

SUMMARIES OF MICHIGAN PAVEMENT ROUGHNESS
1970 Test Program

LAST COPY
DO NOT REMOVE FROM LIBRARY



MICHIGAN DEPARTMENT OF STATE HIGHWAYS

SUMMARIES OF MICHIGAN PAVEMENT ROUGHNESS
1970 Test Program

Research Laboratory Section
Testing and Research Division
Research Project 47 F-15
Research Report No. R-761

Michigan State Highway Commission
Charles H. Hewitt, Chairman; Wallace D. Nunn, Vice-Chairman;
Louis A. Fisher; Claude J. Tobin; Henrik E. Stafseth, Director
Lansing, January 1971

SUMMARIES OF MICHIGAN PAVEMENT ROUGHNESS
1970 Test Program

This report summarizes roughness tests conducted during the 1970 test year on new portland cement concrete, new bituminous concrete, bituminous resurfacing, and tests conducted on existing pavements after 5, 10, 15, and 20 years of service.

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

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

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

Individual rigid pavement projects constructed as standard two-lane pours, and their respective roughness values as determined in the 1970 test program, are listed in Table 1. During the 20 years of roughness surveys, these integrator values have ranged from a low (smooth) of 93 to a high (rough) of 282. For 1970 the range was from 147 to 197.

Table 2 shows that since 1951, with a total of ⁵²⁴~~525~~ rigid pavement projects tested, 36, 53, and 11 percent of this total have been rated good, average, and poor, respectively. In the 1970 test year 0, ⁸³~~85~~, and ⁴⁷~~45~~ percent of the ¹⁵~~13~~ projects tested were rated good, average, and poor, respectively. The weighted arithmetic mean for roughness of all projects of this type tested during the 1970 test year was ¹⁶⁶~~167~~ accumulated inches per mile which represents an ^{7.8}~~8.4~~ percent increase in measured roughness for two-lane pours tested in 1970 over those tested in 1969.

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

Individual rigid pavement projects constructed as one-lane pours, and their respective roughness values as determined in the 1970 test program, are listed in Table 3. The testing procedure for these projects is the same as for standard two-lane pours; 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 two-lane pour pavements.

During the 13 years roughness tests have been conducted on this type of pavement, integrator values have ranged from a low (smooth) of 106 to a high (rough) of 276. For the 1970 test year the range was 139 to 199.

Table 4 shows that since 1958, with a total of 98 projects of this type tested, 5, 68, and 27 percent of this total have been rated good, average, and poor, respectively. In the 1970 test year 0, 71, and 29 percent of the 7 projects tested were rated good, average, and poor, respectively. The weighted arithmetic mean for roughness of all projects of this type tested during the 1970 test year was 169. This represents a 6.6 percent decrease in measured roughness of one-lane pours tested in 1970 over those tested in 1969.

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

Table 5 summarizes projects tested during the 1970 test year which were constructed in two-lane pours utilizing slip-form equipment. This is the second year this method of construction has been used. Table 6 shows 7 projects of this type have been tested to date, with a weighted arithmetic mean of 181 accumulated inches per mile and ranging from 140 to 217 accumulated inches per mile.

Rigid Pavement Construction (One-Lane Pours, Slip-Form Construction)

Roughness summaries for individual projects of this type tested during the 1970 test year are given in Table 7. This was the first year for construction of this type. Roughness values ranged from 156 to 179 accumulated inches per mile with a weighted arithmetic mean of 169 accumulated inches per mile.

5, 10, 15, and 20 Year Roughness

Table 8 summarizes roughness measurements conducted on projects of past construction years during the 1970 test program. For a complete history of the projects, results of previous test programs are also included where available.

Flexible Pavement Construction (Freeway Specification)

During the 1970 test year one project was completed of this type. This project was designed to utilize the bituminous leveling course as a wearing course for approximately five years or until resurfacing is required, at which time the normal wearing course will be added. Table 9 summarizes

data for this project. Table 10 summarizes test data for all years in which this type of construction was tested.

Flexible Pavement Construction (Non-Freeway)

Results of test measurements conducted on pavements of this type during the 1970 test year are summarized in Table 11. 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

Results of roughness surveys on projects of this type are summarized in Table 12. Once again, due to the numerous variables in both surface type and underlying pavement, no attempt will be made to obtain an average roughness.

