be much less likely on pavements constructed under the Department's current specifications which require texturing by steel tines.

TESTING AND RESEARCH DIVISION

F. Copple - Group Supervisor
Pavement Performance Group
Physical Research Unit

FC:cgc

cc: L. T. Oehler



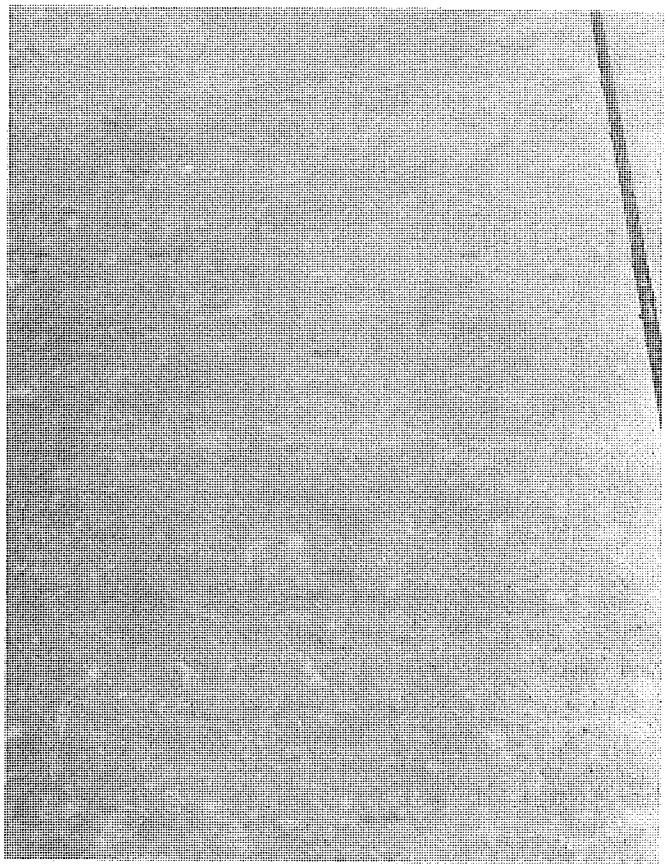
CONTROL SECTION 82122, SERVICE ROAD PROJECT LIMITS

Control Section 82122
I 96 Service Roads
Concrete Construction Data

Job No. (1)	Project Length (Mi.)	Paving Contractor	Construction Year	Aggregate Source (2) Fine	Coarse
01231A	2.6	Thompson-McCully	1971 & 72	63-7 63-55	E. C. Levy, Dix
01236A	1.582	Holloway Const. Co.	1972	63-7 63-55	63-7 E. C. Levy, Dix
01238A	1.297	Eisenhour Const. Co.	1972	63-55	E. C. Levy Dix
01241A	0.892	Midwest Bridge Co.	1971	63-55	E. C. Levy, Dix
01244A	0.753	Midwest Bridge Co.	1971	63-7 63-55	E. C. Levy, Dix
01247A	0.301	N. A.	N. A.	N. A.	N. A.

1. See attached drawing for location.

2. Gravel Pit Identification:
   63-7, Walker Sand & Gravel Co.
   63-55, Lyon Sand & Gravel Co.



Schoolcraft Road - Brush texture remains only between wheelpaths.

Schoolcraft Road - Soil from construction operation on pavement.

OFFICE MEMORANDUM

August 4, 1975

TO: D. E. Orne
Engineer of Traffic & Safety

FROM: L. T. Oehler

SUBJECT: Special Skid Test Request at Various Statewide Locations
Research Project 54 G-74, 75 SR-6

In accord with your April 14, 1975 request, skid tests have been conducted at the 15 locations specified. Friction levels ranged from 0.20 to 0.64. Nineteen percent of the 108 lanes tested yielded average wsf values below 0.30; nineteen percent ranged from 0.30 to 0.35; thirteen percent ranged from 0.36 to 0.39; the remaining 49 percent of the lanes tested 0.40 or above. A complete summary of skid tests are attached for your review.

TESTING AND RESEARCH DIVISION

Engineer of Research
Research Laboratory Section

LTO:PMS:cgc
Attachment

cc: E. L. Martin
M. L. Jones
D. VanHine
E. H. Miller
J. P. Neve, Jr.
P. J. Riley

Location	Surface Type	Direction and Lane	Coefficient of Wsf Low	High	Avg.
District #1					
US-41 (10th Ave.) at US-41 (10th St.)	Bit	EBOL	0.31	0.34	0.33
		EBIL	0.28	0.30	0.29
US-41 (10th St.), N. of 10th Ave.	Conc	SBOL	0.21	0.22	0.21
		SBIL	0.24	0.24	0.24
US-41, N. of 19th Ave.	Conc	NBOL	0.24	0.27	0.26
		NBIL	0.24	0.26	0.25
		SBOL	0.24	0.26	0.25
		SBIL	0.27	0.27	0.27
US-41, S. of 23rd Ave.	Conc	NBOL	0.24	0.26	0.25
		NBIL	0.25	0.28	0.27
		SBOL	0.24	0.26	0.25
		SBIL	0.26	0.27	0.27
US-41, S. of 26th Ave.	Conc	NBOL	0.25	0.27	0.26
		NBIL	0.27	0.28	0.27
		SBOL	0.24	0.28	0.26
		SBIL	0.27	0.29	0.28
District #5					
M-66 at Steele St., City of Ionia		M-66			
	Conc	NBOL	0.32	0.33	0.33
		NBIL	0.33	0.34	0.33
		SBOL	0.33	0.35	0.34
		SBIL	0.35	0.40	0.37
		Steele St.			
	Bit	WBOL	0.59	0.62	0.60
		WBIL	0.46	0.50	0.48
District #6					
M-65 at US-23		US-23			
	Bit	EB	0.41	0.44	0.43
		WB	0.61	0.64	0.63
		M-65			
	Conc	SB	0.34	0.37	0.36
M-84 at Delta - Three Mile Road		M-84			
	Bit	NB	0.37	0.41	0.39
		SB	0.32	0.34	0.33
		Delta Rd.			
	Bit	EB	0.20	0.20	0.20
		Three Mile Rd.			
	Bit	NB	0.20	0.23	0.22

Location	Surface Type	Direction and Lane	Coefficient of Wsf Low	High	Avg.
District #7					
BL 94 from M.P. 6.40 to M.P. 8.3, Cities of Battle Creek and Springfield		W. of Forest St.			
	Conc	EBOL	0.33	0.34	0.33
		EBIL	0.34	0.39	0.36
	Bit	WBOL	0.52	0.53	0.52
		WBIL	0.57	0.58	0.57
		W. of Upton			
	Conc	EBOL	0.34	0.34	0.34
		EBIL	0.32	0.34	0.33
	Bit	WBOL	0.47	0.51	0.49
		WBIL	0.52	0.56	0.54
		W. of Kendall			
	Bit	EBOL	0.41	0.47	0.45
		EBIL	0.45	0.49	0.47
		WBOL	0.36	0.38	0.37
		WBIL	0.44	0.50	0.47
		W. of Washington			
	Bit	EBOL	0.44	0.45	0.45
		EBIL	0.40	0.46	0.43
		WBOL	0.30	0.31	0.30
		WBIL	0.43	0.44	0.43
		W. of Capitol			
	Bit	EBOL	0.29	0.32	0.30
		EBIL	0.42	0.42	0.42
		WBOL	0.44	0.47	0.45
		WBIL	0.49	0.51	0.50
District #8					
I-496 from E. of NB US-127 Exit Ramp E and S to S of the GTWRR, Structure (X06 of 33045)	Conc	W. of River			
		EBOL			0.43
		EBIL			0.43
	Conc	On River Bridge (B02 of 33045)			
		EBOL			0.47
		EBIL			0.57
	Conc	E. of River Bridge (B02 of 33045)			
		EBOL			0.40
		EBIL			0.52
	Conc	On Bridge over Ramp to Trowbridge Road (S05 of 33045)			
		EBOL			0.41
		EBIL			0.55
	Conc	At Ramp from Trowbridge Road			
		EBOL			0.42
		EBIL			0.54
	Conc	On Bridge over Trowbridge Road (X03 of 33045)			
		EBOL			0.41
		EBIL			0.42

Location	Surface Type	Direction and Lane	Coefficient of Wsf Low	High	Avg.
District #8					
I-496 from E. ofNB US-127 Exit Ramp E and S to S of the GTWRR, Structure (X06 of 33045) (Continued)	Conc	On Bridge over GTWRR			
		EBOL			0.40
		EBIL			0.39
	Conc	Between RR Overpass and Trowbridge Rd.			
		WBOL			0.44
		WBIL			0.51
	Conc	NW of Overpass			
		WBOL			0.35
		WBIL			0.42
	Conc	Adjacent to gore (US-127 - I-496 Separation)			
		WBOL			0.46
		WBIL			0.39
	Conc	E. from SB US-127 Overpass			
		WBOL			0.39
		WBIL			0.44
	Conc	On SB US-127 Overpass (X06 of 33045)			
		WBOL			0.42
		WBIL			0.49
	Conc	Between SB US-127 and River Bridge			
		WBOL			0.40
		WBIL			0.39
	Conc	On River Bridge (B02 of 33045)			
		WBOL			0.47
		WBIL			0.51
	Conc	W. of River			
		WBOL			0.36
		WBIL			0.41
	Conc	US-127 N. of Jct. with WB I-496			
		NBOL			0.49
		NBIL			0.54
		SBOL			0.42
		SBIL			0.54
Off Ramp from EB I-496 to NB US-127	Conc	Immediately off I-496			
		EB	0.33	0.34	0.34
	Conc	Between I-496 and US-127			
		EB	0.33	0.34	0.33
	Conc	300 ft. Section of Ramp to Flint			
		EB	0.27	0.27	0.27
	Conc	300 ft Section of Ramp to East Lansing			
		EB	0.30	0.31	0.30
WB Trowbridge to SB US-127 Ramp	Conc	Immediately off Trowbridge Road			
		WB	0.36	0.40	0.37
	Conc	Beyond Station 9+00			
		WB	0.32	0.33	0.33

Location	Surface Type	Direction and Lane	Coefficient of Wsf Low	High	Avg.
District #8					
BL 94 - M-17 (Washtenaw) at Huron Parkway	Bit	BL 94 - M-17			
		EBOL	0.55	0.58	0.56
		EBIL	0.50	0.55	0.52
		WBOL	0.51	0.52	0.51
		WBIL	0.46	0.49	0.48
		Huron Parkway			
	Bit	NBIL	0.48	0.50	0.49
		NBRT	0.50	0.54	0.52
		SB	0.48	0.54	0.52
Metro District					
BL 75 (Perry St.) approach to US-10 BR, BL 75, M-59 (Pontiac Loop)	Bit	NBOL	0.38	0.40	0.39
		NBIL	0.39	0.42	0.40
	Conc	SBOL	0.31	0.35	0.33
		SBIL	0.32	0.33	0.33
US-24 from N. Curbline of 10 Mile Rd., N. to MP 2.44 (excluding Spray Grip area)	Conc	NBOL	0.28	0.29	0.29
		NB#3	0.33	0.34	0.33
		NB#2	0.35	0.37	0.36
		NBIL	0.30	0.34	0.32
		SBOL	0.24	0.28	0.27
		SB#3	0.28	0.31	0.29
		SB#2	0.33	0.36	0.34
		SBIL	0.35	0.37	0.36

OFFICE MEMORANDUM

July 16, 1975

TO: D. E. Orne
Engineer of Traffic and Safety

FROM: L. T. Oehler

SUBJECT: Skid Tests on M-66 and US-31 in Antrim and Charlevoix Counties
Research Project 54 G-74, 75 SR-7

In accord with your April 15, 1975 request, skid tests were conducted July 7, 1975.

Wsf values on a 1500-ft patch, located on M-66 at Penny Bridge Road (milepost 7.18), ranged from 0.53 to 0.59 and averaged 0.56.

US-31 approaches to the lift bridge in Charlevoix, however, yielded coefficients considerably lower. Values ranged from 0.27 to 0.38 and averaged 0.32.

Below test results at both locations are shown for your review.

Location	Lane	Coefficient of wsf		
		Low	High	Avg.
M-66 at Penny Bridge Road	NB	0.53	0.56	0.54
	SB	0.54	0.59	0.57
US-31 at Approaches to Lift Bridge in Charlevoix	NBOL	0.30	0.31	0.30
	NBIL	0.32	0.38	0.36
	SBOL	0.27	0.31	0.29
	SBIL	0.33	0.36	0.34

TESTING AND RESEARCH DIVISION

L. T. Oehler

Engineer of Research
Research Laboratory Section

LTO:PMS:cgc

cc: K. A. Allemeier
B. A. Conradson

OFFICE MEMORANDUM

May 23, 1975

TO: D. E. Orne
Engineer of Traffic & Safety

FROM: L. T. Oehler

SUBJECT: Skid Tests on Ballenger Highway in Genesee County
Research Project 54 G-74, 75 SR-8

In accord with your May 1, 1975 request, skid tests have been conducted on Ballenger Highway from 1600 ft south of Miller Road, S'ly approximately 0.53 mile. Friction level measurements conducted May 22, 1975 yielded 40 mph wsf values ranging from 0.26 to 0.37 and averaging 0.31. Low, high and average coefficients, respectively, for each lane were:

NBOL	0.27	0.29	0.28
NBIL	0.32	0.36	0.34
SBOL	0.26	0.29	0.28
SBIL	0.33	0.37	0.35

TESTING AND RESEARCH DIVISION

L R T Oehler

Engineer of Research
Research Laboratory Section

LTO:PMS:cgc

cc: K. A. Allemeier

OFFICE MEMORANDUM

July 31, 1975

TO: D. E. Orne
Engineer of Traffic and Safety

FROM: L. T. Oehler

SUBJECT: Skid Tests on M 46 from W of Miller Rd to E of the Tittabawassee River. Research Project 54 G-74, 75 SR-9.

In accord with your May 20, 1975 request, a representative number of skid tests have been conducted on M 46 between mileposts 2.92 and 4.61. Three surface types, concrete, bituminous, and latex concrete are involved in the subject area. Wsf values, determined July 22, 1975 ranged from 0.22 to 0.41 and averaged 0.31. A breakdown of friction levels is shown below for your review.

M 46 Location	Surface Type	Coefficient of Wsf			
		WBOL	WBIL	EBIL	EBOL
E of Tittabawassee River E Overflow (W of M 47)	Bit	0.34	0.35	0.40	0.37
On Tittabawassee River E Overflow Bridge (B03 of 73062)	Conc	0.29	0.36	0.29	0.31
Between Tittabawassee River E Overflow Bridge (B03 of 73062) and Tittabawassee River (B02 of 73062)	Conc	0.24	0.29	0.26	0.22
On Tittabawassee River Bridge (B02 of 73062)	Latex Conc	0.32	0.39	0.34	0.32
W of Tittabawassee River	Conc	0.22	0.25	0.28	0.22
E of River St	Bit	0.32	0.41	0.38	0.34
W of Swanson St	Conc	0.25	0.29	0.27	0.25
W of Lutzke St	Conc	0.26	0.29	0.31	0.29
E of Miller Rd	Conc	0.29	0.31	0.30	0.28

TESTING AND RESEARCH DIVISION

L. T. Oehler

Engineer of Research

LTO:PMS:bf

cc: K. A. Allemeier
D. Van Hine

OFFICE MEMORANDUM

June 5, 1975

TO: Donald E. Orne
Engineer of Traffic and Safety

FROM: L. T. Oehler

SUBJECT: Skid Tests on M 43 (W. Main St), City of Kalamazoo. Research Project 54 G-74, 75 SR-10.

In accord with your May 5, 1975 request, skid tests have been completed on M 43 between Cherryhill Rd and Douglas Ave. Forty tests were conducted May 27, 1975 on this 1.47 mi section. Coefficients on the concrete surface between Cherryhill Rd and Berkley St ranged from 0.32 to 0.39 and averaged 0.36. Wsf values determined on the bituminous surface between Berkley St and Douglas Ave ranged from 0.43 to 0.50 and averaged 0.47. Test locations and respective 40 mph friction levels are indicated below.

M 43 Test Location	Surface Type	40 mph Coefficient of Wsf			
		WBOL	WBIL	EBIL	EBOL
W. of Coolidge Ave	Conc	0.36	0.37	0.37	0.33
W. of Grandpre (Jenks Blvd)	Conc	0.33	0.39	0.39	0.36
W. of Jenison Ave	Conc	0.35	0.38	0.36	0.34
W. of Dartmouth St	Conc	0.33	0.36	0.36	0.32
W. of Berkley St	Conc	0.34	0.34	0.38	0.36
W. of Prairrie St	Bit	0.45	0.47	0.48	0.47
W. of Hilbert St	Bit	0.44	0.48	0.48	0.44
W. of Monroe St	Bit	0.45	0.43	0.50	0.46
W. of Grand Ave	Bit	0.44	0.48	0.47	0.48
W. of Douglas Ave	Bit	0.44	0.48	0.50	0.48

TESTING AND RESEARCH DIVISION

for Engineer of Research

LTO:PMS:bf

cc: K. A. Allemeier
E. H. Miller

OFFICE MEMORANDUM

August 5, 1975

TO: K. A. Allemeier
Engineer of Testing & Research

FROM: L. T. Oehler

SUBJECT: Skid Tests on M-24, N. of Columbiaville Road in Lapeer County (Project 44012-06103). Reseearch Project 54 G-74, 75 SR-11

In accord with a verbal request from Paul Serafin, skid tests have been conducted on a 3 mile portion of Project 44012-06103, located on M-24 from Columbiaville Road N. in Lapeer County. Field personnel conducted skid tests June 4, 1975 and reported evidence of flushing on the SB lane from Columbiaville Rd. N. approximately 500 ft. Skid coefficients in the flushed area were in the low 0.30 range, but the remaining portion of this 3 mile section of Bituminous Concrete yielded friction levels averaging well above 0.40.

