

SUMMARIES OF MICHIGAN PAVEMENT ROUGHNESS  
1969 Test Program



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MICHIGAN DEPARTMENT OF STATE HIGHWAYS

SUMMARIES OF MICHIGAN PAVEMENT ROUGHNESS  
1969 Test Program

Prepared for the Road Construction Division

Research Laboratory Section  
Testing and Research Division  
Research Project 47 F-15  
Research Report No. R-738

Michigan State Highway Commission  
Charles H. Hewitt, Chairman; Wallace D. Nunn, Vice-Chairman;  
Louis A. Fisher; Claude J. Tobin; Henrik E. Stafseth, Director  
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## INFORMATION RETRIEVAL DATA

**REFERENCE:** Felter, R. L. Summaries of Michigan Pavement Roughness: 1969 Test Program. Michigan Department of State Highways Research Report No. R-738. May 1970.

**ABSTRACT:** The test results for the nineteenth year of this long-term study of riding quality of newly constructed or opened Michigan pavements are tabulated, with full identification of projects; their lengths, routes, and locations; and contractors responsible for paving. This year, in order to make the report more complete and informative, all roughness tests conducted during the test year (i. e., bituminous construction and resurfacing, and tests conducted at 5-, 10-, 15-, and 20-year service) will be included.

**KEY WORDS:** roughness, riding quality.

SUMMARIES OF MICHIGAN PAVEMENT ROUGHNESS  
1969 Test Program

This report summarizes roughness measurements conducted during the 1969 test year.

In the past, the annual report has summarized roughness measurements conducted on new concrete pavements and new bituminous pavements constructed to expressway standards. In an effort to make the report more complete and informative, all roughness tests conducted during the test year will now be included. This will now include tests conducted on all bituminous construction, bituminous resurfacing, and tests conducted at 5, 10, 15, and 20 year service levels of pavements.

An additional classification will also appear this year due to the initiation of slip-form paving during the past construction year. Due to its unique construction methods, projects so constructed will be reported separately from conventional paving projects.

Rigid Pavement Construction (Two-Lane Pours, Conventional Construction)

Individual rigid pavement projects constructed as standard two-lane pours, and their roughness values as determined in the 1969 test program, are listed in Table 1. During the 19 years of roughness surveys, these integrator values have ranged from a low (smooth) of 93 to a high (rough) of 282. For 1969 the range was from 141 to 197.

On the basis of riding quality, the Laboratory classified projects in three integrator-count categories:

"good"	(0 to 130 accumulated inches per mile)
"average"	(131 to 174)
"poor"	(175 or more)

Table 2 shows that since 1951, with a total of 512 rigid pavement projects tested, 37, 52, and 11 percent of this total have been rated good, average, and poor, respectively. In the 1969 test year 0, 75, and 25 percent of the 4 projects tested were rated good, average, and poor respectively. The weighted arithmetic mean for roughness of all projects of this type tested during the 1969 test year was 154 accumulated inches per mile. This represents a 2.7 percent increase in measured roughness for two-lane pours tested in 1969 over those tested in 1968.

### Rigid Pavement Construction (One-Lane Pours, Conventional Construction)

In addition to the usual surveys of roughness on newly constructed standard rigid pavement (two-lane pours), the 1969 measurements include 3 rigid pavement widening projects (one-lane pours), with results shown in Table 3.

The testing procedure for these projects is the same as for the standard rigid pavements. However, due to somewhat different construction procedures required for pours of one-lane width, the range of roughness values to be expected varies from standard rigid pavements. Table 4 summarizes test data obtained during the 12 years in which this type of construction has been under study.

### Rigid Pavement Construction (Two-Lane Pours, Slip-Form Construction)

During the past construction year 1 project constructed utilizing slip-form methods was tested. Results are summarized in Table 5.

### 5, 10, 15 and 20 Year Roughness

Table 6 summarizes roughness measurements conducted on projects of past construction years during the 1969 test program. For a complete history of the projects, results of previous test programs are also included where available.

### Flexible Pavement Construction (Freeway Specification)

No projects of this type were completed during the 1969 test year.

### Flexible Pavement Construction (Non-Freeway)

In the past, only flexible pavements constructed to freeway specifications were included in the roughness survey program. Beginning with the 1969 test program all new flexible pavements will be tested. Results of test measurements conducted on pavements of this type during the 1969 test year are summarized in Table 7. Due to the numerous variables involved in construction of this type, no attempt will be made to formulate an average roughness for these projects.

### Resurfacing Projects

This classification is also an addition to the roughometer program. Results of roughness surveys on projects of this type are summarized in Table 8. Once again, due to the numerous variables in both surface type and underlying pavement, no attempt will be made to obtain an average roughness. For a few projects it was possible to obtain roughness before and after resurfacing. These projects are noted in the table.

TABLE 1  
ROUGHNESS DATA SUMMARY FOR RIGID PAVEMENT  
(Two-Lane Pours)

Const. Year	Project	District	Test Length, mi.	Type	Route and Project Location	Roughness Integrator, in./mile	Paving Contractor
1968	U 33061-020*	8	1.183	36' dual	M 43 from W of Catherine St E to Logan St	197	Eisenhour Construction Co., Inc. (1)
1969	F 41132-021	5	2.131	24' dual	US 131 from S of Post Rd to S of 10 Mile Rd	146	Denton Construction Co. (2)
1969	F 41132-022	5	5.034	24' dual	US 131 from S of 10 Mile Rd NE'ly to N of 14 Mile Rd		
					Sta. 786+50 (POB) to Sta. 925+00	145	L. W. Edison
					Sta. 925+00 to Sta. 1052+50	162	Carl Goodwin & Sons, Inc.
1969	SS 76011-009 M 76011-010*	6	4.221	24' & 48'	M 52 from S of Bennington Rd N to N of Krouse Rd	141	Cooke Contracting Co.
			Weighted arithmetic mean for 1969 construction tested in 1969			149	
			Weighted arithmetic mean for 1969 test year (two-lane pours)			154	

(1) Subcontract from Walter Toebe and Company; Sugden, Inc. & D & K Corporation

(2) Subcontract from Maclean Construction Company; Kamminga & Roodvoets, Inc.