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

Const. Year	Project	District	Test Length, mi.	Type	Route and Project Location	Roughness Integrator, in./mile	Paving Contractor	
1968	1 06111-009	6	1.924	24' dual	I 75 comm. approx. 1400 ft SE of Maple Ridge Rd thence NW'ly on I 75 reloc. to Arenac-Ogemaw county line	147	Sargent Contracting Co. & Sargent Machinery & Equipment Co. ¹	
1969	1 31051-014	1	0.655	24' dual	US 41 (reloc.) comm. at a point 280 ft W'ly of Division St thence W'ly to a point 270 ft of Pearl St, Village of Houghton	170	Proksch Construction Co.	
1969	F 25084-015*	6	2.681	36' dual	M 78 from 500 ft W of Howe Rd E'ly to Vassar Rd	160	Denton Construction Co.	
1969	F 25084-016**	6	0.864	24' & 36' dual	M 78 comm. at Vassar Rd thence E'ly to M 15 (Sta. 888+00 to Sta. 933+63 is conventional paving)	173	Denton Construction Co. ²	
1969	U 25085-002* Job No. 00355 A	6	1.57	36' & 48' dual	M 78 reloc. from S of Ballenger Hwy thence E'ly to W of Fenton Rd	153	Cooke Contracting Co. ²	
1969	USS 73081-004* F 73091-005	6	0.945	58', 60', & dual-24'-48'	M 81 from 10th St E'ly & NE'ly to 25th St in Saginaw	171	Sargent Contracting Co.² & Sargent Machinery & Equipment Co.	
1969	F 25085-015*	6	0.79	36' dual	M 78 comm. at Hammerburg Rd thence E'ly to E of Saginaw St	148	Cooke Contracting Co. ⁴	
1969	F 25042-015* Job No. 00325 A	6	2.26	24' & 36' dual	M 78 (reloc.) from E of Bristol Rd thence E'ly to West city limits of Flint	158	Cooke Contracting Co. ²	
1969	SS 25101-012	6	0.51	48'	M 57 from East city limits of Cllo thence E'ly to M 54	147	W. F. McNally Co.	
1969	U 11031-004	7	1.907	60' & 72'	M 139 comm. at I 94 thence N'ly to Ox Creek & the Penn Central RR	166	Carl Goodwin & Sons, Inc.	
Weighted arithmetic mean for ¹⁹⁶⁹ 1969 construction tested in 1970 161								
1970	I 33044-057 Job No. 00454 A	8	1.951***	24' dual	I 496 from 140 ft W of Jenison St E'ly to West city limits of East Lansing (from Grand Ave E'ly to West city limits of East Lansing is conventional construction)	197	Eisenhour Construction Co., Inc.	
1970	Ms 63031-020 Job No. 00550 A	9	1.250	48' dual	US 24 from 1400 ft N of 14 Mile Rd N'ly to 2670 ft N of 15 Mile Rd	193	Anderson & Ruzzin, Inc.	
1970	I 73101-066 Job No. 01022A I 73101-067 Job No. 01023	6	2.11	24' dual	I 675 from approx. 250 ft South of Ash St N'ly to approx. 163 ft South of Schust Rd	161	Denton Construction Co. ⁶	
Weighted arithmetic mean for 1970 construction tested in 1970							184	
Weighted arithmetic mean for 1970 test year							167 166	

See Table #3

* For additional data see Table 3
 ** For additional data see Table 3 and 7
 *** For additional data see Table 5
 (1) Subcontract from Holloway Construction Co.
 (2) Subcontract from Chas. J. Rogers, Inc. & Chas. J. Rogers Construction Co.
 (3) Contract awarded to Sargent Contracting Co. & Sargent Machinery & Equipment Co. & W. F. McNally Co.
 (4) Subcontract from Walter Toebe and Co.
 (5) Subcontract from S. D. Solomon & Sons
 (6) Subcontract from Canonic Construction Co.; Brown Brothers, Inc. & Brown Brothers Equipment Co.; C. A. Hull Co., Inc.

TABLE 2
 TWENTY-YEAR ROUGHNESS SUMMARY FOR RIGID PAVEMENT
 (Two-Lane Pours, Conventional Construction)

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							
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
1970	13 ¹²	18.472 ^{18.472}	62.028 ^{62.028}	0	85 ⁸³	15 ¹⁷	167 ¹⁶⁶
1951-1970	525 ⁵²⁴	1858.456 ^{1857.511}	6299.956 ^{6296.176}	36	53	11	133

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

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

TABLE 3
ROUGHNESS DATA SUMMARY FOR RIGID PAVEMENT
(One-Lane Pours, Conventional Construction)