A second series of skid tests were conducted July 27, 1975. At this time more extensive flushing which had become evident in the wheel tracks greatly influenced the resulting friction levels shown below. The table indicates that outside the wheel tracks where traffic has not flushed the oils, almost all coefficients remain well above 0.40.

M-24 Location	Lane	Coefficient of Wsf Low	High	Avg.
N. of Columbiaville Road	NB	0.17	0.21	0.19
	SB	0.24	0.26	0.25
N. of White Road	NB	0.20	0.25	0.23
	SB	0.20	0.25	0.23
	NB*	0.54	0.55	0.54
	SB*	0.43	0.48	0.46
N. of Miller Lake Road	NB	0.21	0.25	0.23
	SB	0.20	0.22	0.21
	NB*	0.54	0.59	0.57
	SB*	0.45	0.47	0.46
N. of So. Junction M-90	NB	0.37	0.42	0.40
	SB	0.45	0.48	0.46

(*) Skid tests conducted out of wheel track.

LTO:PMS:cgc
cc: D. E. Orne
M. E. Witteveen
P. J. Serafin

TESTING AND RESEARCH DIVISION

for Engineer of Research

OFFICE MEMORANDUM

DATE: October 27, 1975

TO: K. A. Allemeier
Engineer of Testing & Research

FROM: L. T. Oehler

SUBJECT: Additional Skid Test Results on M-24, N. of Columbiaville Rd. (Project 44012-06103). Research Project 54 G-74, 75 SR-11a

Skid tests were initially conducted on a 3-mile section of Project 44012-06103, located on M-24 between Columbiaville Road and M-90; test results were forwarded to you in my letter dated August 5, 1975 (75 SR-11). Since this letter, additional skid tests have been conducted under our continuing "General Survey of New Projects" program. Most recent testing, October 14, 1975, covered the entire 19.34 mile length of subject project, i.e., from Columbiaville Road North to M-46. Friction levels determined, ranged from 0.19 to 0.46 and averaged 0.32. A summary of tests conducted on this bituminous aggregate surface, constructed during 1975, are provided for your review, on the attachment.

TESTING AND RESEARCH DIVISION

L. Ray T. Oehler

Engineer of Research
Research Laboratory Section

LTO:PMS:cgc
Attachment

cc: D. E. Orne
M. E. Witteveen
P. J. Serafin

M-24 Location	Test Date	Lane	Coefficient of WSF Low	High	Avg.
Columbiaville Rd. N. 500-ft.	6-4-75	SB	0.32	0.34	0.33
	6-4-75	SB*	0.54	0.57	0.55
N. from 500-ft N. of Columbiaville Road	6-4-75	NB	0.41	0.44	0.43
	6-4-75	NB*	0.57	0.58	0.57
	7-27-75	NB	0.17	0.21	0.19
	10-14-75	NB	0.19	0.22	0.21
	6-4-75	SB	0.48	0.51	0.50
	6-4-75	SB*	0.52	0.57	0.55
	7-27-75	SB	0.24	0.26	0.25
	10-14-75	SB	0.26	0.28	0.27
N. of White Road	7-27-75	NB	0.20	0.25	0.23
	7-27-75	NB*	0.54	0.55	0.54
	7-27-75	SB	0.20	0.25	0.23
	7-27-75	SB*	0.43	0.48	0.46
N. of Miller Lake Road	6-4-75	NB	0.52	0.57	0.54
	6-4-75	NB*	0.51	0.54	0.52
	7-27-75	NB	0.21	0.25	0.23
	7-27-75	NB*	0.54	0.59	0.57
	10-14-75	NB	0.22	0.26	0.25
	6-4-75	SB	0.54	0.57	0.56
	6-4-75	SB*	0.57	0.62	0.59
	7-27-75	SB	0.20	0.22	0.21
	7-27-75	SB*	0.45	0.47	0.46
	10-14-75	SB	0.22	0.29	0.26
N. of Burley Drive	6-4-75	NB	0.53	0.55	0.54
	6-4-75	NB*	0.63	0.64	0.63
	6-4-75	SB	0.39	0.46	0.42
	6-4-75	SB*	0.55	0.56	0.56
N. of M-90	7-27-75	NB	0.37	0.42	0.40
	10-14-75	NB	0.28	0.34	0.31
	7-27-75	SB	0.45	0.48	0.46
	10-14-75	SB	0.29	0.35	0.33
N. of Elmwood Road	10-14-75	NB	0.25	0.34	0.29
	10-14-75	SB	0.33	0.35	0.34
N. of Murphy Lake Road	10-14-75	NB	0.33	0.37	0.36
	10-14-75	SB	0.39	0.39	0.39

M-24 Location	Test Date	Lane	Coefficient of WSF Low	High	Avg.
N. of C&ORR (0.5 mile N. of Lapeer-Tuscola Co. Line)	10-14-75	NB	0.31	0.40	0.34
	10-14-75	SB	0.32	0.37	0.35
N. of Mayville	10-14-75	NB	0.38	0.38	0.38
	10-14-75	SB	0.40	0.46	0.43

(*) Tests conducted outside normal wheeltracks.

OFFICE MEMORANDUM

July 16, 1975

TO: M. E. Witteveen
Engineer of Testing

FROM: L. T. Oehler

SUBJECT: Skid Tests on Project Mb 81011 - 06145A
Research Project 54 G-74, 75 SR-12

In accord with a June 12, 1975 verbal request from John Norton, skid tests have been conducted on M-52 from the Penn Central RR Crossing in Chelsea NW to 1350-ft NW of Roepke Road. Wsf values determined July 2, 1975 ranged from 0.48 to 0.63 and averaged 0.54. Below, field data is broken down for your review.

M-52 Lacation	Lane	Coefficient of wsf		
		Low	High	Avg.
South of Territorial Road	NB	0.56	0.60	0.58
	SB	0.48	0.52	0.50
South of Clark's Lake Road	NB	0.61	0.63	0.62
	SB	0.53	0.56	0.54
North of Chelsea	NB	0.50	0.53	0.51
	SB	0.49	0.51	0.50

TESTING AND RESEARCH DIVISION

L. Ray T. Oehler
Engineer of Research
Research Laboratory Section

LTO:PMS:cgc

cc: K. A. Allemeier
J. Norton

STATE OF MICHIGAN

WILLIAM G. MILLIKEN, GOVERNOR

DEPARTMENT OF STATE HIGHWAYS AND TRANSPORTATION

STATE HIGHWAYS BUILDING - POST OFFICE DRAWER K - LANSING, MICHIGAN 48904

JOHN P. WOODFORD, DIRECTOR

Research Laboratory Section
735 East Saginaw Street
Lansing, Michigan 48906

October 8, 1975

Mr. Ahmed Morsi
Highway and Traffic Systems Engineering
Midwest Research Institute
425 Volker Boulevard
Kansas City, Missouri 64110

Pavement Skid Test Summary. Your Contract No. DOT-FH-11-8120. Our Research Project 54 G-74, 75 SR-13.

Dear Mr. Morsi:

In accord with your May 23, 1975 request, "after" skid test measurements are complete for test and control sites located in Michigan. Michigan operates two skid test systems, one (#1) utilizing single and the other (#2) double wheel lock modes. "Before" tests, reported in earlier correspondence, were all obtained by Test System #2. "After" tests reported in the attachments were obtained using both skid test systems. For identification purposes, tests conducted by skid Test System #1 are identified by an asterisk after corresponding Site Numbers.

Test Section T12 should probably be eliminated from your study since resurfacing of this location remains incomplete. The project details requested for Test Section T27 are contained in the attachments. Control Section C8 was resurfaced in 1974 and, for this reason, deleted in the attached listing.

Very truly yours,

TESTING AND RESEARCH DIVISION

F. Copple

F. Copple - Supervisor
Pavement Performance Group
Physical Research Unit

MICHIGAN
THE GREAT LAKE STATE

MICHIGAN CONTROL HIGHWAY SITES
"AFTER" SKID TEST SUMMARY

Site No.	Control Section	Test Location - POB to POE Description and Milepost	Year Constructed and Surface Type	Test Direction and/or Lane	40 mph Coefficient of Wsf		
C2	46062	East of east exit Adrian Mall, M. P. 3.0 - 3.3	1960 - Bit	EB	0.29	0.30	0.28
				WB	0.32	0.33	0.30
		East of Ogden Rd, M. P. 5.5 - 5.8		EB	0.34	0.34	0.32
				WB	0.35	0.35	0.35
C3	54012	North of Rose St, M. P. 2.2 - 2.5	1958 - Bit	NB	0.42	0.41	0.40
				SB	0.40	0.43	0.45
		South of 19 Mile Rd, M. P. 4.0 - 4.2		NB	0.41	0.37	0.36
				SB	0.34	0.34	0.36
		South of 19 Mile Rd, M. P. 4.3 - 4.5		NB	0.48	0.48	0.51
				SB	0.46	0.44	0.46
C4	13031	South of "E" Dr, M. P. 9.5 - 9.8	1973 - Bit	NB	0.44	0.47	0.46
				SB	0.50	0.45	0.45
		South of "B" Dr, north M. P. 13.3 - 13.6	1960 - Conc	NB	0.42	0.43	0.44
				SB	0.31	0.32	0.35
C6	77033	North of Metcalf Rd, M. P. 2.2 - 2.4	1967 - NSST	NB	0.44	0.43	0.43
				SB	0.45	0.46	0.44
		North of Milwaukee St, M. P. 4.1 - 4.3	1934 - Conc	NB	0.33	0.36	0.37
				SB	0.36	0.37	0.36
		South of County Line, M. P. 7.9 - 8.1	1956 - Conc	NB	0.43	0.42	0.41
				SB	0.39	0.38	0.38
	74071	North of Gardner Line Rd, M. P. 3.3 - 3.5	1961 - Bit	NB	0.40	0.40	0.41
				SB	0.41	0.44	0.43
		North of Sheridan Line Rd, M. P. 6.2 - 6.4		NB	0.40	0.40	0.43
				SB	0.34	0.38	0.39
C7	23092	South of Bunker Rd, M. P. 2.8 - 3.1	1955 - Bit	NB	0.48	0.48	0.43
				SB	0.41	0.41	0.44
		South of Columbia Rd, M. P. 4.8 - 5.0	1931 - Conc	NB	0.27	0.26	0.29
				SB	0.29	0.32	0.29
		North of Vermontville Hwy, M. P. 8.3 - 8.6	1955 - Bit	NB	0.53	0.50	0.50
				SB	0.52	0.50	0.51
		South of Waverly Rd M. P. 10.0 - 10.3	1931 - Conc	NB	0.25	0.28	0.27
				SB	0.31	0.32	0.30
C10	29041	East of Pine River, M. P. 0.5 - 0.8	1963 - Bit	EB	0.45	0.46	0.47
				WB	0.46	0.47	0.46
		West of Pingree Rd, M. P. 4.5 - 4.8		EB	0.46	0.49	0.47
				WB	0.50	0.49	0.48
		East of Smith Rd, M. P. 8.4 - 8.7	1973 - Bit	EB	0.42	0.41	0.41
				WB	0.43	0.42	0.42

Site No.	Control Section	Test Location - POB to POE Description and Milepost	Year Constructed and Surface Type	Test Direction and/or Lane	40 mph Coefficient of Wsf		
C13	64012	North of Buchanan Rd, M. P. 1.6 - 1.9	1961 - Bit	NB	0.28	0.30	0.28
				SB	0.37	0.36	0.33
		North of Fillmore Rd, M. P. 3.5 - 3.7	1966 - Bit	NB	0.53	0.55	0.51
				SB	0.68	0.66	0.66
		South of VanBuren Rd, M. P. 8.4 - 8.6	1955 - Conc	NB	0.39	0.39	0.41
				SB	0.42	0.42	0.41
C14	81031	Northeast of County Line, M. P. 0.1 - 0.3	1953 - Bit	EB	0.38	0.40	0.38
				WB	0.43	0.45	0.42
		Northeast of Arkona Rd, M. P. 3.4 - 3.7	1967 - Bit	EB	0.46	0.45	0.43
				WB	0.45	0.49	0.44
C15	58052	South of Stewart, M. P. 10.7 - 10.9	1958 - Bit	NB	0.30	0.29	0.31
				SB	0.30	0.30	0.34
		South of LaSalle, M. P. 11.5 - 11.7		NB	0.34	0.35	0.36
				SB	0.32	0.37	0.36
	58053	South of Buhl Rd, M. P. 0.8 - 1.0	1970 - Bit	NBOL	0.36	0.37	0.42
				NBIL	0.64	0.66	0.66
				SBOL	0.48	0.47	0.46
				SBIL	0.56	0.52	0.53
		North of Labo Rd, M. P. 3.3 - 3.8		NBOL	0.41	0.45	0.41
				NBIL	0.71	0.67	0.66
				SBOL	0.44	0.48	0.47
				SBIL	0.64	0.64	0.66
C16	77051	East of Walpole St, M. P. 0.5 - 0.8	1954 - Conc	EB	0.35	0.33	0.34
				WB	0.32	0.34	0.33
		In Anchorville, M. P. 1.9 - 2.2		EB	0.32	0.29	0.32
				WB	0.32	0.35	0.31
		West of Fairhaven, M. P. 2.7 - 3.0		EB	0.35	0.34	0.31
				WB	0.32	0.34	0.34
		In Fairhaven, M. P. 3.5 - 3.8		EBOL	0.38	0.36	0.38
				EBIL	0.36	0.36	0.33
				WBOL	0.39	0.36	0.37
				WBIL	0.33	0.32	0.33
		West of Palms Rd, M. P. 5.1 - 5.4		EB	0.30	0.26	0.29
		West of Perch Rd, M. P. 5.4 - 5.7		WB	0.31	0.29	0.29
C19	50031	South of 15 Mile Rd, M. P. 7.6 - 8.0	1959 - Conc	NBOL	0.33	0.31	0.30
			1959 - Bit	NBIL	0.37	0.41	0.39
			1959 - Conc	SBOL	0.30	0.33	0.30
			1959 - Bit	SBIL	0.37	0.38	0.40

Site No.	Control Section	Test Location - POB to POE Description and Milepost	Year Constructed and Surface Type	Test Direction and/or Lane	40 mph Coefficient of Wsf		
C19 (Cont.)		Wendell Rd north to Remick Rd, M. P. 10.0 - 10.4	1959 - Conc	NBOL	0.34	0.37	0.31
			1959 - Bit	NBIL	0.49	0.52	0.52
			1959 - Conc	SBOL	0.32	0.37	0.34
			1959 - Bit	SBIL	0.49	0.48	0.46
		Elizabeth north to M 59, M. P. 13.1 to 14.0	1959 - Conc	NBOL	0.37	0.35	0.33
				NBIL	0.34	0.36	0.38
			1959 - Bit	NBIL	0.42	0.42	0.40
			1959 - Conc	SBOL	0.34	0.34	0.33
			1959 - Bit	SBOL	0.41	0.43	0.42
				SBIL	0.44	0.44	0.47
C20	63051	Cranbrook Rd south to Lone Pine Rd, M. P. 2.2 - 3.0	1972 - Bit	NBOL	0.58	0.57	0.61
				NB#3	0.53	0.55	0.57
				NB#2	0.53	0.57	0.58
				NBIL	0.60	0.62	0.59
			1969 - Bit	SBOL	0.50	0.48	0.50
				SB#3	0.54	0.53	0.52
				SB#2	0.51	0.54	0.53
				SBIL	0.49	0.51	0.53
		North of Oak St, to Oakland M. P. 3.9 - 4.6	1961 - Bit	NBOL	0.56	0.55	0.57
				NB#3	0.54	0.54	0.57
				NB#2	0.55	0.53	0.54
				NBIL	0.56	0.54	0.56
			1969 - Bit	SBOL	0.51	0.48	0.50
				SB#3	0.55	0.53	0.50
				SB#2	0.49	0.51	0.51
				SBIL	0.51	0.51	0.52
C21	03072	North of City of Allegan, M. P. 0.8 - 1.1	1970 - Bit	NB	0.49	0.49	0.48
				SB	0.45	0.43	0.46
		North of Allegan Dam Rd, M. P. 3.5 - 3.8		NB	0.50	0.49	0.50
				SB	0.48	0.49	0.48
		South of M 89, M. P. 6.3 - 6.5		NB	0.57	0.55	0.53
				SB	0.55	0.52	0.52
C22	72013	North of County Rd 402, M. P. 2.8 - 3.1	1961 - Bit	NBOL	0.53	0.54	0.54
				NBIL	0.68	0.67	0.56
		North of Rest Area, M. P. 5.5 - 5.8		NBOL	0.36	0.36	0.36
				NBIL	0.54	0.51	0.49
		South of Snow Bowl Rd, M. P. 6.8 - 6.5		SBOL	0.40	0.41	0.39
				SBIL	0.56	0.52	0.53
		North of Median Crossover, M. P. 5.0 - 4.7		SBOL	0.42	0.45	0.42
				SBIL	0.55	0.57	0.56