\* For additional data, see Table 3

TABLE 2  
 NINETEEN-YEAR ROUGHNESS SUMMARY FOR RIGID PAVEMENT  
 (Two-Lane Pours)

Test Year	Total Projects	Project Mileage	Lane Mileage	Percent of Total Projects			Weighted Arithmetic Mean, in./mi
				Good (0-130 in./mi)	Average (131-174 in./mi)	Poor (175 or more in./mi)	
1951	17	48.327	109.318	47	29	24	144
1952	25	70.615	173.900	4	68	28	154
1953	40	98.791	250.082	17	68	15	146
1954	17	41.271	110.838	29	42	29	147
1955	22	52.690	145.723	36	64	0	140
1956	21	82.473	241.866	19	62	19	141
1957	33	165.086	520.200	61	36	3	126
1958	34	140.506	487.352	74	26	0	114
1959	45	168.892	660.744	51	42	7	124
1960	35	154.333	558.866	83	14	3	117
1961	37	133.043	477.087	38	49	13	133
1962	36	140.128	511.668	25	61	14	137
1963	35	167.040	606.852	40	51	9	131
1964	35	167.040	606.852	40	51	9	131
1965	52	159.679	572.206	21	60	19	140
1966	25	70.586	216.644	16	84	0	143
1967	23	99.570	367.912	35	61	4	132
1968	11	33.440	161.056	9	91	0	150
1969	4	12.569	41.834	0	75	25	154
1951-1969	512	1839.039	6214.148	37	52	11	132

TABLE 3  
 ROUGHNESS DATA SUMMARY FOR RIGID PAVEMENT WIDENING  
 (One-Lane Pours)

Const. Year	Project	District	Test Length, mi.	Type	Route and Project Location	Roughness Integrator, in./mile	Paving Contractor
1968	U 33061-020*	8	1.183	12' dual	M 43 from W of Catherine St E to Logan St	204	Eisenhour Construction Co., Inc. <sup>(1)</sup>
1968	U 13042-003*	7	1.053	12' dual	I 94 BL from US 27 N to I 69	180	Carl Goodwin & Sons, Inc.
					Weighted arithmetic mean for 1968 construction tested in 1969	193	
1969	M 76011-010*	6	0.970	12' dual	M 52 from S of Bennington Rd N to N of Krouse Rd	153	Cooke Contracting Co.
					Weighted arithmetic mean for 1969 test year (one-lane pour)	181	

(1) Subcontract from Walter Toebe and Company; Sugden, Inc. & D & K Corporation

\* For additional data see Table 1



TABLE 4  
 TWELVE-YEAR ROUGHNESS SUMMARY FOR RIGID PAVEMENT WIDENING  
 (One-Lane Pours)

Test Year	Total Projects	Project Mileage*	Lane Mileage**	Percent of Total Projects			Weighted Arithmetic Mean, in./mi
				Good (0-130 in./mi)	Average (131-174 in./mi)	Poor (175 or more in./mi)	
1958	3	5.403	11.176	33.3	33.3	33.3	122
1959	2	3.092	6.184	0	50	50	194
1960	5	13.925	24.152	20	60	20	138
1961	10	17.704	31.995	0	70	30	162
1962	4	10.006	20.012	0	75	25	169
1963-1964	14	27.093	57.940	0	64	36	163
1965	30	61.360	122.508	7	63	30	156
1966	13	27.252	54.173	0	100	0	147
1967	6	13.306	25.212	17	66	17	153
1968	1	2.836	0.700	0	100	0	153
1969	3	3.206	6.412	0	33.3	66.7	181
1958-1969	91	185.183	360.464	6	68	26	156

\* As given in Contract Division monthly "Report of Awards"

\*\* Total mileage of 11- or 12-ft wide lanes

TABLE 5  
ROUGHNESS DATA SUMMARY FOR RIGID PAVEMENT  
(Slip-Form Construction)

Const. Year	Project	District	Test Length, mi.	Type	Route and Project Location	Roughness Integrator, in./mile	Paving Contractor
1969	I 23081-002	8	3.446	24' dual	I 496 from I 96 E'ly to Waverly Rd	140	Eisenhour Construction Co., Inc. (1)