Const. Year	Project	District	Test Length, mi.	Type	Route and Project Location	Roughness Integrator, in./mile	Paving Contractor
1969	F 25084-015*	6	2.681	12' dual	M 78 from 500 ft W of Howe Rd E'ly to Vassar Rd	169	Denton Construction Co. ¹
1969	F 25084-016**	6	0.864	12' dual	M 78 comm at Vassar Rd thence E'ly to M 15 (Sta. 888+00 to Sta. 933+63 is conventional paving)	172	Denton Construction Co. ²
1969	U 25085-002*	6	1.57	12' dual	M 78 relocation from S of Ballenger Hwy thence E'ly to W of Fenton Rd	186	Cooke Contracting Co. ²
1969	USS 73081-004 F 73091-005	6	0.945	<i>5E', 60' & 42' dual 24-48'</i>	M 81 from 10th St E'ly & NE'ly to 25th St in Saginaw	<i>171</i> 173	Sargent Contracting Co. ³ & Sargent Machinery & Equipment Co.
1969	F 25085-015*	6	0.79	12' dual	M 78 comm at Hammburg Rd thence E'ly to E of Saginaw St	199	Cooke Contracting Co. ⁴
1969	F 73131-001	6	1.68	24' & 48'	M 83 from 300 ft N of Townline Rd thence NW'ly to 488 ft N of the North city limits of Frankenmuth (omitting from 800 ft N of Cass River N to Genesee St)	139	Titus Construction Co. ⁵
1969	F 25042-015* Job No. 00325A	6	2.26	12' dual	M 78 from E of Bristol Rd thence E'ly to West city limits of Flint	168	Cooke Contracting Co. ²
Weighted arithmetic mean for 1970 test year						169	

* For additional data see Table 1.

** For additional data see Table 1 and 7.

(1) Subcontract from Holloway Construction Co.

(2) Subcontract from Chas. J. Rogers, Inc. & Chas. J. Rogers Construction Co.

(3) Contract awarded to Sargent Contracting Co. & Sargent Machinery & Equipment Co.; W. F. McNally Co.

(4) Subcontract from Walter Toebe and Company.

(5) Contract awarded to Pickitt & Schreur, Inc.; Titus Construction Co.

TABLE 4
THIRTEEN-YEAR ROUGHNESS SUMMARY FOR RIGID PAVEMENT
(One-Lane Pours, Conventional Construction)

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
1970	7	10.790	25.360 20.635	0	71	29	169
1958-1970	98	195.973	385.824 381.099	5	68	27	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
(Two-Lane Pours, Slip-Form Construction)

Const. Year	Project	District	Test Length, mi.	Type	Route and Project Location	Roughness Integrator, in./mile	Paving Contractor
1970	F 65033-001 Job No. 00937 A	4	1.431	24'	I 75 BL comm. on Cooke Rd at I 75 thence NE'ly to M 76	158	Eisenhour Construction ¹ Co., Inc.
1970	I 65041-002 Job No. 00939 A	4	6.621	24' dual	I 75 comm. at the S Ogemaw county line thence NW'ly to SE of Cooke Rd	168	Eisenhour Construction ¹ Co., Inc.
1970	F 44043-001 Job No. 00626 A	6	4.347	24' dual	M 78 from the Genesee- Lapeer county line E'ly to 1253 ft E of Golf Rd	181	L. W. Edison
1970	I 13074-002 Job No. 00167 A	7	4.753	24' dual	I 69 from 0.5 mi N of "N Drive N" thence N'ly to Eaton county line	217	Eisenhour Construction Co., Inc.
1970	I 13074-001 Job No. 00166 A	7	3.606	24' dual	I 69 from N side of I 94 interchange N'ly to 0.5 mi N of "N Drive N"	206	Eisenhour Construction ² Co., Inc.
1970	I 33044-057 Job No. 00454 A	8	1.149*	24' dual	I 496 from 140 ft W of Jenison St E'ly to West city limits of East Lansing (from Jenison St E'ly to Grand Ave is slip-form portion.	173	Eisenhour Construction ³ Co., Inc.
Weighted arithmetic mean for 1970 test year						188	

* Slip-form mileage only, for additional data see Table 1.

(1) Contract awarded to Sterling Garrett Contracting Co., Inc. & Maclean Construction Co., & Eisenhour Construction Co., Inc.

(2) Subcontract from A. Lindberg & Sons Inc.