Site No.	Control Section	Test Location - POB to POE Description and Milepost	Year Constructed and Surface Type	Test Direction and/or Lane	40 mph Coefficient of Wsf		
C23*	76011	North of Brewer Rd, M. P. 9.2 - 9.5	1973 - Bit	NB	0.48	0.51	0.51
				SB	0.55	0.57	0.54
		South of Bennington Rd, M. P. 10.7 - 11.0		NB	0.55	0.52	0.52
				SB	0.52	0.51	0.52
		North of Bennington Rd, M. P. 11.3 - 11.6	1969 - Conc	NB	0.41	0.44	0.42
				SB	0.41	0.38	0.37
		North of Delaney Rd, M. P. 13.0 - 13.3		NB	0.40	0.41	0.40
				SB	0.45	0.46	0.46
		North of Morrice Rd, M. P. 14.6 - 14.9		NBOL	0.38	0.34	0.35
				NBIL	0.39	0.33	0.37
				SBOL	0.33	0.35	0.35
				SBIL	0.38	0.34	0.40
C24	03023	East of 27th St, M. P. 2.8 - 3.0	1960 - Bit	EB	0.30	0.34	0.34
				WB	0.30	0.30	0.27
		East of 23rd St, M. P. 5.5 - 5.8		EB	0.38	0.41	0.38
				WB	0.41	0.42	0.40
		West of Otsego, M. P. 8.8 - 9.1		EB	0.30	0.29	0.27
				WB	0.37	0.34	0.35
C26	82131	North of Puritan, M. P. 2.4 - 2.6	1956 - Bit	NBOL	0.41	0.41	0.38
				NBIL	0.41	0.41	0.42
				SBOL	0.41	0.41	0.41
				SBIL	0.40	0.39	0.40
		South of Chicago, M. P. 4.7 - 4.9	1969 - Bit	NBOL	0.42	0.45	0.43
				NBIL	0.44	0.45	0.44
				SBOL	0.46	0.45	0.45
				SBIL	0.48	0.46	0.48
		South of Bethune, M. P. 5.8 - 6.1	1968 - Bit	NBOL	0.38	0.41	0.40
				NBCL	0.48	0.47	0.45
				NBIL	0.48	0.46	0.44
				SBOL	0.48	0.49	0.50
				SBCL	0.49	0.50	0.49
				SBIL	0.48	0.48	0.48
C27	63031	North of 8 Mile Rd, M. P. 0.2 - 1.0	1966 - Conc	NBOL	0.30	0.30	0.32
				NB#3	0.35	0.38	0.35
				NB#2	0.39	0.38	0.34
				NBIL	0.36	0.37	0.38
				SBOL	0.38	0.35	0.37
				SB#3	0.39	0.38	0.38
				SB#2	0.39	0.38	0.40
				SBIL	0.41	0.39	0.38

* Single Wheel Test

MICHIGAN TEST HIGHWAY SITES
"AFTER" SKID TEST SUMMARY

Site No.	Control Section	Test Location - POB to POE Description and Milepost	Year Constructed and Surface Type	Test Direction and/or Lane	40 mph Coefficient of Wsf		
T2	12022	0.5 mile east of Fiske Rd, M. P. 2.5 - 2.8	1974 - Bit	EB	0.37	0.36	0.37
				WB	0.38	0.37	0.34
T3*	13011	South of Kellogg St, M. P. 0.4 - 0.6	1974 - Bit	NBOL	0.46	0.48	0.50
				NBIL	0.53	0.50	0.52
				SBOL	0.41	0.40	0.44
				SBIL	0.47	0.45	0.51
		South of Kirby Rd, M. P. 2.0 - 2.3		NB	0.51	0.55	0.53
				SB	0.41	0.46	0.46
T4	13022	0.5 mile east of Homer, M. P. 10.8 - 11.0	1974 - Bit	EB	0.41	0.41	0.41
				WB	0.44	0.43	0.44
		West from M 99, M. P. 12.6 - 12.9		EBOL	0.49	0.50	0.49
				EBIL	0.70	0.71	0.70
				WBOL	0.51	0.47	0.50
				WBIL	0.70	0.70	0.69
		0.4 mile east of divided east to 29 Mile Rd, M. P. 13.8 - 14.0		EB	0.50	0.47	0.52
				WB	0.47	0.45	0.46
T6*	77051	0.5 west of turn in Algonac, M. P. 12.6 - 12.8	1974 - Bit	NB	0.42	0.40	0.44
				SB	0.44	0.40	0.39
		At Algonac State Park, M. P. 15.5 - 14.7		NB	0.53	0.51	0.53
				SB	0.52	0.52	0.53
		South of Avalon Beach Rd, M. P. 18.3 - 18.5		NB	0.50	0.48	0.50
				SB	0.52	0.53	0.48
		0.8 mile north of Avalon Beach Rd, M. P. 19.4 - 19.6		NB	0.50	0.51	0.48
				SB	0.40	0.42	0.45
	77052	0.5 mile north of north limits of Marine City, M. P. 2.5 - 2.7	1974 - Bit	NB	0.44	0.48	0.45
				SB	0.45	0.45	0.50
T7*	19062	1.0 mile east of St. Johns, M. P. 1.5 - 1.8	1974 - Bit	EB	0.53	0.54	0.53
				WB	0.55	0.54	0.55
		East of Shepardville Rd, M. P. 6.4 - 6.7		EB	0.55	0.55	0.57
				WB	0.55	0.52	0.55
		West of Ovid, M. P. 8.2 - 8.5		EB	0.51	0.48	0.54
				WB	0.50	0.51	0.51
T8	30041	West of Chase Rd, M. P. 6.6 - 6.9	1974 - Bit	EB	0.48	0.47	0.44
				WB	0.46	0.44	0.48
		West of Rumsey Rd, M. P. 8.7 - 9.0		EB	0.48	0.44	0.44
				WB	0.50	0.50	0.50

Site No.	Control Section	Test Location - POB to POE Description and Milepost	Year Constructed and Surface Type	Test Direction and/or Lane	40 mph Coefficient of Wsf		
T8 (Cont.)		West of Jerome Rd, M. P. 10.7 - 11.0	1974 - Bit	EB	0.54	0.52	0.50
				WB	0.47	0.48	0.49
		West of Waldron Rd, M. P. 12.6 - 12.9		EB	0.58	0.58	0.57
				WB	0.56	0.55	0.55
		West of US 127, M. P. 15.5 - 15.8		EB	0.54	0.53	0.50
				WB	0.46	0.49	0.48
T10*	33082	East of Marsh Rd, M. P. 4.6 - 4.9	1974 - Bit	EB	0.50	0.48	0.51
				WB	0.47	0.46	0.47
		East of VanAtta Rd, M. P. 6.8 - 7.1		EB	0.46	0.46	0.46
				WB	0.52	0.50	0.47
		West of Zimmer Rd, M. P. 10.0 - 10.3		EB	0.57	0.55	0.55
				WB	0.55	0.51	0.54
T13*	44011	North of Brocker Rd, M. P. 2.2 - 2.5	1974 - Bit	NB	0.53	0.54	0.53
				SB	0.53	0.52	0.58
		North of Pratt Rd, M. P. 5.3 - 5.6		NB	0.47	0.51	0.51
				SB	0.55	0.54	0.52
		North of Newark Rd, M. P. 8.4 - 8.7		NB	0.53	0.50	0.54
				SB	0.51	0.48	0.53
T14	46062	East of RR crossing, M. P. 13.7 - 14.0	1974 - Bit	EB	0.36	0.39	0.40
				WB	0.42	0.43	0.41
		East of Riga Highway, M. P. 15.1 - 15.4		EB	0.48	0.52	0.49
				WB	0.56	0.54	0.52
		East of Rodesiler Highway, M. P. 17.4 - 17.7		EB	0.56	0.55	0.55
				WB	0.59	0.59	0.60
		East of Horton Rd, M. P. 17.9 - 18.2		EB	0.56	0.57	0.55
				WB	0.57	0.57	0.56
T15*	50012	South of GTW RR, M. P. 0.7 - 1.0	1974 - Bit	NB	0.42	0.44	0.47
				SB	0.52	0.50	0.48
		North of 33 Mile Rd, M. P. 5.8 - 6.0		NB	0.48	0.50	0.47
				SB	0.51	0.47	0.47
		North of Kidder Rd, M. P. 9.2 - 9.4		NB	0.53	0.52	0.50
				SB	0.47	0.51	0.50
		South of Macomb-Lapeer County Line, M. P. 10.9 - 11.2		NB	0.52	0.50	0.47
				SB	0.48	0.50	0.50
T16*	50022	East of Hayes Rd, M. P. 3.2 - 3.5	1974 - Bit	EB	0.44	0.45	0.41
				WB	0.53	0.50	0.47
		East of Romeo Plank Rd, M. P. 5.2 - 5.5		EB	0.45	0.45	0.44
				WB	0.51	0.53	0.52

Site No.	Control Section	Test Location - POB to POE Description and Milepost	Year Constructed and Surface Type	Test Direction and/or Lane	40 mph Coefficient of Wsf		
T19*	63053	North of Waterford Rd,	1974 - Bit	NBOL	0.45	0.46	0.48
		M. P. 0.4 - 0.7		NBIL	0.50	0.50	0.53
				SBOL	0.44	0.47	0.47
				SBIL	0.45	0.47	0.48
		North of Walton Blvd,		SBOL	0.40	0.40	0.41
		M. P. 2.5 - 2.8		SBIL	0.48	0.45	0.45
		South of Hatchery Rd,		NBOL	0.44	0.44	0.48
		M. P. 4.0 - 4.3		NBIL	0.52	0.55	0.52
		South of Hatchery Rd,		SBOL	0.41	0.38	0.40
		M. P. 4.5 - 4.8		SBIL	0.44	0.42	0.47
		North of Telegraph Rd,		NBOL	0.42	0.39	0.45
		M. P. 5.9 - 6.0		NBIL	0.41	0.40	0.40
T20*	63091	North of Widetrack Dr,	1974 - Bit	NBOL	0.38	0.40	0.39
		M. P. 0.1		NBIL	0.41	0.48	0.44
		North of Oakhill, M. P. 0.3		SBOL	0.37	0.37	0.34
				SBIL	0.41	0.42	0.40
		North of Hammond St, M.		NBOL	0.39	0.41	0.39
		P. 0.9		NBIL	0.42	0.46	0.47
		Oliver St to Joslyn St, M.		SBOL	0.39	0.38	0.35
		P. 1.1		SBIL	0.35	0.40	0.38
		North of RR overpass, M.		NBOL	0.44	0.41	0.45
		P. 2.5		NBIL	0.50	0.51	0.50
				SBOL	0.44	0.42	0.46
				SBIL	0.50	0.50	0.58
T22*	72013	North of Snowbowl Rd,	1974 - Bit	NBOL	0.57	0.59	0.59
		M. P. 7.9 - 8.5	Type C	NBIL	0.63	0.61	0.61
		M. P. 8.5 - 9.1		NBOL	0.58	0.58	0.57
				NBIL	0.63	0.65	0.63
		M. P. 9.1 - 10.0	1974 - Bit	NBOL	0.58	0.58	0.58
			Type M	NBIL	0.64	0.63	0.64
		M. P. 10.0 - 10.9		NBOL	0.59	0.59	0.60
				NBIL	0.63	0.63	0.64
		M. P. 10.9 - 12.2		NBOL	0.57	0.58	0.59
	72014	M. P. 0.0 - 0.6		NBIL	0.64	0.66	0.65
		M. P. 0.6 - 0.0		SBOL	0.54	0.54	0.53
	72013	M. P. 12.2 - 11.8		SBIL	0.64	0.64	0.65
		M. P. 11.8 - 10.9		SBOL	0.55	0.55	0.55
				SBIL	0.61	0.64	0.60
		M. P. 10.9 - 9.1		SBOL	0.55	0.55	0.55
				SBIL	0.64	0.64	0.61
		M. P. 9.1 - 7.9	1974 - Bit	SBOL	0.58	0.58	0.59
			Type C	SBIL	0.63	0.63	0.63

Site No.	Control Section	Test Location - POB to POE Description and Milepost	Year Constructed and Surface Type	Test Direction and/or Lane	40 mph Coefficient of Wsf		
T23*	76062	West of M 13, M. P. 11.7 - 12.0	1974 - Bit	EB	0.54	0.55	0.52
				WB	0.52	0.48	0.48
		East of Reed Rd, M. P. 8.6 - 8.9		EB	0.48	0.53	0.53
				WB	0.55	0.53	0.53
T24*	81011	North of Chelsea, M. P. 2.9 - 3.2	1974 - Bit	NB	0.48	0.47	0.47
				SB	0.53	0.52	0.55
		North of Clark Rd, M. P. 4.9 - 5.2		NB	0.57	0.57	0.54
				SB	0.57	0.55	0.55
		South of Territorial Rd, M. P. 6.9 - 7.2		NB	0.57	0.54	0.52
				SB	0.50	0.52	0.51
T26*	82151	South of McNichols Rd, M. P. 2.5 - 2.8	1974 - Bit	NBOL	0.45	0.44	0.45
				NBIL	0.37	0.32	0.33
				SBOL	0.34	0.33	0.33
				SBIL	0.46	0.47	0.45
		South of 8 Mile Rd, M. P. 4.6 - 4.9		NBOL	0.39	0.41	0.42
				NBIL	0.42	0.46	0.48
				SBOL	0.40	0.42	0.40
				SBIL	0.44	0.48	0.41
T27*	82141	West of Poinciana St to McArthur St, M. P. 0.3 - 0.8	1975 - Bit	EBOL	0.47	0.47	0.47
				EBCL	0.41	0.45	0.44
				EBIL	0.48	0.45	0.46
				WBOL	0.46	0.45	0.48
				WBCL	0.45	0.46	0.47
				WBIL	0.41	0.40	0.41
T28	70041	West of 12th Ave, M. P. 18.2 - 18.5	1974 - Bit	EBOL	0.43	0.43	0.48
				EBIL	0.54	0.52	0.49
				WBOL	0.38	0.35	0.40
				WBIL	0.49	0.47	0.50
		West of M 11, M. P. 19.7 - 20.0		EBOL	0.44	0.39	0.41
				EBIL	0.52	0.51	0.48
				WBOL	0.43	0.41	0.45
				WBIL	0.48	0.50	0.48
T29	70041	East of Linden Ave, M. P. 16.0 - 16.3	1974 - Bit	EB	0.35	0.37	0.38
				WB	0.37	0.33	0.35

* Single Wheel Test

OFFICE MEMORANDUM

DATE: October 10, 1975

TO: A. P. Chritz, Assistant Supervising Engineer
Bituminous Technical Services Unit

FROM: L. T. Oehler

SUBJECT: Skid Tests on Lakelite-Bituminous Pavements.
Research Project 54 G-74, 75 SR-14.

In accord with your June 26, 1975 request, skid tests have been conducted on two Lakelite-bituminous pavements.

One of the Lakelite-bituminous pavements was placed June 6, 1975 on M 104 in Spring Lake. Because of prevailing geometrics skid tests were confined to the area between Division St and Buchanan St. The WBOL on this project (Ms 70081-07130A) used a mix design with nine percent A. C.; coefficients ranged from 0.42 to 0.46 and averaged 0.45. The remaining lanes employed a mix design with 8.5 percent A. C. Friction levels on these lanes ranged from 0.50 to 0.54 and averaged 0.52.

Skid tests were also conducted on a Muskegon County Lakelite-bituminous pavement, approximately four years old. This surface is located on River Rd between Simonelli and Weber Rds. Friction levels ranged from 0.65 to 0.69 and averaged 0.66. An adjacent control area, bituminous pavement which did not incorporate lakelite in the mix design, was also tested. Coefficients ranged from 0.52 to 0.57 and averaged 0.55.

A summary of skid tests are shown below for your review.

Location	Lane	Coefficient of Wsf		
		Low	High	Avg
M 104 in Spring Lake	EBOL	0.50	0.52	0.51
	EBIL	0.53	0.54	0.54
	WBOL	0.42	0.46	0.45
	WBIL	0.50	0.54	0.52
River Rd in Muskegon County	Control Area			
	EB	0.54	0.57	0.56
	WB	0.52	0.57	0.54

Location	Lane	Coefficient of Wsf		
		Low	High	Avg
River Rd in Muskegon County (Cont.)	Lakelite-Bituminous			
	EB	0.65	0.66	0.65
	WB	0.65	0.69	0.68

TESTING AND RESEARCH DIVISION

L. Roy T. Oehler
Engineer of Research

LTO:PMS:bf

cc: K. A. Allemeier
M. E. Witteveen
P. J. Serafin

OFFICE MEMORANDUM

DATE: December 5, 1975

TO: M. G. Brown - Supervisor
Concrete and Surface Treatment Group

FROM: P. M. Schafer

SUBJECT: Skid Test Results on Limestone Projects.
Research Project 54 G-74, 75 SR-15.