(1) Subcontract from S. D. Solomon & Sons

TABLE 6  
ROUGHNESS DATA SUMMARY FOR 5, 10, 15, & 20 YEAR TESTS

Const. Year	Project	District	Test Length, mi.	Type	Route and Project Location	Remarks	Roughness, Integrator (in./mile)					Paving Contractor
							Initial	5 Year	10 Year	15 Year	20 Year	
1963	BU 82112J, C19U	10	1.45	36' dual conc.	I 696 BR from N of Meyers Rd NW <sup>1</sup> / <sub>2</sub> to N of Seven Mile Rd	24' pour 12' pour	N. A. N. A.	135 169	---	---	---	Denton Construction Co. <sup>(1)</sup>
1963	U 63171A, C1 BU 82193B, C9	9 10	0.76	36' dual conc.	M 39 from N of McNichols Rd N to N of Trojan Ave	24' pour 12' pour	N. A. N. A.	155 181	---	---	---	Cooke Contracting Co. <sup>(2)</sup>
1964	BI 77111E, C5 BI 77111F, C6	9	4.129	24' dual conc.	I 94 from N of Gratiot Ave NE to N of Griswold Rd	----	114	124	---	---	---	Sargent Construction Co. <sup>(3)</sup>
1964	BI 03034B, C9	7	4.771	24' dual conc.	US 31 and I 196 from Washington Rd S to Adams Rd	----	122	133	---	---	---	Carl Goodwin & Sons, Inc.
1964	BI 77111G, C7 BI 77111H, C8	9	3.133	24' dual conc.	I 94 from N of Griswold Rd NE to N of Water St	----	129	140	---	---	---	Sargent Construction Co. <sup>(4)</sup>
1964	I 41029E, C3 I 41029D, C37 I 41029B, C54	5	2.468	24' dual conc.	I 196 from SW of S City Limits of Wyoming N to the Grand River	----	132	151	---	---	---	L. W. Edison Co.
1964	I 41027A, C24 I 41027D, C56 I 41027E, C58 I 41027A, C163 I 41027B, C164 I 41029E, C1 I 41029F, C6 I 41029F, C8	5	4.908	24' dual conc.	I 196 from the Grand River NE to Fuller Ave	----	135	145	---	---	---	Carl Goodwin & Sons, Inc.
1964	I 41029A, C35 I 41029B, C36	5	2.284	24' dual conc.	I 196 from the Ottawa-Kent Co. Line NE to SW of S City Limits of Wyoming	----	136	150	---	---	---	L. W. Edison Co.
1964	F 13121B, C1	7	2.941	24' conc.	I 94 BL from Columbia Ave NE to Dickman Rd	----	137	128	---	---	---	Titus Construction Co. <sup>(5)</sup>
1964	BI 50111G, C41	9	1.118	36' dual, 36' conc.	I 94 from Masonic Blvd N to N of 14 Mile Rd	24' pour 12' pour	137 160	152 160	---	---	---	Cooke Contracting Co. <sup>(2)</sup>
1964	F 81103B, C7	8	3.632	24' dual conc.	M 14 from US 23 E to Plymouth Rd	----	141	141	---	---	---	L. A. Davidson <sup>(6)</sup>
1964	F 50092A, C1	9	1.37	24' conc.	M 19 from I 94 NW to Gratiot Ave	----	142	145	---	---	---	Anderson & Ruzzin Inc. <sup>(7)</sup>
1964	U 39051D, C5 F 39051B, C6	7	4.709	24' dual conc.	US 131 BR from Hopkins St. NW to US 131	----	145	147	---	---	---	Sargent Construction Co. <sup>(8)</sup>
1964	BI 50111H, C11	9	2.497	36' dual conc.	I 94 from N of 14 Mile Rd N to the Clinton River spillway	24' pour 12' pour	147 176	158 177	---	---	---	Cooke Contracting Co. <sup>(2)</sup>
1964	U 33061D, C11 U 33061E, C12	8	0.923	36', 48' conc.	M 43 (WB) from Center St W to Logan St	24' pour 12' pour	175 192	179 198	---	---	---	Eisenhour Construction Co. <sup>(9)</sup>

N. A. = Not Available

(1) Subcontract from Louis Garavaglia Contractors, Inc.

(2) Contract awarded to Chas. J. Rogers, Inc.; Cooke Contracting Company; Jutton Kelly Company

(3) Subcontract from A. Lindberg & Sons, Inc.

(4) Subcontract from K. G. Marks, Inc.; Blue Water Excavating Co., Inc.

(5) Subcontract from Carl Goodwin & Sons, Inc.

(6) Contract awarded to S. D. Solomon & Sons; L. A. Davidson

(7) Contract awarded to Anderson & Ruzzin, Inc.; Sterling Garrett Contracting Co., Inc.

(8) Subcontract from Holloway Construction Co.

(9) Contract awarded to Eisenhour Construction Co., Inc.; Walter Toebe & Co.