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

TABLE 6
TWO-YEAR ROUGHNESS SUMMARY FOR RIGID PAVEMENT
(Two-Lane Pours, Slip-Form Construction)

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)	
1969	1	3.446	13.784	0	100	0	140
1970	6	21.907	84.766	0	50	50	188
1969-1970	7	25.353	98.550	0	57	43	181

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

** Total mileage of 11 or 12 ft wide lanes

TABLE 7
ROUGHNESS DATA SUMMARY FOR RIGID PAVEMENT
(One-Lane Pours, Slip-Form Construction)

Const. Year	Project	District	Test Length mi.	Type	Route and Project Location	Roughness Integrator, in./mile	Paving Contractor
1969	F 25084-016	6	2.734*	24' & 36' dual	M 78 comm at Vassar Rd thence E'ly to M 15 (Sta. 933+63 to Sta. 1078 is Slip-Form Portion)	179	Sargent Contracting Co. & Sargent Machinery & Equipment Co. ¹
1969	I 73101-022	6	1.55	24' dual	I 675 comm at I 75 thence W'ly to Saginaw City Limits	156	Sargent Contracting Co. & Sargent Machinery & Equipment Co.
Weighted arithmetic mean for 1969 construction tested in 1970						171	
1970	F 32092-004 Job No. 00426 A	6	8.958	24' & 48'	US 25 from M 53 E'ly to Huron City	174	Sargent Contracting Co. & Sargent Machinery & Equipment Co.
1970	F 25084-003 Job No. 00344 A	6	2.472	24' dual	M 78 comm approx 0.5 miles East of M 15 thence E'ly to East County Line	157	Sargent Contracting Co. & Sargent Machinery & Equipment Co. ²
Weighted arithmetic mean for 1970 construction tested in 1970						168	
Weighted arithmetic mean for 1970 test year						169	

* Slip-form length only, for additional data See Table 1 & 3

(1) Subcontract from Chas. J. Rogers, Inc. & Chas. J. Rogers Construction Co.

(2) Subcontract from Pickitt & Schreur, Inc.

TABLE 8
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	
1965	SS 22051A, C2	1	0.982	24' conc	US 8 from Menominee River N'yly to exist. US 8		165	180				Bacco Construction Co.
1965	F 27023B, C3	1	8.416	24' bit conc	US 2 from Gogebic Station SE'yly 8.416 mi		96	132				Mathy Construction Co. ¹
1965	F 27023D, C4	1	7.830	24' bit conc	US 2 from 8.416 mi SE of Gogebic Station East to 1.25 mi West of Watersmeet		90	133				Mathy Construction Co. ²
1965	BU 61153A, C1 BU 61153B, C2	5	2.485	24' dual & 48' bit conc	US 31 BR from Spring St NE'yly to US 31		101	119				Holloway Construction Co.
1965	U 70012B, C2	5	0.546	60' conc	M 21 & US 31 BR from Fairbanks Ave E'yly & N'yly to Clover St		168	170				Neil & Al Construction Co.
1965	SS 76012B, C2	6	1.263	12' dual conc	M 47 (M52) from N limits of Owosso N to Saginaw County line		174	191				Sargent Construction Co. ³
1965	U 73073B, C9	6	1.014	36' conc	M 81 from Carolina St E'yly to Schaefer St in Saginaw	12' pours	151	138				W. F. McNally Co.
1965	I 11014B, C9 I 11015A, C35	7	14.00	12' dual bit conc	I 94 from LaPorte Rd NE'yly to the South limits of Bridgeman		96	104				Reith-Riley Construction Co., Inc.
1965	I 11015B, C36	7	11.240	12' dual bit conc & 12' dual conc	I 94 from the South limits of Bridgeman N'yly to US 31 & US 33	7.24 mi bit conc 4.00 mi conc	100	102	126	125		Reith-Riley Construction Co., Inc. (bit conc) Denton Construction Company (conc) ⁴
1965	I 11016A, C17	7	7.42	12' dual conc	I 94 from US 31 & US 33 NE'yly to I 196		117	135				L. W. Lamb Company ⁵
1965	U 13121G, C6	7	0.658	24' dual conc	I 94 BL from Capitol Ave E'yly to "S" St in Battle Creek		159	170				Carl Goodwin & Sons, Inc.
1965	I 39022C, C11	7	0.779	24' dual conc	I 94 from the Penn RR NE'yly to Sprinkle Rd		153	148				Carl Goodwin & Sons, Inc.
1965	I 39022C, C12	7	0.777	24' dual conc	I 94 from S. Westnedge Ave E'yly to Lovers Lane		162	151				Carl Goodwin & Sons, Inc.
1965	U 30032A, C1	8	1.285	12' dual conc	M 99 from Spring St NW'yly & N'yly to 616 ft S of N limits of Hillsdale		213	215				Titus Construction Co. ⁶
1965	USS 33011A, C5	8	1.062	12' dual conc	M 99 from West Ingham County line NE'yly to I 96		189	194				Eisenhour Construction Co., Inc.
1965	F 33035B, C1 BI 33084A, C21	8	3.423	24' dual conc	US 127 from S of Holt Rd N'yly to I 96		141	150				Sargent Construction Co. ⁷
1965	BI 81104A, C18 U 81105A, C1 U 81105B, C2	8	3.708	24' dual conc	M 14 from 0.83 mi W of Wagner Rd NE'yly to the Huron River		149	160				Sargent Construction Co. ⁷
1965	F 50011F, C12	9	3.250	24' dual conc	M 53 from 17-1/2 Mile Rd N to N of M 59		133	149				Sargent Construction Co. ⁷
1965	F 50022A, C5	9	0.676	12' dual conc	M 59 from M 53 BR E'yly to M 53		159	177				Holloway Construction Co.