In accord with your verbal request, skid tests have been conducted on the 50 bituminous concrete projects for your limestone aggregate study. Along with the 1975 skid test results, the attached tables include a complete historical review of coefficients for each of the requested projects.

A copy of this letter is also being forwarded to Traffic and Safety Division because of low friction levels encountered at some of the locations.

TESTING AND RESEARCH DIVISION

P. M. Schafer
Transportation Research Technician

PMS:bf

cc: D. E. Orne

TABLE 1
SUMMARY OF SKID TEST DATA
4.12 Projects - Crushed Limestone

Project No.	Coarse Aggregate Source	Construction Year	Lane	Coefficient of Wsf Service Year at Skid Test						
				I	1	2	3	4	5*	5**
01051-001	71-15	1970	NB	0.54	----	----	----	----	0.56	0.43
			SB	0.55	----	----	----	----	0.50	0.45
55022-03031A	55-76	1971	EB	0.54	----	----	----	0.47	----	----
			WB	0.52	----	----	----	0.46	----	----
08051-00061A	39-1	1971	NB	----	0.63	----	----	0.59	----	----
			SB	----	0.65	----	----	0.59	----	----
25072-03950A	32-4	1971	NB	----	0.49	----	----	0.37	----	----
			LT Tested NB	----	0.67	----	----	----	----	----
			SB	----	0.51	----	----	0.41	----	----
51011-01740A	75-5	1971	NBOL	----	0.40	----	----	0.21	----	----
			NBIL	----	0.38	----	----	0.24	----	----
			SBOL	----	0.35	----	----	0.20	----	----
			SBIL	----	0.39	----	----	0.15	----	----
61011-00823A	75-5	1971	EB	0.39	----	----	----	0.26	----	----
			WB	0.37	----	----	----	0.27	----	----
13043-04117A	Material Services	1972	EB	----	0.51	----	0.40	----	----	----
			WB	----	0.50	----	0.42	----	----	----
44012-04789A	32-4	1972	NB	----	0.51	----	0.34	----	----	----
			SB	----	0.51	----	0.37	----	----	----

* July 1975 tests
** October 1975 tests

TABLE 1 (Cont.)

49022-04337A	75-5	1972	EB	----	0.58	----	0.43	----	----	----
			WB	----	0.57	----	0.43	----	----	----
75022-04338A	75-5	1972	EB	----	0.61	----	0.44	----	----	----
			WB	----	0.61	----	0.47	----	----	----
78042-03813A	Material Services	1972	EB	----	0.64	----	0.52	----	----	----
			WB	----	0.63	----	0.54	----	----	----
04021-04956A	71-15	1973	M 32							
			EB	----	0.39	0.35	----	----	----	----
			WB	----	0.39	0.33	----	----	----	----
			M 65							
			NB	----	0.51	0.47	----	----	----	----
			SB	----	0.54	0.46	----	----	----	----
			US 23							
			NB	----	0.35	0.32	----	----	----	----
			SB	----	0.39	0.28	----	----	----	----
18031-04958A	17-66	1973	US 27 BR							
			NB	----	0.36	0.32	----	----	----	----
			SB	----	0.39	0.34	----	----	----	----
			US 10							
			EB	----	0.36	0.32	----	----	----	----
			WB	----	0.36	0.36	----	----	----	----
			US 10							
			EBOL	----	0.47	0.28	----	----	----	----
			EBIL	----	0.47	0.27	----	----	----	----
			WBOL	----	0.46	0.22	----	----	----	----
			WBIL	----	0.48	0.27	----	----	----	----

TABLE 1 (Cont.)

78011-04785A	Material Services	1973	M 103						
			NB	0.47	0.34	0.53	----	----	----	----
			SB	0.44	0.37	0.41	----	----	----	----
			US 12							
			EB	0.38	0.27	0.33	----	----	----	----
			WB	0.37	0.27	0.31	----	----	----	----
			US 131							
			NB	0.37	0.30	0.41	----	----	----	----
			SB	0.33	0.31	0.30	----	----	----	----
13031-04837A	Materials Services and 39-1	1973	NB	----	0.47	0.51	----	----	----	----
			SB	----	0.46	0.47	----	----	----	----
25051-05458A	32-4 and 63-4	1973	NBOL	----	0.42	0.34	----	----	----	----
			NBIL	----	0.41	0.30	----	----	----	----
			SBOL	----	0.44	0.34	----	----	----	----
			SBIL	----	0.38	0.39	----	----	----	----
73062-04738A	71-15 and 71-47	1973	EBOL	----	0.42	0.31	----	----	----	----
			EBIL	----	0.48	0.34	----	----	----	----
			WBOL	----	0.37	0.31	----	----	----	----
			WBIL	----	0.45	0.33	----	----	----	----
01051-06118A	71-15	1974	NB	0.53	0.56	----	----	----	----	----
			SB	0.51	0.57	----	----	----	----	----
06072-06123A	71-15	1974	US 23							
			NB	0.36	0.44	----	----	----	----	----
			SB	0.41	0.49	----	----	----	----	----
			M 65							
			NB	0.54	0.53	----	----	----	----	----
			SB	0.57	0.59	----	----	----	----	----

TABLE 1 (Cont.)

11021-06126A	Material Services	1974	EB	0.39	0.49	----	----	----	----	----
			WB	0.40	0.50	----	----	----	----	----
30041-06076A	58-3	1974	EB	0.43	0.51	----	----	----	----	----
			WB	0.43	0.51	----	----	----	----	----
30061-06077A	58-3	1974	EB	0.49	0.47	----	----	----	----	----
			WB	0.48	0.49	----	----	----	----	----
46062-06081A	58-3	1974	EB	0.43	0.50	----	----	----	----	----
			WB	0.40	0.53	----	----	----	----	----
98004-04607A (Control Section 73033)	17-40	1974	NBOL	0.45	0.38	----	----	----	----	----
			NBIL	0.44	0.33	----	----	----	----	----
			SBOL	0.45	0.30	----	----	----	----	----
			SBIL	0.40	0.29	----	----	----	----	----
24011-00307	15-32	1973	NB	----	0.35	0.30	----	----	----	----
			SB	----	0.37	0.32	----	----	----	----
24011-00308	15-32	1973	NBOL	----	0.38	0.31	----	----	----	----
			NBIL	----	0.32	0.24	----	----	----	----
			SBOL	----	0.34	0.24	----	----	----	----
			SBIL	----	0.32	0.22	----	----	----	----
24011-03949	15-32	1973	NBOL	----	0.28	0.18	----	----	----	----
			NBIL	----	0.27	0.15	----	----	----	----
			SBOL	----	0.27	0.16	----	----	----	----
			SBIL	----	0.25	0.19	----	----	----	----
73063-06142A	71-47	1974	EB	0.39	0.47	----	----	----	----	----
			WB	0.43	0.45	----	----	----	----	----
77051-04849A & 77051-04916A	71-47	1974	EB	0.44	0.41	----	----	----	----	----
			WB	0.44	0.45	----	----	----	----	----
77051-05929A	71-47	1974	NB	0.46	0.48	----	----	----	----	----
			SB	0.45	0.45	----	----	----	----	----

TABLE 2
SUMMARY OF SKID TEST DATA
4.12 Projects - Crushed Limestone (Type C Mod.)

Project No.	Coarse Aggregate Source	Construction Year	Lane	Coefficient of Wsf Service Year at Skid Test						
				I	1	2	3	4	5	
25041-03996A	75-5	1971	EBOL	----	0.52	----	----	0.38	----	----
			EBIL	----	0.52	----	----	0.36	----	----
			WBOL	----	0.50	----	----	0.34	----	----
			WBIL	----	0.57	----	----	0.36	----	----
73131-03810A	17-66	1971	NB	----	0.57	----	----	0.46	----	----
			SB	----	0.55	----	----	0.47	----	----
11012-03757A	17-66	1972	NBOL	----	0.43	----	0.31	----	----	----
			NBIL	----	0.51	----	0.42	----	----	----
			SBOL	----	0.42	----	0.37	----	----	----
			SBIL	----	0.52	----	0.41	----	----	----
13044-03941A	Material Services	1972	EB	----	0.47	----	0.44	----	----	----
			WB	----	0.50	----	0.54	----	----	----
14041-03794A	Material Services	1972	EB	----	0.54	----	0.49	----	----	----
			WB	----	0.56	----	0.47	----	----	----
21024-00262A	75-5	1972	EB	----	0.63	----	0.46	----	----	----
			WB	----	0.63	----	0.50	----	----	----
25082-00318A	32-4	1972	EBOL	----	0.41	----	0.27	----	----	----
			EBIL	----	0.53	----	0.36	----	----	----
			WBOL	----	0.44	----	0.29	----	----	----
			WBIL	----	0.53	----	0.37	----	----	----
49021-04336A	75-5	1972	EB	----	0.60	----	0.44	----	----	----
			WB	----	0.61	----	0.47	----	----	----

TABLE 2 (Cont.)

73151-03960A	75-5	1972	NBOL	----	0.47	----	0.31	----	----	----
			NBIL	----	0.60	----	0.58	----	----	----
79032-03964A	32-4	1972	NB	----	0.48	----	0.45	----	----	----
			SB	----	0.48	----	0.46	----	----	----
11074-05042A	Material Services	1973	M 51							
			NB	----	0.33	0.39	----	----	----	----
			SB	----	0.37	0.37	----	----	----	----
			M 60							
			EB	----	0.47	0.49	----	----	----	----
			WB	----	0.47	0.49	----	----	----	----
			M 60							
			EBOL	----	0.46	0.48	----	----	----	----
			EBIL	----	0.60	0.64	----	----	----	----
21022-05203A	21-46	1973	EBOL	0.32	0.44	0.34	----	----	----	----
			EBIL	0.42	0.56	0.44	----	----	----	----
			WBOL	0.42	0.53	0.42	----	----	----	----
			WBIL	0.38	0.61	0.57	----	----	----	----
22023-05205A	75-5	1973	EB	----	0.52	0.48	----	----	----	----
			WB	----	0.51	0.48	----	----	----	----
49031-05208A	75-5	1973	EB	0.53	0.52	0.35	----	----	----	----
			WB	0.53	0.51	0.39	----	----	----	----
55021-05212A (part)	75-5	1973	South of Powers							
			NB	0.43	0.54	0.40	----	----	----	----
			SB	0.42	0.56	0.44	----	----	----	----

TABLE 2 (Cont.)

55021-05212A (part)	55-95	1973	In Powers							
			NBOL	0.54	----	0.48	----	----	----	----
			NBIL	0.40	----	0.44	----	----	----	----
			SBOL	0.49	----	0.52	----	----	----	----
			SBIL	0.33	----	0.39	----	----	----	----
55021-05212A (part)	55-95	1973	Powers East							
			EB	0.45	0.39	0.39	----	----	----	----
			WB	0.39	0.49	0.41	----	----	----	----
22023-06026A	55-95	1973	EB	0.44	----	0.49	----	----	----	----
			WB	0.39	----	0.52	----	----	----	----
11051-05491A	Material Services	1974	NBOL	0.40	0.39	----	----	----	----	----
			NBIL	0.40	0.40	----	----	----	----	----
			SBOL	0.34	0.32	----	----	----	----	----
			SBIL	0.39	0.37	----	----	----	----	----
14011-06130A	Material Services	1974	EB	0.36	0.30	----	----	----	----	----
			WB	0.34	0.34	----	----	----	----	----
78022-06129A (part)	58-3	1974	US 12							
			EB	0.45	0.53	----	----	----	----	----
			WB	0.47	0.46	----	----	----	----	----
78022-06129A (part)	58-3	1974	M 66							
			NBOL	0.45	0.37	----	----	----	----	----
			NBIL	0.43	0.36	----	----	----	----	----
			SBOL	0.50	0.39	----	----	----	----	----
			SBIL	0.42	0.39	----	----	----	----	----

STATE OF MICHIGAN

WILLIAM G. MILLIKEN, GOVERNOR

DEPARTMENT OF STATE HIGHWAYS AND TRANSPORTATION

STATE HIGHWAYS BUILDING - POST OFFICE DRAWER K - LANSING, MICHIGAN 48904

JOHN P. WOODFORD, DIRECTOR

October 6, 1975

Mr. Daniel L. Spreitzer
Test Engineer
Harnischfeger Corporation
2525 - 14 Avenue, N.
Escanaba, Michigan 49829

Dear Mr. Spreitzer:

Dry Skid Testing at Site for Brake Testing
P&H Crane. Research Project 54 G-74,
75 SR-16

In response to your May 27, 1975 request, skid tests were conducted on a selected bituminous section of M-35, approximately 1000 ft in length, and lying north of Gladstone. Tests were performed September 23 and 25 under wet and dry surface conditions, respectively; all data are presented in the attached table. Coefficients of wet sliding friction vary inversely with temperature by about 0.2% per degree fahrenheit. We suspect this temperature dependency may be greater under dry test conditions although we do not possess confirming data. The mean dry 20 mph coefficient of friction reported here is 0.76 (SN-76), obtained at an ambient temperature of 48°F. Because of inherent variability in the road surface and since a slight increase in temperature at the time of testing would reduce friction levels, this road surface should meet your requirements of a SN of 75 or less.

Very truly yours,

TESTING AND RESEARCH DIVISION

K. A. Allemeier, P.E.
Engineer of Testing and Research

MICHIGAN
THE GREAT LAKE STATE

SKID TEST SUMMARY
M-35 N. of Gladstone, CS 21032
1966 Bituminous Aggregate Surface

Test Date	Air Temp. (°F.)	Test Lane	Test Speed (mph)	Test Condition	Coefficient of Friction (SN/100)
9-23-75	42	NB	20	Wet	0.63
		NB			0.67
		NB			0.67
		SB			0.70
		SB			0.62
		SB			0.65
		NB	40	Wet	0.47
		NB			0.45
		NB			0.51
		SB			0.46
		SB			0.50
		SB			0.50
9-25-75	48	NB	20	Dry	0.77
		NB			0.76
		NB			0.75
		SB			0.75
		SB			0.74
		SB			0.76

OFFICE MEMORANDUM

DATE: October 2, 1975

TO: D. E. Orne
Engineer of Traffic and Safety

FROM: L. T. Oehler

SUBJECT: Skid Tests on M 46 at Crystal Rd, Montcalm County.
Research Project 54 G-74, 75 SR-17.

In accord with your July 15, 1975 request, skid tests have been conducted on M 46, 1/4 mile east and west of Crystal Rd (milepost 8.85 to 9.35, Control Section 59045). Measurements were taken in and out of wheel tracks, as you specified. "In wheel track" wsf values ranged from 0.26 to 0.39 and averaged 0.33. "Out of wheel track" wsf values ranged from 0.26 to 0.50 and averaged 0.40. All values and their respective test locations are shown below.

M 46 Location	Coefficient of Wsf			
	In Wheel Track		Out of Wheel Track	
	Eastbound	Westbound	Eastbound	Westbound
1050 ft W of Crystal Rd	0.34	0.34	0.44	0.40
800 ft W of Crystal Rd	0.35	0.35	0.46	0.44
550 ft W of Crystal Rd	0.35	0.35	0.50	0.40
300 ft W of Crystal Rd	0.31	0.29	0.45	0.35
At Crystal Rd	0.31	0.31	0.29	0.26
300 ft E of Crystal Rd	0.31	0.26	0.39	0.32
550 ft E of Crystal Rd	0.33	0.33	0.41	0.33
800 ft E of Crystal Rd	0.33	0.38	0.48	0.44
1050 ft E of Crystal Rd	0.35	0.39	----	0.42

TESTING AND RESEARCH DIVISION

L. T. Oehler
Engineer of Research

LTO:PMS:bf

cc: L. J. Doyle
M. L. Jones

OFFICE MEMORANDUM

DATE: October 10, 1975

TO: M. E. Witteveen
Engineer of Testing

FROM: L. T. Oehler

SUBJECT: Skid Tests on M 24 and M 53 in the cities of Lapeer and Warren, repectively. Research Project 54 G-74, 75 SR-18.

A recent equipment correlation has indicated minor changes in data forwarded to you in August 20, 1975 correspondence regarding subject area. Please destroy your August 20, 1975 letter and substitute the following.

In accord with a July 17, 1975 telephone request from John Norton, wsf values have been obtained on two recently completed plant-mix seal applications in the cities of Lapeer and Warren. Skid tests were conducted July 22, 1975 on M 24 in Lapeer; resulting coefficients ranged from 0.48 to 0.56 and averaged 0.52. August 14, 1975 tests on M 53 in Warren yielded friction levels ranging from 0.40 to 0.48 and averaging 0.44. A breakdown of skid data is included below for your review.