TABLE 6 (Cont.)  
ROUGHNESS DATA SUMMARY FOR 5, 10, 15, & 20 YEAR TESTS

Const. Year	Project	District	Test Length, mi.	Type	Route and Project Location	Remarks	Roughness Integrator (in./mile)					Paving Contractor
							Initial	5 Year	10 Year	15 Year	20 Year	
1964	F 81121A, C2	8	0.874	24' dual conc.	M 153 from Plymouth-Ann Arbor Rd SE to Franks Lake & Ford Rds	----	176	170	----	----	----	Eisenhour Construction Co. <sup>(10)</sup>
1964	F 52043B, C4	1	6.708	24' conc.	US 41 from NW of M 94 NW to Green Garden Hill Rd, omitting 0.47 mi at the Chocolay River	----	221	216	----	----	----	L. W. Brumm <sup>(11)</sup>
1964	F 62031C, C10	5	1.035	12', 48' conc.	M 37 (constructed longitudinal joints) from S of M 46 N to Wood St	12' pour	166	182	----	----	----	Eisenhour Construction Co. <sup>(11)</sup>
1964	U 13121E, C2 U 13121E, C3	7	0.869	24' conc.	I 94 BL (EB) (constructed longitudinal joint) from 20th St E to Upton Ave	12' pour	187	177	----	----	----	Titus Construction Co. <sup>(12)</sup>
1964	BF 61075D, C7	5	3.348	24' dual bit. conc.	US 31 from N of Colby Rd N to existing US 31	----	75	86	----	----	----	Spartan Asphalt Paving Co. <sup>(13)</sup>
1964	BU 61075E, C5 BU 61075A, C6 BF 61075A, C16 BU 61075A, C15	5	4.005	24', 36'dual bit. conc.	US 31 from Marcoux St N to River Rd	----	78	88	----	----	----	Spartan Asphalt Paving Co. <sup>(14)</sup>
1964	Mb 73031A, C8 SS 73031A, C9	6	8.486	24' bit. conc.	M 47 from Bell Ave N to M 46	----	80	91	----	----	----	Saginaw Asphalt Paving Co. <sup>(15)</sup>
1959	BF 44011, C1R BF 63112, C5R	6	5.483	24' dual conc.	M 24 from Oxford N to Braver Rd	----	115	N.A.	154	----	----	Louis Garavaglia Contractors, Inc.
1959	M 50021, C5U M 50021, C6R	9	0.655	22', 24' dual conc.	M 59 from Mound Rd E to Clinton River Bridge	----	189	N.A.	216	----	----	Western Construction Co.
1959	M 50998, C1R	9	1.0	24' dual conc.	M 59 from Hall Rd N to Auburn Ave	----	188	N.A.	237	----	----	Western Construction Co.
1958	M 52043, C2	1	3.205	24' conc.	US 41 from NW of M 28 SE to S of Beaver Grove	----	138	165	162	----	----	L. W. Brumm
1959	DUSS 56051, C2U	6	2.670	44' conc.	US 10 BR from Ellsworth St in Midland N to US 10	----	132	150	156	----	----	Hertel-Deyo Co. <sup>(16)</sup>
1959	DF 58042, C1	10	7.662	24', 44' 2 @ 24' conc.	M 50 from Old US 23 E to US 24	----	115	137	151	----	----	Denton Construction Co.
1959	BM 61072, C2RN BM 61072, C3UN	5	4.502	24' dual conc. single 24'	US 31 from I 96 N to M 46	----	117	134	139	----	----	Hertel-Deyo Co. <sup>(16)</sup>
1958	BM 61074, C1RN BM 61151, C2RN BM 61152, C4RN	5	1.090	24' dual conc.	I 96 E & W of US 31	----	151	154	156	----	----	L. A. Davidson

<sup>(10)</sup> Contract awarded to O. E. Gooding & Co.; Eisenhour Construction Co., Inc.

<sup>(11)</sup> Subcontract from Paul C. Miller

<sup>(12)</sup> Subcontract from Hoffman Bros.

<sup>(13)</sup> Subcontract from Maclean Construction Co.; Raff & Dexter Contractors

<sup>(14)</sup> Subcontract from Raff & Dexter Contractors; Pierson Contracting Co.

<sup>(15)</sup> Subcontract from Sargent Construction Co.

<sup>(16)</sup> Contract awarded to Hertel-Deyo Co.; C. E. Utterback

TABLE 6 (Cont.)  
ROUGHNESS DATA SUMMARY FOR 5, 10, 15, & 20 YEAR TESTS

Const. Year	Project	District	Test Length, mi.	Type	Route and Project Location	Remarks	Roughness, Integrator (in./mile)					Paving Contractor
							Initial	5 Year	10 Year	15 Year	20 Year	
1959	BF 25031, C6RN BF 47014, C1RN	6	9.902	24' conc.	US 23 from S of US 23 BR S to S of Clyde Rd	24' SB only	153	N. A.	159	----	----	Sargent Construction Co. <sup>(a)</sup>
1959	BF 25042, C1RN	6	6.390	24' dual conc.	M 78 from M 13 NW to Swartz Creek	----	112	149	153	----	----	Denton Construction Co.
1959	BF 29011, C2RN	5	2.614	24' dual conc.	US 27 from Pierce Rd N to N of Washington Rd	----	113	137	138	----	----	Sargent Construction Co. <sup>(a)</sup>
1959	BM 29011, C5RN	5	0.439	11' dual conc.	US 27 BR from US 27 W to E of Catherine St	11' pour	163	178	186	----	----	Eisenhour Construction Co.
1959	F 31051, C4	1	2.354	24' conc.	US 41 from the Snake River NW to S of Chassel	----	129	142	145	----	----	Thornton Construction Co.
1958	BI 34043, C2RN	5	8.572	24' dual conc.	I 96 from Nash Highway E to M 66	----	129	139	144	----	----	L. W. Edison Co.
1959	BI 34044, C3RN	5	2.599	24' dual conc.	I 96 from Portland Rd E to the Grand River	----	125	147	168	----	----	L. A. Davidson
1959	BI 34044, C5RN BI 34044, C6UN	5	1.693	24' dual conc.	I 96 from the Grand River E to Grand River Ave	----	129	143	153	----	----	L. W. Edison Co. <sup>(17)</sup>
1959	BI 38102, C2RN	8	0.842	24' dual conc.	I 94 from Calhoun-Jackson Co. Line E to Ludlow Rd	----	148	169	178	----	----	Eisenhour Construction Co. <sup>(18)</sup>
1959	BI 38102, C1RN	8	4.518	24' dual conc.	I 94 from E of M 99 E to Old US 12	----	114	134	142	----	----	L. A. Davidson
1959	BI 11018, C1RN BI 80023, C1RN	7	4.977	24' dual conc.	I 94 from E of M 140 to W of Thomas Rd	----	95	122	123	----	----	Pierson Contracting Co. <sup>(19)</sup>
1959	BI 13081, C2RN	7	6.832	24' dual conc.	I 94 from E of Columbia Rd E to W of Main St	----	103	129	139	----	----	L. A. Davidson
1960	BI 13082, C1RN BI 13082, C2RN BI 13082, C3RN	7	7.213	24' dual conc.	I 94 from Old US 12 E to 17-1/2 Mile Rd	----	130	140	146	----	----	Julius Porath & Sons and Sargent Construction Co. <sup>(a)</sup>
1959	BI 13082, C3	7	3.185	24' dual conc.	I 94 from Main St E to W of the Kalamazoo River	----	102	142	140	----	----	L. A. Davidson
1959	BI 13082, C4RN	7	1.375	24' dual conc.	I 94 from W of the Kalamazoo River to Wheatfield Rd	----	103	145	149	----	----	L. A. Davidson
1959	BI 13083, C1 BI 13083, C2	7	5.031	24' dual conc.	I 94 from 17-1/2 Mile Rd E to E of 22-1/2 Mile Rd	----	146	142	155	----	----	Julius Porath & Sons <sup>(a)</sup>