Location	Lane	Coefficient of Wsf		
		Low	High	Avg
M 24, City of Lapeer	NBOL	0.48	0.50	0.49
Control Section 44012	NBIL	0.51	0.56	0.54
M. P. 0.5 to M. P. 0.7	SBOL	0.50	0.52	0.51
	SBIL	0.53	0.53	0.53
M 53, City of Warren	NBOL	0.41	0.44	0.42
Control Section 50011	NBCL	0.42	0.44	0.43
M. P. 5.5 to M. P. 6.0	NBIL	0.46	0.47	0.46
	SBOL	0.40	0.42	0.41
	SBCL	0.42	0.48	0.46
	SBIL	0.42	0.46	0.44

TESTING AND RESEARCH DIVISION

L. T. Oehler
Engineer of Research

LTO:PMS:bf

cc: K. A. Allemeier
J. Norton

OFFICE MEMORANDUM

DATE: October 3, 1975

TO: D. E. Orne
Engineer of Traffic and Safety

FROM: L. T. Oehler

SUBJECT: Skid Tests on M 59 from Osceola St easterly to Franklin Rd, City of Pontiac. Research Project 54 G-74, 75 SR-19.

In accord with your July 22, 1975 request, skid tests have been conducted on M 59 between Osceola St and Franklin Rd (milepost 19.34 to 20.49, Control Section 63041). All wsf values determined on September 7, 1975 were below 0.40. Coefficients ranged from 0.32 to 0.38 and averaged 0.35. The testing pattern included three areas with corresponding friction levels for each shown below.

M 59 Location	Coefficient of Wsf				
	WBOL	WBCL	WBIL	EBIL	EBOL
E of Osceola	0.38	0.34	0.32	0.34	0.34
E of Dakota	0.35	0.35	0.32	0.34	0.32
E of Miami	0.37	0.34	0.34	0.37	0.37

TESTING AND RESEARCH DIVISION

L Roy T Oehler

Engineer of Research

LTO:PMS:bf

cc: P. J. Riley

OFFICE MEMORANDUM

DATE: October 2, 1975

TO: D. E. Orne
Engineer of Traffic and Safety

FROM: L. T. Oehler

SUBJECT: Skid Tests on M 66, North of Nashville.
Research Project 54 G-74, 75 SR-20.

In accord with your July 31, 1975 request, skid tests have been conducted at a representative number of locations on M 66 between the north limits of Nashville and State Rd (milepost 3.28 to 5.00, Control Section 08052). Subject roadway is bituminous with intermittent partial lane patching. Because of this and surface differences noticed by test personnel, both wheel tracks were skid tested. Friction levels ranged from 0.21 to 0.52 and averaged 0.39. Seven of the 16 tests conducted yielded wsf values below 0.40. All values are shown below for your review.

M 66 Location	Coefficient of Wsf			
	SB-OWT	SB-IWT	NB-IWT	NB-OWT
South of State Rd	0.40	0.38	0.51	0.21
North of Thornapple Lake Rd	0.52	0.32	0.48	0.39
South of Thornapple Lake Rd	0.46	0.27	0.52	0.45
North of Nashville	0.44	0.22	0.47	0.21

OWT = outer wheel track
IWT = inner wheel track

TESTING AND RESEARCH DIVISION

L. Kay T. Oehler
Engineer of Research

LTO:PMS:bf

cc: E. H. Miller

OFFICE MEMORANDUM

August 21, 1975

TO: Donald C. Orne
Engineer of Traffic and Safety

FROM: L. T. Oehler

SUBJECT: Skid Tests on M 25 at the Veterans Memorial Bridge in Bay City. Research Project 54 G-74, 75 SR-21.

In accord with your July 31, 1975 request, skid tests have been conducted at the subject M 25 structure over the Saginaw River in Bay City. August 13, 1975 test results on the concrete approaches to and departures from this bridge yielded wsf values ranging from 0.21 to 0.35 and averaging 0.31. The bridge deck itself (B01 of 09042) has a latex concrete surface; friction levels here ranged from 0.36 to 0.46 and averaged 0.41. Test data are broken down below for your review.

M 25 Location	Surface Type	Lane	Coefficient of Wsf		
			Low	High	Avg
Approaches to bridge	Concrete	EBOL*	0.32	0.35	0.34
		EBIL*	0.32	0.35	0.34
		WBOL	0.21	0.27	0.25
		WBIL	0.31	0.35	0.33
Bridge deck	Latex Concrete	EBOL	0.40	0.42	0.41
		EBIL	0.40	0.44	0.41
		WBOL	0.36	0.40	0.38
		WBIL	0.42	0.46	0.44
Departure from bridge	Concrete	EBOL	0.26	0.34	0.31
		EBIL	0.29	0.35	0.33
		WBOL *	0.21	0.29	0.26
		WBIL *	0.28	0.34	0.31

* Tests conducted close to Henry St.

TESTING AND RESEARCH DIVISION

L. K. Oehler

Engineer of Research

LTO:PMS:bf

cc: K. A. Allemeier
D. VanHine

OFFICE MEMORANDUM

DATE: October 10, 1975

TO: Richard L. Blost, Supervising Engineer
Safety Programs Unit

FROM: L. T. Oehler

SUBJECT: Skid Tests on US 41 from 26th Ave north, City of Menominee.
Research Project 54 G-74, 75 SR-22.

In accord with your August 15, 1975 request, skid tests have been conducted on US 41, north of 26th Ave in the City of Menominee. Fourty-four friction level measurements were made in this area and are summarized below. Thirteen of the 44 tests yielded wsf lower than 0.30; the remaining 31 tests had coefficients which ranged from 0.44 to 0.60 and averaged 0.48.

US 41 Location	Surface Type	Coefficient of Wsf			
		SBOL	SBIL	NBIL	NBOL
North of 26th St	Conc	0.26	0.50	0.27	0.26
North of 30th St	Conc	0.26	0.51	0.26	0.27
South of Railroad Crossing	Conc	0.27	0.45	0.45	0.25
North of 36th St	Conc	0.25	0.44	0.45	0.27
North of 38th St	Conc	0.44	0.44	0.45	0.44
North of M 35 Junction	Conc	0.44	0.27	0.46	0.52
North of 41st St	Conc	0.44	0.46	0.44	0.27
North of 43rd St	Conc	0.44	0.50	0.48	0.46
North of 46th St	Conc	0.45	0.47	0.51	0.50
South end of four-lane roadway	Conc	0.27	0.44	0.48	0.53
Two-lane roadway	Conc	0.47	----	----	0.50
Two-lane roadway	Bit	0.60	----	----	0.60

TESTING AND RESEARCH DIVISION

L. T. Oehler

Engineer of Research

LTO:PMS:bf

cc: K. A. Allemeier
E. L. Martin
A. J. Marusich

OFFICE MEMORANDUM

DATE: October 2, 1975

TO: R. L. Blost, Supervising Engineer
Safety Programs Unit

FROM: L. T. Oehler

SUBJECT: Skid Tests on M 37 Curve, Near Casnovia.
Research Project 54 G-74, 75 SR-23.

In accord with your August 25, 1975 request, skid tests have been conducted on the M 37 curve at the west village limits of Casnovia. Friction levels were obtained at 200-ft intervals in both directions from a bituminous to concrete surface transition, which takes place within subject curve. Concrete coefficients ranged from 0.42 to 0.48 and averaged 0.46; bituminous values ranged from 0.32 to 0.39 and averaged 0.36. Wsf values and their respective locations are shown below for your review.

Lane	Coefficient of Wsf							
	Bituminous				Concrete			
	800-ft*	600-ft	400-ft	200-ft	200-ft	400-ft	600-ft	800-ft
NB	0.38	0.38	0.32	0.33	0.46	0.48	0.46	0.47
SB	0.39	0.38	0.37	0.35	0.42	0.46	0.48	0.46

* Distance measured from the concrete to bituminous transition.

TESTING AND RESEARCH DIVISION

L. Ry T. Oehler

Engineer of Research

LTO:PMS:bf

cc: M. L. Jones

OFFICE MEMORANDUM

DATE: January 6, 1976

TO: Peter Kamarainen
Construction Division

FROM: L. T. Oehler

SUBJECT: Skid Tests on I 75 Open Graded Friction Course.
Research Project 54 G-74, 75 SR-24.

In response to your October 28, 1975 phone request, skid tests have been conducted on the open graded friction course placed on I 75 approaches to the drawbridge at Zilwaukee. Initial coefficients of friction, obtained November 3, 1975, average 0.45; after two months service the average coefficient of friction increased slightly to 0.52. Tabulated below are coefficients of friction by lane and test date for your review.

Test Lane	November 3, 1975			December 30, 1975		
	Low	High	Avg	Low	High	Avg
NBOL	0.46	0.48	0.47	0.53	0.55	0.54
NBIL	0.40	0.44	0.43	0.48	0.51	0.50
SBOL	0.46	0.47	0.46	0.53	0.57	0.56
SBIL	0.42	0.45	0.44	0.50	0.51	0.50

TESTING AND RESEARCH DIVISION

Engineer of Research

LTO:PTL:bf

OFFICE MEMORANDUM

DATE: October 8, 1975

TO: B. A. Conradson
District Traffic and Safety Engineer

FROM: L. T. Oehler

SUBJECT: Skid Tests on Project Mb 83013-07669A.
Research Project 54 G-74, 75 SR-25.

In accord with your September 15, 1975 request, skid tests have been conducted on M 37 from M 115 north to M 113 (Project Mb 83013-07669A). The bituminous aggregate surfacing of this roadway was completed during the 1975 construction season by Peninsula Asphalt Corp. Wsf values were obtained September 22, 1975 and ranged from 0.23 to 0.41 and averaged 0.31. A layout of the bituminous aggregate surface tested and corresponding friction levels are shown on the attachments.

TESTING AND RESEARCH DIVISION

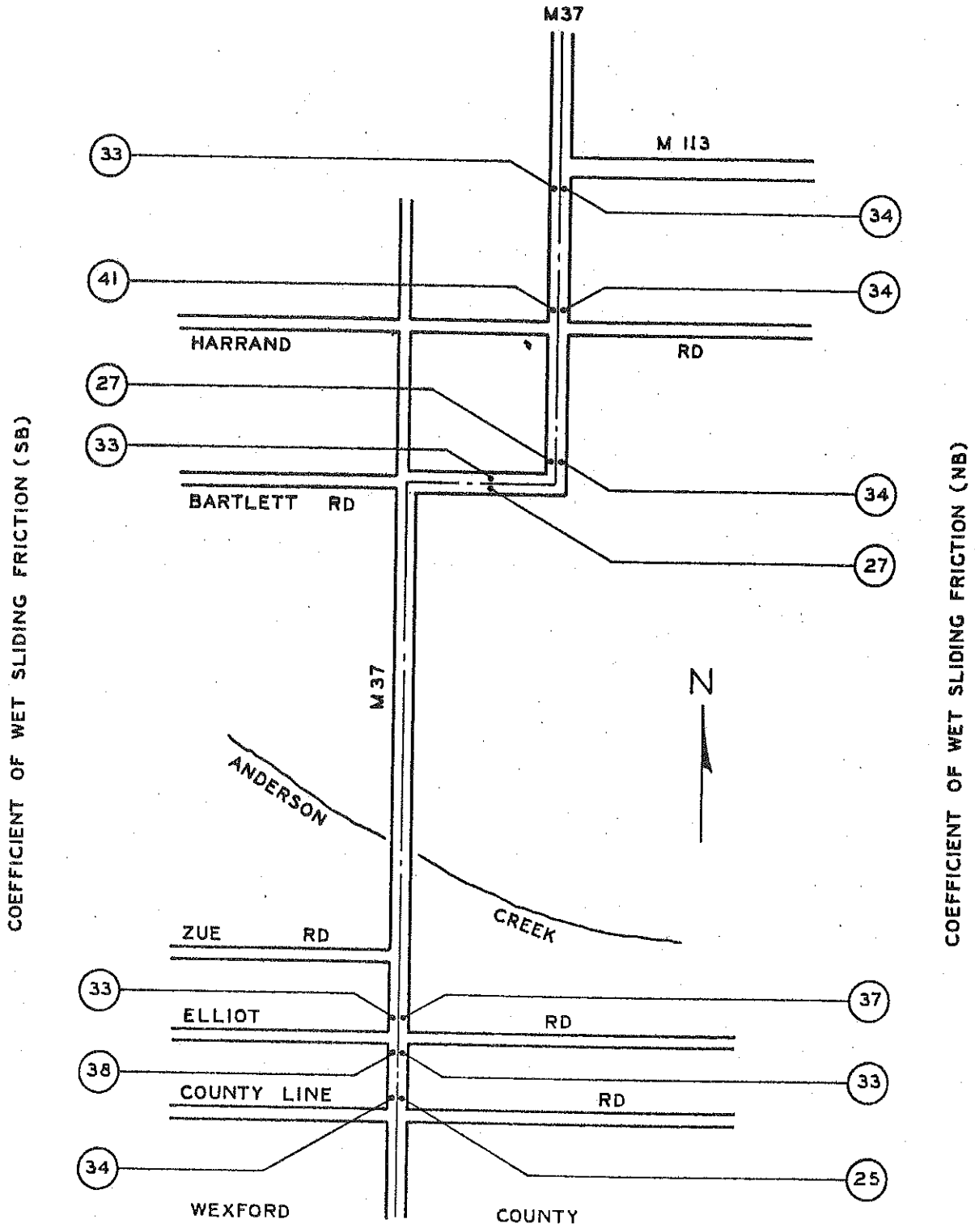
L. T. Oehler

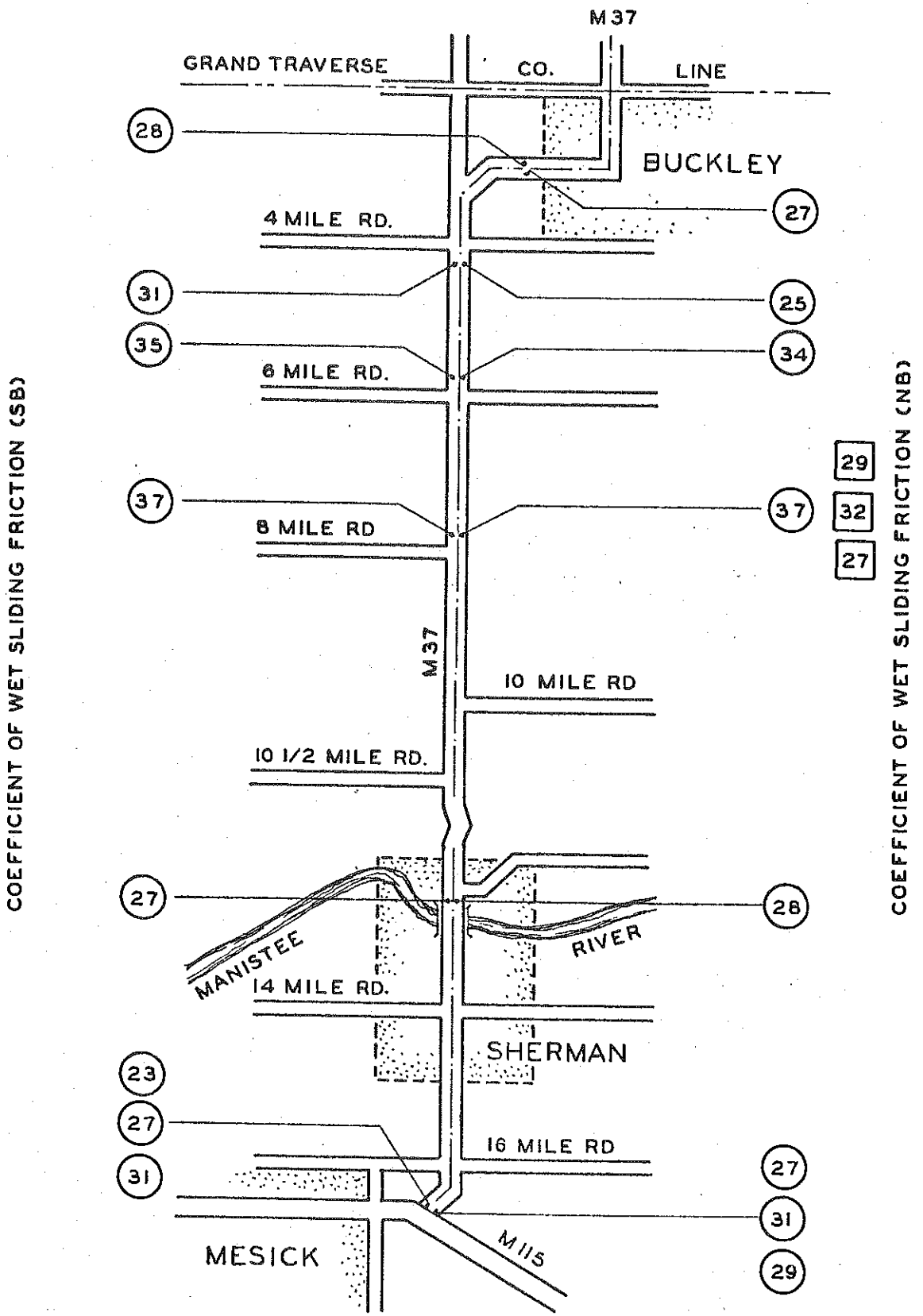
Engineer of Research

LTO:PMS:bf

Attachments

cc: T. R. Wiseman
D. E. Orne
K. A. Allemeier


M37
M 113
33
34
41
34
HARRAND
RD
27
33
BARTLETT RD
34
27
M37
N
ANDERSON
CREEK
ZUE RD
33
37
ELLIOT
RD
38
33
COUNTY LINE
RD
34
25
WEXFORD
COUNTY
COEFFICIENT OF WET SLIDING FRICTION (SB)
COEFFICIENT OF WET SLIDING FRICTION (NB)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SHERMAN
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COEFFICIENT OF WET SLIDING FRICTION (SB)
COEFFICIENT OF WET SLIDING FRICTION (NB)

OFFICE MEMORANDUM

DATE: October 3, 1975

TO: D. E. Orne
Engineer of Traffic and Safety

FROM: L. T. Oehler

SUBJECT: Skid Tests on US 12 Between Hubbard St and US 10, City of Detroit. Research Project 54 G-74, 75 SR-26.