(17) Subcontract from Brown Brothers

(18) Contract awarded to Eisenhour Construction Co.; S. D. Solomon & Sons

(19) Subcontract from S. D. Solomon & Sons

TABLE 6 (Cont.)  
ROUGHNESS DATA SUMMARY FOR 5, 10, 15, & 20 YEAR TESTS

Const. Year	Project	District	Test Length, mi.	Type	Route and Project Location	Remarks	Roughness, Integrator (in./mile)					Paving Contractor
							Initial	5 Year	10 Year	15 Year	20 Year	
1959	BI 13083, C4	7	7.738	24' dual conc.	I 94 from W of 23 Mile Rd to the Calhoun-Jackson Co. Line	---	117	150	154	---	---	Sargent Construction Co. (6)
1959	BI 16092, C1RN BI 24071, C3RN	4	2.465	24' dual conc.	I 75 from S of Mackinac Bridge S to US 31	---	199	198	206	---	---	A Lindberg & Sons; Bacco Construction Co.
1959	DF 73062, C2R	6	4.049	24' dual conc.	M 46 from W junction with M 52 E to the Tittabawasee River	---	141	153	157	---	---	Sargent Construction Co.
1958	U 73062, C1U	6	0.966	22' dual conc.	M 46 from Gratiot St to Washington St in Saginaw	---	180	196	186	---	---	W. F. McNally Co. (20)
1958	DF 73073, C1R DU 73073, C2U	6	3.214	36' conc.	M 81 (WB) from M 47 E to Carolina St	24' pour 12' pour	125 ---	150 182	161 185	---	---	Denton Construction Co.
1959	BI 73111, C1RN BI 73111, C2RR	6	1.865	24' dual conc.	I 75 from M 81 N to M 13	---	121	140	140	---	---	Cooke Construction Co. (21)
1959	78051, C1R 78051, C2U	7	2.653	11' dual conc.	M 66 from Michigan-Ohio State Line N to S of US 12 in Sturgis	11' pour	198	237	219	---	---	Sargent Construction Co.
1959	BI 80024, C2RN	7	5.039	24' dual conc.	I 94 from W of M 119 E to Schussler Rd	---	131	146	156	---	---	Carl Goodwin & Sons
1959	BI 82025, C27UN	10	1.235	36' dual conc.	I 94 from Whittier to Detroit City Limits	24' pour 11' pour	156 157	N.A. N.A.	183 171	---	---	Cooke Construction Co. (22)
1959	I 82025, C3R	10	1.506	36' dual conc.	I 94 from Kingsville Ave to Vernier Rd	24' pour 11' pour	163 166	N.A. N.A.	183 179	---	---	Western Construction Co. (1)
1959	U 82052, C12U U 82053, C1U F 82053, C12R	10	2.498	36' dual conc.	US 24 from Oxford Rd N to Ford Rd in Dearborn	24' pour 11' pour	N.A. N.A.	176 176	182 181	---	---	Bairley & Lindley, Inc.
1959	F 82053, C2R F 82053, C9R	10	1.52	36' conc.	US 24 (SB) from Ford Rd N to Ann Arbor Trail & US 24 (NB) from Warren Rd N to Ann Arbor Trail	24' pour 11' pour	157 160	N.A. N.A.	174 180	---	---	Cooke Construction Co. (22)
1958	F 52041, C2 F 52042, C3 F 52042, C4	1	4.368	11' conc.	US 41 & M 35 between Negaunee & Marquette	11' pour	137	181	197	---	---	Bacco Construction Co.
1959	U 55011, C1U U 55011, C2U	1	0.591	44' conc.	US 41 from 39th St N in Menominee	---	142	154	160	---	---	Bacco Construction Co.
1959	BF 38111, C3RN	8	1.406	24' dual conc.	US 127 from the S Branch of the Grand River N to NYC RR	---	135	147	163	---	---	Sargent Construction Co.

(20) Contract awarded to W. F. McNally Co.; A. V. Rehms & Son

(21) Contract awarded to Cooke Construction Co.; A. S. Leffler Gravel Co.

(22) Contract awarded to Cooke Construction Co.; Charles J. Rogers; Jutton-Kelly Co.

**TABLE 6 (Cont.)**  
**ROUGHNESS DATA SUMMARY FOR 5, 10, 15, & 20 YEAR TESTS**

Const. Year	Project	District	Test Length, mi.	Type	Route and Project Location	Remarks	Roughness, Integrator (in./mile)					Paving Contractor
							Initial	5 Year	10 Year	15 Year	20 Year	
1959	FB 38111, C4RN	8	1.563	24' dual conc.	US 127 from McDevitt Rd N to the S Branch of the Grand River	----	140	149	162	----	----	L. A. Davidson
1959	BI 39024, C1RN BI 39024, C2RN	7	6.174	24' dual conc.	I 94 from 6th St E to US 131	----	143	156	160	----	----	L. W. Edison Co.
1959	BI 39024, C3RN BI 80024, C1RN	7	5.111	24' dual conc.	I 94 from Schussler Rd E to 6th St	----	117	111	149	----	----	Sargent Construction Co. <sup>(a)</sup>
1959	BI 41024, C2RN	5	8.674	24' dual conc.	I 96 from Whitneville Rd E to W of Kent-Ionia Co. Line	----	137	141	164	----	----	L. W. Edison Co.
1959	BI 11017, C1RN BI 11017, C2RN	7	4.875	24' dual conc.	I 94 from Carmody Rd NE to E of M 140	----	134	130	145	----	----	Pierson Contracting Co.
1954	F 15-07, C6R F 15-07, C7R	3	7.303	22' conc.	US 31 from NE of Antrim-Charlevoix Co. Line NE to SW of Charlevoix	----	149	149	N. A.	165	----	Sargent Construction Co.
1953	M 31-19, C5 M 31-19, C6	1	2.377	22' conc.	US 41 from N of Chassel N to Houghton	----	206	N. A.	219	226	----	Thornton Construction Co.
1949	41-75, C3	5	6.1	22' conc.	M 37 from M 11 S to Kraft Ave	----	N. A.	N. A.	193	236	286	L. W. Edison
1949	F 47-26, C6	8	3.567	22' conc.	M 59 from Oak Grove Rd E to W of Hughes Rd.	----	N. A.	173	192	234	234	Ray Sablain
1949	F 34-15, C4	5	2.992	22' conc.	M 66 from Eaton-Ionia Co. Line N to Bippely Rd	----	N. A.	N. A.	122	N. A.	182	Louis Garavaglia & Sons
1949	07-20, C5	1	5.526	22' conc.	US 41 from W of Pelkie Creek E to W of DSS&A RR	----	N. A.	N. A.	154	N. A.	196	Bacco Construction Co.
1949	07-20, C6	1	4.2	22' conc.	US 41 from N of US 141 E to W of Pelkie Creek	----	N. A.	N. A.	179	N. A.	238	C. G. Bridges
1948	07-21, C2	1	3.9	21' conc.	US 41 from S of Taylor Creek S to N of M 28	----	N. A.	N. A.	172	N. A.	223	C. G. Bridges
1947	F 17-07, C6	2	4.947	22' conc.	M 28 from E of Rexford E to E of Raco	----	N. A.	N. A.	174	164	182	I. L. Whitehead
1948	F 17-07, C8	2	5.987	22' conc.	M 28 from E of Raco E to M 221	----	N. A.	N. A.	176	201	214	C. G. Bridges
1948	21-16, C4	2	1.219	22' conc.	M 35 from N of Delta-Menominee Co. Line N	----	N. A.	N. A.	196	226	230	C. G. Bridges
1949	36-05, C3	1	3.869	22' conc.	US 2 from Adam St In Iron River E 3.2 miles	----	N. A.	N. A.	206	246	255	Pierson Contracting Co.
1948	52-02, C7	1	1.477	22' conc.	US 41 from Green Garden Rd N to S of Beaver Grove	----	N. A.	N. A.	222	N. A.	295	Pierson Contracting Co.
1949	F 39-45, C2 F 39-45, C3	7	4.302	22' conc.	M 89 from M 43 to 42nd St	----	N. A.	N. A.	151	201	266	L. W. Edison Co.

TABLE 7  
ROUGHNESS DATA SUMMARY FOR FLEXIBLE PAVEMENT CONSTRUCTION  
(Non-Freeway)

Const. Year	Project	District	Test Length, mi	Width	Surface Type	Route and Project Location	Roughness, Integrator, in./mile	Paving Contractor
1968	SS 01024-002	4	6.3	24', 44'	Bit. agg. surface course 4.11	M 72 from US 23 W to Co. Rd 171	107	Central Paving Co. (1)
1968	SS 60011-004	4	6.9	24'	Bit. agg. surface course 4.11	M 33 from S of Co. Rd 612 N to M 32	124	Lake & Howell Construction Co. (2)
1969	SS 17072-004	2	7.079	24'	Bit. agg. surface course 4.11	M 129 from Tone Rd N to Dafter Rd	109	Hodgkiss & Douma, Inc. (3)
1969	SS 62014-001	5	7.03	24', 48'	Bit. agg. surface course 4.11	M 20 from M 82 E to Croswell Ave	100	Reith-Riley Construction Co. (4)
1969	F 33021-003	8	2.875	24'	Bit. conc.	M 52 from S of Topping Rd to Dansville Rd	85	Howell Construction Co. (5)

(1) Subcontract from Sterling Garret Contracting Co., Inc.

(2) Subcontract from Hodgkiss & Douma, Inc.

(3) Subcontract from I. L. Whitehead Co.

(4) Subcontract from J. V. Burkett Construction Co.