In accord with your September 19, 1975 request, skid tests have been conducted on US 12 (Michigan Ave) between Hubbard St and US 10 (Lodge Freeway). Half of the EBCL and WBCL is brick; the other half is bituminous. Consequently, in these lanes, friction levels were taken in the outside and inside wheel tracks to differentiate surface types. Wsf values on the three lanes of bituminous ranged from 0.28 to 0.47 and averaged 0.38; the brick lanes ranged from 0.25 to 0.38 and averaged 0.32. A summary of skid test results is shown below for your review.

Test Location	Surface Type	Lane	Coefficient of Wsf		
			Low	High	Avg
West of Harrison	Brick	EBOL	0.29	0.38	0.33
	Brick	EBCL-OWT	0.28	0.35	0.32
	Bit	EBCL-IWT	0.41	0.44	0.42
	Bit	EBIL	0.34	0.39	0.36
	Brick	WBOL	0.25	0.31	0.28
	Brick	WBCL-OWT	0.33	0.35	0.34
	Bit	WBCL-IWT	0.33	0.39	0.37
	Bit	WBIL	0.28	0.35	0.32
West of US 10	Brick	EBOL	0.29	0.34	0.31
	Brick	EBCL-OWT	0.31	0.38	0.35
	Bit	EBCL-IWT	0.41	0.47	0.45
	Bit	EBIL	0.33	0.42	0.37
	Brick	WBOL	0.27	0.29	0.28
	Brick	WBCL-OWT	0.33	0.37	0.35
	Bit	WBCL-IWT	0.38	0.41	0.40
	Bit	WBIL	0.38	0.39	0.38

TESTING AND RESEARCH DIVISION

L. T. Oehler

Engineer of Research

LTO:PMS:bf

cc: P. J. Riley

OFFICE MEMORANDUM

DATE: October 10, 1975

TO: D. L. Wickham
Construction Staff Engineer

FROM: F. Copple

SUBJECT: Skid Test Measurements on I 196, State Project 70024-00983A.
Research Project 54 G-74, 75 SR-27.

In response to your September 23, 1975 verbal request, skid tests were conducted September 29, 1975, on the eastbound lanes of I 196 within and both sides of the area bounded by Stations 628 to 636. Included in the following skid data summary are results of earlier routine survey tests performed on July 1, 1975.

Test Date	Test Location	Lane Tested	No. of Tests	40 mph Coefficient of Wsf		
				Low	High	Avg
7-1-75	From southwest of Byron Rd to northeast of 56th Ave	EBOL	3	0.59	0.63	0.61
		EBIL	3	0.64	0.68	0.66
		WBOL	3	0.58	0.60	0.59
		WBIL	3	0.65	0.69	0.67
9-29-75	West of Station 628	EBOL	3	0.55	0.61	0.58
		EBIL	3	0.61	0.65	0.63
	From Station 628 to 636	EBOL	6	0.37	0.52	0.42
		EBIL	3	0.48	0.59	0.53
	East of Station 636	EBOL	3	0.47	0.47	0.47
		EBIL	3	0.53	0.55	0.54

TESTING AND RESEARCH DIVISION

F. Copple

F. Copple - Supervisor
Pavement Performance Group

FC:bf

cc: K. A. Allemeier
L. T. Oehler

OFFICE MEMORANDUM

DATE: November 13, 1975

TO: D. E. Orne
Engineer of Traffic & Safety

FROM: K. A. Allemeier

SUBJECT: Field Skid Tests of Pavement Marking Materials
Research Project 54 G-74, 75 SR-28

In accord with your September 24, 1975 request, skid tests have been conducted on the three pavement marking materials placed on the unopened section of westbound US127 at US-27. Item four of your request (RR X'ing site) has been deleted because a suitable test location could not be found. Since pavement texture is not completely smoothed by most paint applications, skid tests were also conducted on the transverse broomed concrete pavement adjacent to the marking materials.

Following is a summary of skid test values as obtained October 30, 1975.

Surface Tested	Lane and Location	40 mph Coefficient of wsf Low	High	Avg.
#1 - Dept. Fast Dry Paint, White Beaded	WBIL - East Marking	0.34	0.39	0.37
#2 - Hot Plastic, Yellow Beaded	WBOL	0.22	0.25	0.23
#3 - Cold Plastic, White	WBIL - West Marking	0.03	0.07	0.04
Concrete Pavement adjacent to #1	WBIL	0.65	0.69	0.67

TESTING AND RESEARCH DIVISION

K.A. Allemeier

Engineer of Testing and Research

KAA:PTL:cgc

cc: L. T. Oehler
J. P. Neve, Jr.

OFFICE MEMORANDUM

DATE: October 20, 1975

TO: D. E. Orne
Engineer of Traffic and Safety

FROM: L. T. Oehler

SUBJECT: Skid Tests on M 85 Curve, City of Trenton.
Research Project 54 G-74, 75 SR-29.

In accord with your September 29, 1975 request, skid tests have been conducted on M 85 (Fort Rd) in the curve area north of West Rd in the city of Trenton. Friction levels on this concrete surface, as measured October 8, 1975, ranged from 0.28 to 0.40 and averaged 0.34. Test personnel reported the presence of tar intermittently splashed onto the SBIL. This tar could be a spill-over resulting from a previous shoulder surfacing. Individual lane coefficients for the subject curve area are shown below.

Lane	Coefficient of Wsf		
	Low	High	Avg
NBOL	0.35	0.38	0.37
NBIL	0.35	0.40	0.38
SBOL	0.29	0.33	0.31
SBIL	0.28	0.33	0.31

TESTING AND RESEARCH DIVISION

L Roy T Oehler
Engineer of Research

LTO:PMS:bf

cc: P. J. Riley
L. Brown

OFFICE MEMORANDUM

DATE: October 27, 1975

TO: F. Copple, Supervisor
Pavement Performance Group

FROM: P. M. Schafer

SUBJECT: Skid Tests on I-96 over the Thornapple River (B01 of 41024)
Research Project 54 G-74, 75 SR-30

In accord with your September 26, 1975 request skid tests have been conducted again on the partially transverse combed deck of B01 of 41024. Reported below is a historical review of wsf values obtained during 1974 and 1975.

B01 of 41024 Location	Texturing Method	Test Date	Lane and Direction	40 mph Coefficient of WSF Low	High	Avg.
East half of deck	Transverse Comb	8-12-74	EBOL	0.48	0.52	0.49
		5-23-75		0.54	0.55	0.54
		10-16-75		0.45	0.48	0.46
	Burlap Drag	5-23-75	WBOL	0.50	0.53	0.52
		10-16-75		0.48	0.55	0.52
West half of deck	Burlap Drag	8-12-74	EBOL	0.37	0.40	0.38
		5-23-75		0.45	0.46	0.45
		10-16-75		0.45	0.45	0.45
	Burlap Drag	5-23-75	WBOL	0.51	0.52	0.52
		10-16-75		0.47	0.50	0.49

B01 of 41024 Location	Texturing Method	Test Date	Lane and Direction	20 mph Coefficient of WSF Low	High	Avg.
East half of deck	Transverse Comb	5-23-75	EBOL	0.68	0.69	0.69
		10-16-75		0.50	0.52	0.51
	Burlap Drag	5-23-75	WBOL	0.66	0.70	0.68
		10-16-75		0.55	0.58	0.57
West half of deck	Burlap Drag	5-23-75	EBOL	0.59	0.64	0.62
		10-16-75		0.52	0.53	0.52
	Burlap Drag	5-23-75	WBOL	0.66	0.68	0.67
		10-16-75		0.53	0.54	0.54

TESTING AND RESEARCH DIVISION

P. M. Schafer

P. M. Schafer - Pavement Performance Group

PMS:cgc
cc: R. L. Felter

OFFICE MEMORANDUM

DATE: October 24, 1975

TO: P. J. Serafin, Supervising Engineer
Bituminous Technical Services Unit

FROM: L. T. Oehler

SUBJECT: Skid Test Results on Experimental Rubber Asphalt Project in Detroit and on Open-Graded Friction Course in Bay City.
Research Project 54 G-74, 75 SR-31.

In accord with your October 7, 1975 request, skid tests have been conducted in the two areas you specified.

Friction levels were measured October 19, 1975 on the experimental rubber asphalt project recently completed on Michigan Ave (US 12) between Wyoming Ave and Hubbard St in Detroit. Initial skid tests on the rubber asphalt sections yielded coefficients ranging from 0.50 to 0.64 and averaging 0.57. The control area, conventional asphalt sections, yielded initial wsf values ranging from 0.48 to 0.66 and averaging 0.58. No significant difference between the conventional and experimental surface is indicated by initial friction levels. Attached is a summary of test data for your review.

Skid tests were conducted October 15, 1975 on the recently completed open-graded friction course located on M 25 between Heavenridge St and Scheurman Rd in Bay City. Initial coefficients at this location ranged from 0.37 to 0.47 and averaged 0.42; results of these tests are shown below.

Lane Tested	Coefficient of Wsf		
	Low	High	Avg
EBOL	0.40	0.42	0.41
EBIL	0.40	0.45	0.42
WBOL	0.41	0.47	0.45
WBIL	0.37	0.44	0.42

TESTING AND RESEARCH DIVISION

L. T. Oehler

Engineer of Research

LTO:PMS:bf

Attachment

cc: K. A. Allemeier
M. E. Witteveen

EXPERIMENTAL RUBBER ASPHALT PROJECT (Mb 82062-07727A)
Skid Test Date: 10-19-75
75 SR-31

Surface Type	US 12 Location	Direction and Lane	Coefficient of Wsf		
			Low	High	Avg
Conventional Asphalt	From 635 ft west of Wyoming east to Wyoming	EBOL	0.60	0.65	0.62
		EBIL	0.58	0.60	0.59
		WBOL	0.59	0.61	0.60
		WBIL	0.58	0.59	0.59
	Wyoming to Cabot	EBOL	0.55	0.60	0.58
		EBIL	0.53	0.58	0.56
		WBOL	0.54	0.58	0.56
		WBIL	0.48	0.55	0.51
	28th St to Clark	EBOL	0.59	0.63	0.61
		EBCL	0.52	0.59	0.56
		EBIL	0.58	0.58	0.58
		WBOL	0.59	0.61	0.60
		WBCL	0.60	0.63	0.61
		WBIL	0.55	0.61	0.58
	Clark to Hubbard	EBOL	0.60	0.63	0.61
		EBCL	0.53	0.59	0.56
		EBIL	0.52	0.57	0.54
		WBOL	0.60	0.66	0.62
		WBCL	0.55	0.61	0.58
		WBIL	0.58	0.61	0.59
Rubber Asphalt	Cabot to Freer	EBOL	0.55	0.58	0.57
		EBIL	0.54	0.60	0.56
		WBOL	0.52	0.57	0.54
		WBIL	0.50	0.53	0.52
	Freer to Livernois	EBOL	0.54	0.60	0.56
		EBIL	0.57	0.64	0.59
		WBOL	0.57	0.60	0.58
		WBIL	0.58	0.64	0.61

OFFICE MEMORANDUM

DATE: October 16, 1975

TO: J. F. Oravec
Engineer of Maintenance

FROM: L. T. Oehler

SUBJECT: Skid Tests on I 75 Seal Coat, Otsego County.
Research Project 54 G-74, 75 SR-32.

Attached are results from skid tests made on October 13 on a length of I 75 in Otsego County; the particular area is one where a seal had been placed. Tests were made before the field crew could be informed of specific locations noted in your letter of October 8. However, tests were taken intermittently over the entire length of the seal coat so those areas noted were included.

Seal coat friction levels ranged from 0.09 to 0.31 and averaged 0.20. Adjacent bituminous concrete surfaces yielded coefficients ranging from 0.33 to 0.60 and averaging 0.45.

TESTING AND RESEARCH DIVISION

L. Ray T Oehler
Engineer of Research

LTO:PMS:bf

Attachment

cc: K. A. Allemeier
P. J. Serafin

I 75 Location	Surface Type	Lane, Direction and Wheeltrack	Coefficient of Wsf		
			Low	High	Avg
1st seal coat patch north of Parmetor Rd	Seal Coat	NBOL-IWT	0.12	0.14	0.13
2nd seal coat patch north of Parmetor Rd - downhill grade	Seal Coat	NBOL-IWT	0.12	0.26	0.19
Continuing northerly	Bit Conc	NBOL-IWT	0.59	0.60	0.59
Adjacent to rest area	Seal Coat	NBOL-IWT	0.22	0.27	0.26
		NBOL-OWT	0.16	0.31	0.25
South to south limits of Vanderbilt	Seal Coat	NBOL-IWT	0.13	0.19	0.18
		NBOL-OWT	0.23	0.28	0.25
South of Alexander Rd	Seal Coat	NBOL-IWT	0.20	0.23	0.21
		NBOL-OWT	0.21	0.25	0.23
Continuing northerly	Bit Conc	NBIL-IWT	0.54	0.54	0.54
North of Milepost 294	Seal Coat	NBOL-IWT	0.12	0.16	0.13
		NBOL-OWT	0.19	0.22	0.21
North of Milepost 295	Bit Conc	NBOL-IWT	0.37	0.38	0.37
		NBOL-OWT	0.37	0.39	0.38
Immediately prior to 1st seal coat application	Bit Conc	SBOL-IWT	0.33	0.40	0.37
South of Milepost 294	Seal Coat	SBOL-IWT	0.09	0.13	0.11
		SBOL-OWT	0.13	0.15	0.14
South of Milepost 292	Seal Coat	SBOL-IWT	0.22	0.31	0.26
		SBOL-OWT	0.18	0.28	0.25
North of old US 27	Seal Coat	SBOL-IWT	0.18	0.25	0.21

OFFICE MEMORANDUM

DATE: October 24, 1975

TO: P. Kamarainen
Construction Division

FROM: L. T. Oehler

SUBJECT: Skid Tests on Eastbound M 50 ramp to Southbound US 127, North of Jackson. Research Project 54 G-74, 75 SR-33.

As a result of your October 14, 1975 conversation with F. Copple, skid tests have been made on the short length of seal coat on the eastbound M 50 ramp to southbound US 127. Three tests were conducted October 23, 1975, at this site; wsf values ranged from 0.14 to 0.19 and averaged 0.16.

TESTING AND RESEARCH DIVISION

L. T. Oehler

Engineer of Research

LTO:PMS:bf

cc: K. A. Allemeier
D. E. Orne

OFFICE MEMORANDUM

DATE: November 14, 1975

TO: P. Kamarainen
Construction Division

FROM: L. T. Oehler

SUBJECT: Skid Tests at Two Ramp Locations in Jackson County
Research Project 54 G-74, 75 SR-33a

Skid tests were conducted on the M-50 ramp to southbound US-127 on October 23, 1975 and reported to you in my October 24 correspondence. At this time wsf values ranged from 0.14 to 0.19 and averaged 0.16.

A kerosene and sand treatment was applied to the above ramp and to the northbound US-127 ramp to M-50 during the week of November 3. In response to your October 31 phone request, skid tests have been conducted on the treated areas. Friction levels on the southbound ramp ranged from 0.38 to 0.46 and averaged 0.43. The northbound ramp yielded wsf values ranging from 0.29 to 0.60 and averaging 0.44.

TESTING AND RESEARCH DIVISION

L. T. Oehler

Engineer of Research
Research Laboratory Section

LTO:PMS:cgc

cc: K. A. Allemeier
D. E. Orne

OFFICE MEMORANDUM

DATE: October 24, 1975

TO: P. J. Serafin, Supervising Engineer
Bituminous Technical Services Unit

FROM: L. T. Oehler

SUBJECT: Additional Skid Tests on M 37 from Mesick to M 113 (Project Mb 83013-07669A). Research Project 54 G-74, 75 SR-34.