(5) Subcontract from O. E. Gooding & Co.



TABLE 8  
ROUGHNESS DATA SUMMARY FOR RESURFACING PROJECTS

Const. Year	Project	District	Test Length, mi.	Width	Surface Type	Route and Project Location	Roughness, Integrator, in./mile	Paving Contractor
1968	F 22012A-002	1	10.262	24'	Bit. agg. 4.11	M 95 from US 2 N to Co. Rd 569	105	Payne & Dolan of Wisconsin, Inc.
1968	Mb 02021-009 (Portion)	2	2.833	20', 22', 42'	Bit. agg. 4.11	M 67 from US 41 E'y & N'y 2.833 miles	108	Fox Valley Construction Co.
1968	Mb 48041-002 (Portion)	2	16.090	22'	Bit. agg. 4.11	M 28 from Luce-Schoolcraft Co. Line E'y to E of M 117	146	Lake Construction Co. & Howell Construction Co.
1968	Mb 49023-009 (Portion)	2	2.762	24'	Stone filled sand-asphalt	US 2 from W of Co. Rd 401 E'y to W of I 75	114	Lake Construction Co. & Howell Construction Co.
1968	Mb 53032-003	3	5.60	22'	Bit. conc.	US 10 & US 31 from E of W Junction of US 10 & US 31 E'y to Reinburg Ave in Scottville	84	Laman Asphalt & Paving
1968	Mb 57041-001 (Portion)	3	15.1	20'	Bit. agg. 4.11	M 42 from M 37 E'y to W City Limits of Manton	129	Globe Construction Co.
1968	Mb 83021-008	3	8.66	20', 22'	Bit. agg. 4.11	M 55 from W of Co. Rd 21 E'y to M 115	105	The Hicks Co.
1968	Mb 20032-004	4	2.95	20', 22'	Bit. agg. 4.11	M 93 from Co. Rd 612 S 2.95 miles	145	Lake Construction Co. & Howell Construction Co.
1968	Mb 24051-002	4	5.89	20', 22'	Bit. agg. 4.11	M 131 from N of US 31 N'y & W'y to Zoll St in Harbor Springs	121	Hodgkiss & Douma, Inc.
1968	SS 34011-004	5	1.241	24'	Bit. conc.	M 91 from M 44 N to N of Ellis Rd	100	Reith-Riley Construction Co., Inc. <sup>(1)</sup>
1968	Mb 54011-005	5	16.719	62', 27' dual	Bit. conc.	US 131 from M 46 N'y (intermittently) to M 20 in Big Rapids	90	Reith-Riley Construction Co., Inc.
1968	Mb 62011-003	5	3.95	20'	Bit. conc.	M 20 & M 82 from W Co. Line E'y to E of C&O RR in Fremont	94	Reith-Riley Construction Co., Inc.
1968	Mb 62022-001	5	9.2	20'	Bit. conc.	M 82 from M 37 W to M 20	97	Reith-Riley Construction Co., Inc.
1968	Mb 64011-008	5	2.0	22'	Bit. conc.	US 31 from Muskegon-Oceana Co. Line N'y 2.0 miles	133	Laman Asphalt Paving Co.
1968	SS 32021-005	6	4.434	24'	Bit. conc.	M 142 from S of S Limits of Pigeon S'y & E'y to W Limits of Elkton	95	Williams Bros. Asphalt Paving Co. <sup>(2)</sup>
1968	Mb 32051-003	6	8.566	21', 46'	Bit. agg. 4.11	M 19 from Huron Line Rd N to M 142	120	Ann Arbor Construction Co.

(1) Subcontract from D. J. McQuestion & Sons

(2) Subcontract from Johnson-Greene Co.

TABLE 8 (Cont.)  
ROUGHNESS DATA SUMMARY FOR RESURFACING PROJECTS

Const. Year	Project	District	Test Length, mi.	Width	Surface Type	Route and Project Location	Roughness, Integrator, in./mile	Paving Contractor
1968	Mb 44011-005	6	8.574	20', 22'	Bit. conc.	M 24 from S of Braur Rd N'yly to S of Turrill Rd	107	Ayling-Cunningham Asphalt Paving Co.
1968	Mb 44031-003	6	1.957	20', 22', 27', 30'	Bit. conc.	M 53 from Macomb-Lapeer Co. Line N'yly to N of Water St in Almont	124	Ayling-Cunningham Asphalt Paving Co.
1968	Mb 74073-002	6	6.794	22'	Bit. conc.	US 25 from N Limits of Port Sanilac N'yly to Deckerville Rd	156	Ann Arbor Construction Co.
1968	Mb 79062-003	6	9.279	20', 22'	Stone filled sand asphalt	M 81 from SW of Green Rd NE'yly & E'yly to M 53	106	Frank Strausberg & Son Co.
1968	Mb 08011-003	7	5.305	20'	Bit. conc.	M 43 from Shultz Rd N'yly to M 37	101	Reith-Riley Construction Co., Inc.
1968	Mb 08031-007	7	9.611	20'	Bit. conc.	M 37 from Calhoun-Barry Co. Line N'yly to Maple Grove Rd	143	Reith-Riley Construction Co., Inc.
1968	Mb 11052-009 (Portion)	7	7.691	20'	Bit. conc.	US 33 from N City Limits of Benton Harbor NE'yly to I 96	133	John G. Yerlington Co.
1968	Mb 14011-008	7	6.06	22'	Bit. conc.	M 40 from Berrien-Cass Co. Line NE'yly to W of W City Limits of Dowagiac	132	John G. Yerlington Co.
1968	Mb 14051-002	7	6.81	20', 22', 37'	Bit. agg. 4.11	M 119 from US 12 N to M 60	150	John G. Yerlington Co.
1968	Mb 80111-009	7	2.435	24', 32'	Bit. conc.	M 119 from NYC RR in Lawton N'yly & NW'yly 2.435 miles	118	John G. Yerlington Co.
1968	Mb 23091-003 (Portion)	8	5.153	var.	Bit. agg. 4.11	M 99 from S Limits of Eaton Rapids S to the Eaton-Jackson Co. Line	149	Workman-Richardson Asphalt Co.
1968	U 33034-011	8	2.798	64'	Bit. conc.	US 27 from S of Douglas St N'yly to N of Northcrest Rd	114	Spartan Asphalt Paving Co. <sup>(3)</sup>
1968	Ms 77032-007	9	3.403	24'	Sheet asphalt	US 25 BR (NB) from SW of M 29 NE'yly to Dove St in Port Huron	112	Detroit Concrete Products Corp.
1968	M 82101-013	10	4.979	55'	Bit. conc.	M 14 from Hines Dr E'yly to Mercedes Rd	113	A & A Asphalt Paving Co. <sup>(4)</sup>
1969	F 07013-004	1	8.636	24'	Bit. conc.	US 41 from S of Old US 41 N'yly to the Baraga-Houghton Co Line	95	George Hocking Construction Co.