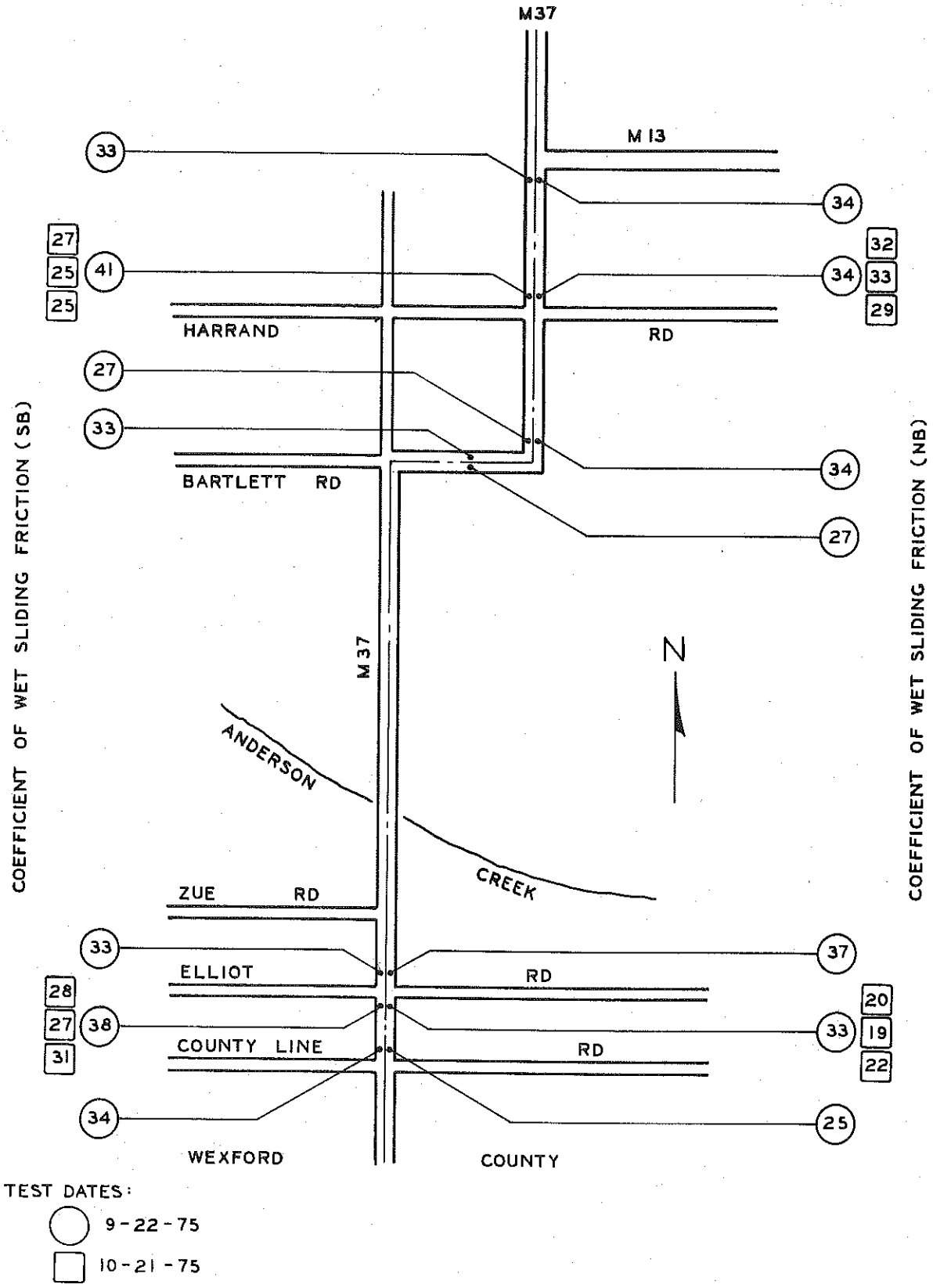
In accord with your teletype message dated October 13, 1975, additional skid tests have been conducted on M 37 between Mesick and M 113 to determine if the sheen on the surface has been worn off and the urgency of signing has been alleviated. Initially skid tests were conducted on this surface September 22, 1975 and reported in my October 8, 1975 letter to B. A. Conradson (75 SR-25). At this time wsf values ranged from 0.23 to 0.41 and averaged 0.31. The most recent tests were conducted October 21, 1975; wsf values ranged from 0.18 to 0.33 and averaged 0.25 (19 percent lower than those determined one month earlier). Attached is a layout of the subject area showing results from both sets of skid tests.

TESTING AND RESEARCH DIVISION

L. T. Oehler
Engineer of Research

LTO:PMS:bf

cc: T. R. Wiseman
B. A. Conradson
D. E. Orne
K. A. Allemeier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COUNTY LINE
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COUNTY
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COEFFICIENT OF WET SLIDING FRICTION (NB)
TEST DATES:
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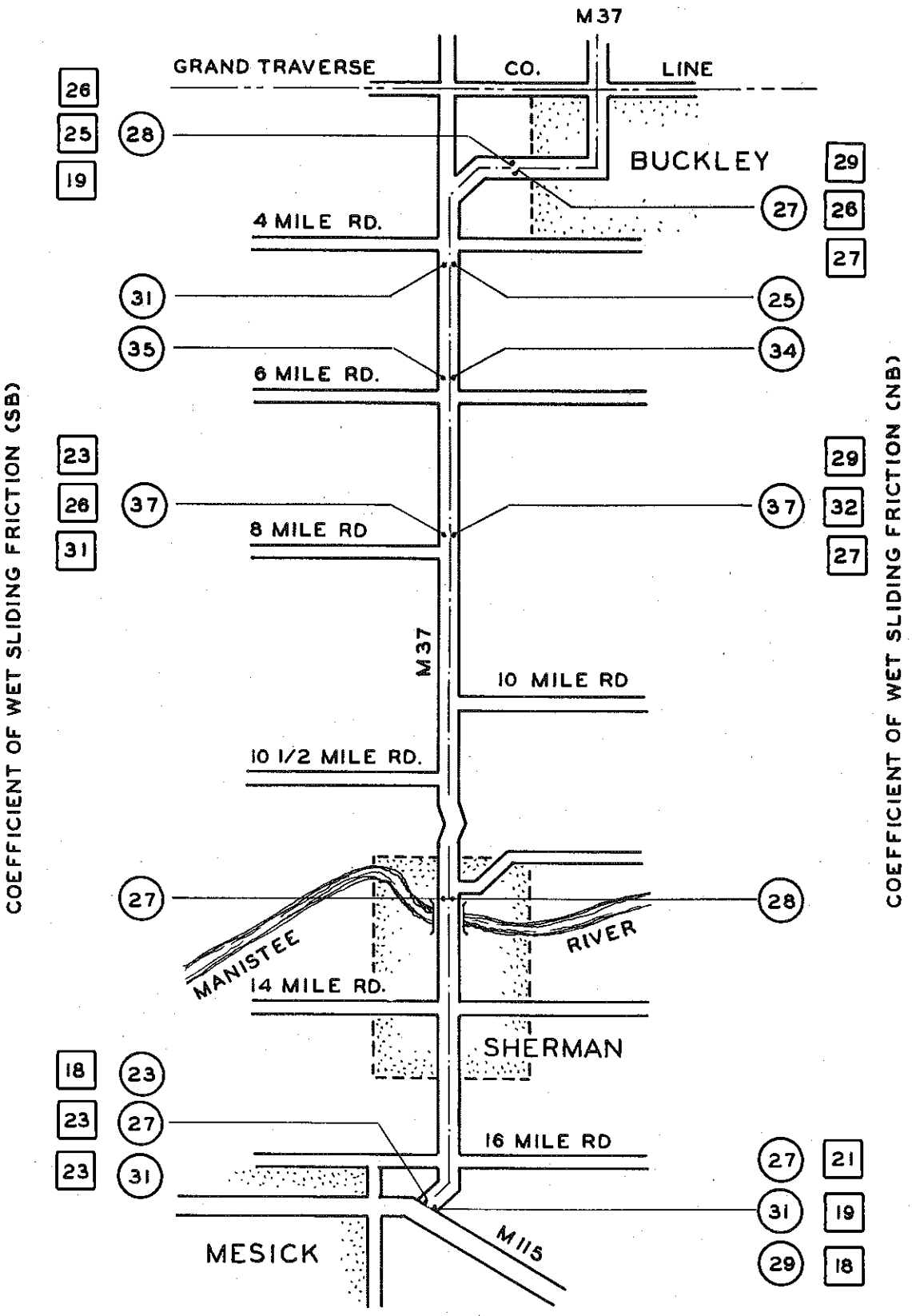
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6 MILE RD.
8 MILE RD
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10 1/2 MILE RD.
14 MILE RD.
16 MILE RD
M37
MANISTEE RIVER
SHERMAN
MESICK
M115
COEFFICIENT OF WET SLIDING FRICTION (SB)
COEFFICIENT OF WET SLIDING FRICTION (NB)
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31 19
29 18
TEST DATES:
9-22-75
10-21-75

OFFICE MEMORANDUM

DATE: November 14, 1975

TO: D. E. Orne
Engineer of Traffic and Safety

FROM: L. T. Oehler

SUBJECT: Skid Tests at Four Saginaw County Locations
Research Project 54 G-74, 75 SR-35

In accord with your October 14, 1975 request, skid tests have been conducted at the four locations you specified.

1. The I-75 exit ramp to northbound I-675 is single lane as traffic leaves I-75 but becomes a two-lane ramp prior to its' crossing over I-75. Wsf values at this location ranged from 0.29 to 0.52 and averaged 0.37.

2. I-675 from the east city limits of Saginaw west to the westbound exit ramp to 5th and 6th streets (milepost 0.96 to 1.83) yielded a friction level range of 0.35 to 0.48 and an average of 0.43.

3. Location 3 was I-675 from west of the Saginaw River structure west and north to the Shattuck Road underpass (milepost 2.80 to 4.01). All lanes except the SBOL appear to possess a uniform friction level throughout this test location. The SBOL has a polished appearance in the area between Weiss Road and the Saginaw River. SBOL coefficients in the polished area average 0.29 and out of the polished area average 0.40. Considering all tests conducted in location 3, wsf values ranged from 0.25 to 0.42 and averaged 0.35.

4. The fourth location requested was the deck of the I-675 bridge over Saginaw River (milepost 2.70). Coefficients ranged from 0.34 to 0.54 and averaged 0.42.

Skid tests were conducted October 29, 1975 and are shown below for your review.

Location	Lane Tested	40 mph Coefficient of Wsf Low	High	Avg
	One-Lane Section			
1. I-75 Exit Ramp to northwest bound I-675	NB	0.31	0.37	0.34
	Two-Lane Section			
	NBOL	0.29	0.38	0.33
	NBIL	0.38	0.52	0.44

	Location	Lane Tested	40 mph Coefficient of Wsf Low	High	Avg.
2.	I-675 from the east limits of Saginaw west to the westbound exit ramp to 5th and 6th Streets (milepost 0.96 to 1.83)	NBOL	0.35	0.38	0.37
		NBIL	0.47	0.48	0.47
		SBOL	0.35	0.42	0.38
		SBCL	0.40	0.48	0.45
		SBIL	0.40	0.48	0.45
3.	I-675 from west of the Saginaw River west and north to Shattuck Road (milepost 2.80 to 4.01)	North of Weiss Road			
		NBIL	0.31	0.39	0.34
		SBOL	0.39	0.41	0.40
		South of Weiss Road			
		NBOL	0.32	0.33	0.33
		SBOL	0.25	0.32	0.29
		SBIL	0.34	0.42	0.38
4.	I-675 Bridge over the Saginaw River	NBOL	0.34	0.37	0.35
		NBIL	0.45	0.47	0.46
		SBOL	0.39	0.41	0.40
		SBCL	0.38	0.44	0.40
		SBIL	0.48	0.54	0.52

TESTING AND RESEARCH DIVISION

Engineer of Research
Research Laboratory Section

LTO:PMS:cgc

cc: D. F. VanHine

OFFICE MEMORANDUM

DATE: November 12, 1975

TO: D. L. Wickham
Construction Division

FROM: F. Copple

SUBJECT: Skid Tests on the Rouge River Bridge
Research Project 54 G-74, 75 SR-36

On October 19, skid tests were conducted over the recently completed latex concrete surface, placed on the southbound lanes of the Rouge River Bridge (Project I 82194-08086A). Wsf values ranged from 0.35 to 0.54 and averaged 0.45. No marked differences in average friction levels were noticed across the four lanes tested; respective average wsf values for the SBOL, SB#3, SB#2 and SBIL were 0.46, 0.43, 0.46 and 0.44. Individual test values and approximated test locations are displayed on the attachment.

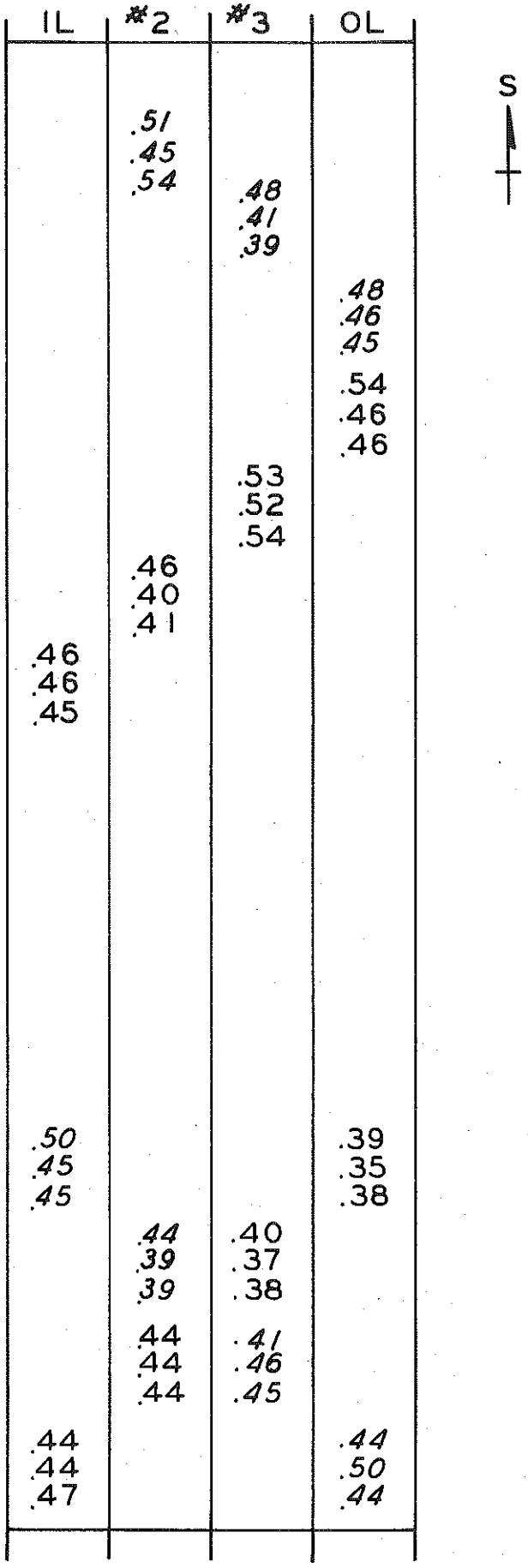
TESTING AND RESEARCH DIVISION

F. Copple

F. Copple - Group Supervisor
Pavement Performance Group
Research Laboratory Section

FC:cgc
Attachment

cc: K. A. Allemeier
L. T. Oehler
M. G. Brown



SKID TESTS ON ROUGE RIVER BRIDGE
75 SR-36

SECTION VII

SPECIAL ATTENTION LOCATIONS

Special Attention Locations

Commencing with the 1973 test program all locations with friction levels averaging 0.35 or lower will be reported as soon as such friction levels are determined. This will be accomplished throughout previously established "high-accident" or "special request" programs, which have always been reported without delay, or through a recent established "special attention" reporting procedure. Reported within this section are the "special attention" locations and their respective Wsf values.

OFFICE MEMORANDUM

August 28, 1975

TO: D. E. Orne
Engineer of Traffic and Safety

FROM: L. T. Oehler

SUBJECT: Report of Pavements with Wsf Values Averaging Below 0.35.
Research Project 54 G-74, 75 SA-1.

In conformance with our policy of reporting friction levels below 0.35, the attached list of 18 locations is furnished for your review. Listed friction levels were discovered during routine 1975 skid tests at the aforementioned locations.