(3) Subcontract from T. A. Forsberg, Inc., & Eisenhour Construction Co., Inc.

(4) Contract Awarded to Tony Angelo Cement Construction Co.; A & A Asphalt Paving Co.

TABLE 8 (Cont.)  
ROUGHNESS DATA SUMMARY FOR RESURFACING PROJECTS

Const. Year	Project	District	Test Length, mi.	Width	Surface Type	Route and Project Location	Roughness, Integrator, in./mile	Paving Contractor
1969	M 52031-005	1	4.61	20'	Bit. agg. 4.09	M 35 from SE of Little Lake W'yly to abandoned RR in New Swanzy	141	Caspian Construction Co.
1969	Mb 75021-010 (Portion)	2	4.073	20'	Stone filled sand-asphalt	US 2 from M 149 NE'yly to the W City Limits of Manistique	108	Lake Construction Co., & Howell Construction Co.
1969	Ms 69014-012	4	0.530	24'	Stone filled sand-asphalt	I 75 (SB) from 2400' N of Old US 27 N'yly 2800'	92	Lake Construction Co., & Howell Construction Co.
1969	Ms 19031-007	5	1.170	42', 44'	Bit. conc.	US 27 from N of Northrest Rd N'yly to 499' S of Clark Rd	104	Spartan Asphalt Paving Co.
1969	U 41012-006	5	2.476	60'	Bit. conc.	Old US 131 (Plainfield Ave) from I 96 NE'yly to Airway St	106	L. W. Edson
1969	Mb 41013-014 (Portion)	5	3.068	24' to 46'	Bit. conc.	US 131 from M 57 S to divided highway N of Rockford	121	Reith-Riley Construction Co., Inc.
1969	Mb 25052-007	6	2.21	40', 60'	Bit. conc.	M 54 BR from Carpenter Rd N'yly to S Limits of Mt. Morris	122	Flint Asphalt & Paving Co. <sup>(6)</sup>
1969	Mb 25072-013	6	2.784	32', 44'	Bit. conc.	M 54 from Carpenter Rd N'yly to N of Mt. Morris Rd	90	Spartan Asphalt Paving Co.
1969	Mm 9BC-6A (76021)	6	7.294	2 @ 24'	Bit. conc.	M 78 EB from Clinton-Shiawassee Co. Line NE'yly 5.1 miles. M 78 WB from M 52 SW'yly 2.2 miles	120	Spartan Asphalt Paving Co.
1969	Mb 12031-013	7	16.72	24'	Bit. conc.	Old US 27 from Indiana State Line N'yly to Branch-Calhoun Co. Line	128	Reith-Riley Construction Co., Inc.
1969	Mb 23011-005	8	2.65	20' to 30'	Bit. conc.	M 78 from Barry-Eaton Co. Line NE'yly to Bellevue	146	Reith-Riley Construction Co., Inc.
1969	Mb 46062-007 (Portion)	8	2.712	20'	Special hot emulsion sand mix	US 223 from W of Crockett Hwy to W Limits of Blissfield	97 206	Ayling-Cunningham Asphalt Paving Co. (before resurfacing)
1969	Mb 46101-007 (Portion)	8	2.919	20' to 40'	Stone filled sand asphalt	US 12 from E of Pentecost Hwy E'yly to W of Tipton Hwy	91 234	Ayling-Cunningham Asphalt Paving Co. (before resurfacing)
			5.021	20' to 40'	Stone filled sand asphalt	US 12 from W of Tipton Hwy E'yly to W Limits of Clinton	103 186	(before resurfacing)
1969	Mb 50092-005	9	5.729	30' to 41'	Bit. conc.	M 19 from N of New Haven Rd N'yly to S Limits of Muttonville	94 245	Detroit Concrete Products Co. (before resurfacing)
1969	Mb 82021-018	10	7.859	2 @ 24'	Bit. conc.	I 94 from W of Wayne-Wash-tonaw Co. Line E'yly 7.859 miles	121	Cooke Contracting Co.

(6) Subcontract from Chas. J. Rogers, Inc., and Chas. J. Rogers Construction Co.