TESTING AND RESEARCH DIVISION

for
Engineer of Research

LTO:PMS:bf

Attachment

cc: K. A. Allemeier

Project No.	Location	Surface Type	Direction and Lane	Coefficient of Wsf		
				Low	High	Avg
02041	M 28 at Hickory St, City of Munising	Conc	EBOL	0.40	0.41	0.41
			EBIL	0.37	0.38	0.38
			WBOL	0.34	0.36	0.35
			WBIL	0.35	0.37	0.36
		Longitudinal Grooved Conc	EBOL	0.33	0.37	0.35
			EBIL	0.33	0.34	0.34
			WBOL	0.33	0.34	0.34
			WBIL	0.32	0.34	0.33
11051-05491A	US 31 - US 33 from Fort St N'ly to M 60 BR (Main St) in Niles	Bit Conc	NBOL	0.39	0.39	0.39
			NBIL	0.39	0.40	0.40
			SBOL	0.31	0.33	0.32
			SBIL	0.37	0.37	0.37
11053	Northbound BL 94 - US 33 from Pleasant St to Ship St in St. Joseph	Conc	NBOL	0.20	0.22	0.21
			NBIL	0.27	0.30	0.29
		Transverse Grooved Conc	NBOL	0.24	0.25	0.24
			NBIL	0.32	0.33	0.33
14011-06130A	M 60 (State St) from M 62 (Broadway St) E'ly 1.12 mi to E village limits of Cassapolis	Bit Conc	EB	0.29	0.30	0.30
			WB	0.34	0.34	0.34
28012A, C1	M 37 from Beitner Rd N to Silver Lake Shore Rd	Bit Conc	NB	0.32	0.33	0.33
			SB	0.34	0.35	0.35
30032A, C1	M 99 (Will Carlton Rd) from Spring St NW'ly and N'ly to 616 ft S of the N city limits of Hillsdale	Conc Bit Conc Conc Bit Conc	NBOL	0.31	0.33	0.32
			NBIL	0.44	0.45	0.44
			SBOL	0.31	0.35	0.33
			SBIL	0.42	0.44	0.43
33082 (MP 3.28 to MP 3.6)	M 43 from GTWRR structure (X01 of 33082) E to Hamilton Rd in Okemos	Bit	EBOL	0.22	0.29	0.25
			EBIL	0.39	0.44	0.41
			WBOL	0.26	0.43	0.33
			WBIL	0.42	0.49	0.46
41031-005 (part)	M 45 from W city limits of Grand Rapids E to Bridge St - Control Section 41081	Bit Conc	EBOL	0.17	0.20	0.18
			EBIL	0.20	0.23	0.21
			WBOL	0.20	0.23	0.21
			WBIL	0.23	0.25	0.24

Project No.	Location	Surface Type	Direction and Lane	Coefficient of Wsf		
				Low	High	Avg
80071-06144A (part)	M 40 from 41 ft N of Van Buren St, in Gobles, N'ly 4.43 mi to 40 ft S of the Van Buren-Allegan Co. Line	Bit Agg	NB	0.31	0.36	0.34
			SB	0.30	0.33	0.32
81081	M 17 approaches to Summitt St, Ypsilanti	Conc	EBOL	0.32	0.33	0.32
			EBCL	0.27	0.30	0.28
			EBIL	0.30	0.32	0.31
		Transverse Grooved Conc	EBOL	0.30	0.32	0.31
			EBCL	0.28	0.33	0.31
			EBIL	0.30	0.36	0.33
81081	M 17 approaches to Oakwood, Ypsilanti	Conc	EBOL	0.33	0.37	0.35
			EBIL	0.33	0.37	0.35
			WBOL	0.28	0.33	0.30
			WBIL	0.30	0.32	0.31
		Transverse Grooved Conc	EBOL	0.39	0.42	0.41
			EBIL	0.40	0.41	0.40
			WBOL	0.38	0.40	0.39
			WBIL	0.34	0.36	0.35
81081	M 17 approaches to Mansfield, Ypsilanti	Conc	EBOL	0.25	0.26	0.25
			EBIL	0.25	0.27	0.26
			WBOL	0.31	0.35	0.32
			WBIL	0.30	0.35	0.32
		Transverse Grooved Conc	EBOL	0.32	0.35	0.33
			EBIL	0.33	0.37	0.35
			WBOL	0.37	0.40	0.38
			WBIL	0.35	0.36	0.36
81081	M 17 approaches to Hewitt, Ypsilanti	Conc	EBOL	0.28	0.30	0.29
			EBIL	0.28	0.32	0.31
			WBOL	0.30	0.32	0.31
			WBIL	0.30	0.36	0.33
		Transverse Grooved Conc	EBOL	0.34	0.35	0.34
			EBIL	0.35	0.36	0.35
			WBOL	0.39	0.40	0.39
			WBIL	0.39	0.40	0.39

Project No.	Location	Surface Type	Direction and Lane	Coefficient of Wsf		
				Low	High	Avg
81081	M 17 approaches to Golfside, Ypsilanti	Conc	EBOL	0.28	0.30	0.29
			EBIL	0.34	0.37	0.36
			WBOL	0.27	0.32	0.30
			WBIL	0.29	0.30	0.29
		Transverse Grooved Conc	EBOL	0.32	0.37	0.35
			EBIL	0.36	0.40	0.37
			WBOL	0.40	0.42	0.41
			WBIL	0.35	0.39	0.37
X01 of 82024	I 94 over DeQuindre Yard	Latex Conc	EBRT	0.37	0.39	0.38
			EBOL	0.31	0.33	0.32
			EBCL	0.34	0.34	0.34
			EBIL	0.32	0.36	0.34
			WBRT	0.30	0.32	0.31
			WBOL	0.32	0.34	0.33
			WBCL	0.34	0.35	0.35
			WBIL	0.38	0.42	0.40
S18 of 82025	Allard Ave over I 94	Polyurethane	EBOL	0.43	0.46	0.45
		Conc*	EBIL	0.31	0.34	0.33
		Conc*	WBOL	0.50	0.53	0.52
		Conc*	WBIL	0.06	0.09	0.07
		Polyurethane	WBIL	0.33	0.35	0.34
82053	US 24 at 5 Mile Rd	Skid Resistant Resurfacing	US 24			
			NBOL	0.30	0.32	0.31
			NB#3	0.34	0.35	0.34
			NB#2	0.35	0.36	0.36
			NBIL	0.34	0.36	0.35
			SBOL	0.36	0.37	0.36
			SBCL	0.38	0.41	0.39
			SBIL	0.40	0.41	0.41
			5 Mile Rd			
			EBOL	0.39	0.42	0.41
			EBIL	0.41	0.44	0.42
			WBOL	0.37	0.42	0.40
			WBIL	0.44	0.46	0.45
S27 of 82195	Brush St over I 75	Latex Mod Mortar	NBOL	0.39	0.42	0.40
			NBCL	0.32	0.35	0.34
			NBIL	0.33	0.38	0.36

* A polyurethane coating has been partially or entirely worn off.

OFFICE MEMORANDUM

DATE: October 31, 1975

TO: D. E. Orne
Engineer of Traffic and Safety

FROM: L. T. Oehler

SUBJECT: Report of Pavements with Wsf Values Averaging Below 0.35
Research Project 54 G-74, 75 SA-2

In conformance with our continuing policy of reporting friction levels below 0.35, the attached list of 30 locations is furnished for your review. Listed friction levels were discovered during routine 1975 skid tests at the designated locations.

TESTING AND RESEARCH DIVISION

L. Ray T Oehler
Engineer of Research

LTO:PMS:cgc
Attachment

cc: K. A. Allemeier
District Engineers

Project Number	Location	Surface Type	Direction and Lane	Coefficient of Wsf Low	High	Avg
02041	M-28 Curve at Hickory Street, City of Munising	Grooved Conc	EBOL	0.35	0.39	0.37
			EBIL	0.31	0.35	0.33
			WBOL	0.29	0.33	0.31
			WBIL	0.35	0.39	0.37
		Conc	EBOL	0.35	0.41	0.38
			EBIL	0.42	0.42	0.42
			WBOL	0.31	0.34	0.32
			WBIL	0.34	0.39	0.37
07011-07632 (Control 07021)	M-28 from Baraga-Houghton County Line E 6.41 miles	Bit Agg	East of County Line			
			EB	0.34	0.38	0.36
			WB	0.34	0.37	0.36
			East End of Project			
			EB	0.29	0.37	0.33
			WB	0.27	0.29	0.28
13121G, C66	I-94 BL from Capitol Ave. E. of "S" St. in Battle Creek	Conc	EBOL	0.33	0.35	0.34
			EBIL	0.37	0.42	0.39
			WBOL	0.33	0.35	0.34
			WBIL	0.38	0.42	0.40
25073	M-54 at M-57	Exp. Skid Resistance Surface	NBOL	0.10	0.21	0.17
			NBIL	0.51	0.61	0.57
			SBOL	0.28	0.39	0.35
			SBIL	0.48	0.63	0.57
40022-07687	M-72 from E. of M-66 E. to Crawford Co. Line	Bit Agg	EB	0.23	0.31	0.25
			WB	0.21	0.37	0.30
			WBTL	0.33	0.37	0.36
41041-04028A	Old M-21 at I-196	Bit Conc	EBOL	0.32	0.34	0.33
			EBIL	0.39	0.42	0.41
			WBOL	0.36	0.40	0.38
			WBIL	0.42	0.43	0.42
44011-003 (00622)	M-24 from Turill Rd. N. to N. of Pearl Street	Conc Bit Conc Bit	NBOL	0.27	0.33	0.29
			NBIL	0.39	0.44	0.41
			SBOL	0.26	0.28	0.27
			SBIL	0.40	0.42	0.41
48032-005	M-123 in Newberry from S. limits to Helen Street	Bit Agg	NB	0.27	0.31	0.29
			SB	0.32	0.35	0.33

Project Number	Location	Surface Type	Direction and Lane	Coefficient of Wsf Low	High	Avg
50013A, C1	M-53 from S. of 21 Mile Rd. N. to S. of 25 Mile Rd.	Conc	NBOL	0.33	0.37	0.36
			NBIL	0.39	0.42	0.40
			SBOL	0.32	0.35	0.33
			SBIL	0.42	0.46	0.44
50013A, C2	M-53 from N. of 24 Mile Rd. N. to Old M-53, N. of Washington	Conc	NBOL	0.37	0.41	0.39
			NBIL	0.45	0.47	0.46
			SBOL	0.32	0.35	0.34
			SBIL	0.41	0.46	0.44
50022A, C5	M-59 from Old M-53 E. to M-53 relocation	Conc	EBOL	0.25	0.25	0.25
		Bit Conc	EBIL	0.28	0.34	0.31
		Conc	WBOL	0.22	0.27	0.24
		Bit Conc	WBIL	0.32	0.34	0.33
50023	M-59 Curve between DeQuindre Rd. and Ryan Rd.	Grooved Conc	EBOL	0.38	0.39	0.39
			EBIL	0.37	0.40	0.39
			WBOL	0.32	0.38	0.36
			WBIL	0.33	0.37	0.34
		Conc	EBOL	0.33	0.37	0.34
			EBIL	0.45	0.51	0.47
			WBOL	0.34	0.38	0.37
			WBIL	0.38	0.42	0.40
56023	Eastbound M-20 at Ashman St., City of Midland	Grooved Conc	EBOL	0.29	0.35	0.32
			EBCL	0.29	0.34	0.32
			EBIL	0.31	0.35	0.33
		Conc	EBOL	0.34	0.37	0.35
			EBCL	0.32	0.33	0.33
			EBIL	0.32	0.37	0.34
56023	Eastbound M-20 at Rodd St., City of Midland	Grooved Conc	EBOL	0.31	0.37	0.33
			EBCL	0.33	0.34	0.34
			EBIL	0.31	0.34	0.32
		Conc	EBOL	0.29	0.34	0.32
			EBCL	0.29	0.33	0.31
			EBIL	0.31	0.33	0.32
56023	Eastbound M-20 at Cronkwright, City of Midland	Grooved Conc	EBOL	0.32	0.38	0.34
			EBCL	0.34	0.34	0.34
			EBIL	0.38	0.41	0.39
		Conc	EBOL	0.32	0.34	0.33
			EBCL	0.32	0.37	0.34
			EBIL	0.35	0.37	0.36

Project Number	Location	Surface Type	Direction and Lane	Coefficient of Wsf Low	High	Avg
58053-003 (00790)	US-24 from S. of Stoney Creek Bridge in Monroe Co. NE to Carter Rd. in Wayne Co., omitting at Huron River Bridge in Flatrock and at West Rd.		South of Vreeland Rd (Control Section 82051)			
		Bit Conc	NBOL	0.31	0.32	0.31
			NBIL	0.38	0.40	0.39
			SBOL	0.38	0.38	0.38
			SBIL	0.40	0.42	0.41
			South of Rockwood (Control Section 58053)			
		Bit Conc	NBOL	0.44	0.47	0.45
			NBIL	0.53	0.54	0.53
			SBOL	0.41	0.44	0.42
			SBIL	0.47	0.50	0.48
63031-020 (00850A)	US-10 - US-24 from N. of 14 Mile Rd. N. to N. of 15 Mile Road	Conc	NBOL	0.37	0.41	0.40
			NB#3	0.34	0.40	0.38
			NB#2	0.32	0.35	0.34
			NBIL	0.39	0.40	0.40
			SBOL	0.32	0.37	0.35
			SB#3	0.33	0.37	0.35
			SB#2	0.38	0.40	0.39
			SBIL	0.35	0.40	0.38
63031-021 (01842A)	US-10 - US-24 from S. of Exeter Dr. N. to N. of Shallow Brook Drive	Conc	NBOL	0.42	0.46	0.44
			NB#3	0.29	0.33	0.31
			NB#2	0.28	0.31	0.29
			NBIL	0.25	0.34	0.30
			SBOL	0.28	0.29	0.29
			SB#3	0.26	0.28	0.27
			SB#2	0.28	0.32	0.30
			SBIL	0.34	0.37	0.36
63525-05505	M-150 from M-59 relocation N. to N. of Hamlin Road	Conc	NBOL	0.27	0.32	0.30
			NBIL	0.34	0.39	0.37
			SBOL	0.28	0.33	0.30
			SBIL	0.38	0.39	0.38
73033, C9	M-58 (formerly M-81) from Carolina St., E. to Schaefer Street	Conc	WBOL	0.28	0.32	0.30
			WBCL	0.28	0.29	0.28
			WBIL	0.25	0.32	0.28
73063-04989A	M-46 from C&O RR E. to Outer Drive	Bit Conc	EBOL	0.33	0.39	0.36
			EBIL	0.39	0.39	0.39
			WBOL	0.32	0.34	0.33
			WBIL	0.32	0.35	0.34
73101-024 (01017A)	I-675 from W. of 14th St. W. to Washington Ave. in Saginaw	Conc	NBOL	0.33	0.38	0.36
			NBIL	0.53	0.54	0.53
			SBOL	0.29	0.34	0.32
			SBIL	0.44	0.48	0.46

Project Number	Location	Surface Type	Direction and Lane	Coefficient of Wsf Low	High	Avg
76021	I-69 at M-52	Grooved	EBOL	0.26	0.29	0.27
		Conc	EBIL	0.27	0.32	0.29
		Conc	EBOL	0.28	0.29	0.29
			EBIL	0.32	0.39	0.36
77023, C10	EB M-21 from Old M-146 E. to M-25	Conc	EBOL	0.40	0.46	0.43
			EBIL	0.28	0.31	0.30
82062-013 (01185)	US-12 at M-39	Conc	EBOL	0.26	0.32	0.30
			EB#3	0.32	0.33	0.33
			EB#2	0.33	0.37	0.35
			EBIL	0.39	0.44	0.42
			WBOL	0.35	0.41	0.38
			WB#3	0.32	0.38	0.35
			WB#2	0.33	0.35	0.34
			WBIL	0.31	0.35	0.33
82121, C7	I-96 BR (Grand River Ave.) from McNichols Rd. SE to Freeland Rd.	Bit Conc	EBOL	0.35	0.38	0.37
			EBIL	0.35	0.39	0.37
			WBOL	0.33	0.37	0.34
			WBIL	0.32	0.37	0.34
82131, C9	M-1 (Woodward Ave) from E. Grand Blvd. NW to Clairmont St.	Bit Conc	NBOL	0.34	0.35	0.34
			NBIL	0.37	0.38	0.38
			SBOL	0.38	0.40	0.39
			SBIL	0.34	0.38	0.36
S01 of 82191	I-75 over Huron River Drive	Latex Conc	NBOL	0.42	0.44	0.43
			NBCL	0.32	0.37	0.34
			NBIL	0.48	0.50	0.49
			SBOL	0.38	0.39	0.38
			SBCL	0.28	0.34	0.32
			SBIL	0.38	0.41	0.39
82211-027	M-85 from S. of LeRoy St. in Trenton N. to Peters St. in Detroit	Bit Conc	South of Outer Drive			
			NBOL	0.31	0.33	0.32
			NBCL	0.33	0.39	0.37
			NBIL	0.34	0.39	0.36
			SBOL	0.37	0.38	0.38
			SBCL	0.37	0.40	0.38
			SBIL	0.38	0.40	0.39
			South of Eureka			
			NBOL	0.32	0.33	0.32
			NBIL	0.33	0.37	0.35
			SBOL	0.33	0.37	0.35
			SBIL	0.29	0.34	0.32

Project Number	Location	Surface Type	Direction and Lane	Coefficient of Wsf Low	High	Avg
T98004-04607A (Control 73033)	M-84 from Deidorfer St. N. to 300 ft N. of Shattuck Road	Bit Conc	NBOL	0.35	0.40	0.38
			NBIL	0.32	0.35	0.33
			SBOL	0.28	0.31	0.30
			SBIL	0.28	0.29	0.29