1 Proksch Construction Co.
2 Bacco Construction Co.
3 Subcontract from Johnson-Green Company; Saginaw Asphalt
4 Contract awarded to Denton Construction Co.; Reith-Riley Construction Co., Inc.
5 Subcontract from Denton Construction Co.
6 Contract awarded to Titus Construction Co.; T. A. Forsberg, Inc.
7 Subcontract from Holloway Construction Co.

TABLE 8 (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	
1965	F 50013A, C1	9	3.768	24' dual conc	M 53 from S of 21 Mile Rd N'y to S of 25 Mile Rd		128	144				Sargent Construction Co. ⁷
1965	U 63043B, C2 U 63043F, C3 BI 63172A, C13	9	1.434	24' dual conc	M 59 from GTW RR E'y to Mott Rd		131	138				L. W. Edison
1965	U 63031A, C15	9	2.717	24' & 48' conc	US 24 from 1287 ft N of 8 Mile Rd N'y 2.717 mi		168	170				Cooke Contracting Co.
1965	SS 77052A, C3	9	4.070	24' & 60' conc	M 29 from 2550 ft S of S limits of Marysville N'y to 250 ft S of Bruce Ave		138	147				Anderson & Ruzzin, Inc.
1965	F 50013A, C2	9	3.567	24' dual conc	M 53 from N of 24 Mile Rd N'y to M 53 N of Washington		119	140				Sargent Construction Co. ⁷
1965	U 77023D, C10	9	1.410	36' conc	M 21 EB from M 146 E to US 25	24' pour 12' pour	168 161	176 170				Eisenhour Construction Co., Inc. ⁸
1965	U 82061E, C7	10	1.064	48' conc	US 12 EB from Heywood St E'y to 4th St		195	201				L. A. Davidson
1965	BI 82191E, C17 I 82191F, C18	10	1.67	36' dual conc	I 75 from N of Penn Rd N'y to W of Allen Rd	24' pour 12' pour	154 145	182 171				Roy Fruehauf, Inc.
1965	I 82191G, C20 I 82191H, C21	10	1.288	36' dual conc	I 75 from W of Allen Rd NE'y to S of the North limits of Southgate	24' pour 12' pour	139 159	156 165				Roy Fruehauf, Inc.
1965	I 82191I, C25 I 82191H, C26 I 82191I, C27 I 82191J, C28	10	1.47	36' dual conc	I 75 from S of the North limits of Southgate NE'y to N of US 25	24' pour 12' pour	137 153	165 185				The Kutchins Co. & Kutchins Company, Inc. ⁹
1964	F 63041E, C7	9	3.398	12' & 60' conc	M 59 from Airport Rd E'y to Elizabeth Lake Rd	12' pours	149	162				Eisenhour Construction Co., Inc. ¹⁰
1964	F 82052G, C25	10	3.226	36' conc	US 24 SB from Eureka St N to Haskell St	24' pour 12' pour	141 165	148 157				Cooke Contracting Co. ¹¹
1964	U 82192B, C21 U 82192A, C35 U 82192D, C36	10	1.662	36' dual conc	M 39 from S of Outer Drive NE'y to Rotunda Dr	24' pour 12' pour	158 156	147 149				L. A. Davidson
1960	BF 03111, C1 BF 03111, C2	7	5.916	24' dual conc	US 131 from N city limits of Plainwell N to M 118		110	173				Carl Goodwin & Sons, Inc.
1960	BI 09034, C2 BI 09034, C6	6	3.022	24' dual conc	I 75 from M 84 N'y to Midland Rd		110	135				L. A. Davidson
1960	BI 09034, C1 BI 93112, C1	6	5.938	24' dual conc	I 75 from South city limits of Zillwaukee N'y to M 84		140	162				Louis Garavaglia Contractors, Inc.
1960	BF 09035, C1 BI 09035, C2	6	3.414	24' dual conc	I 75 from Midland Rd N'y to M 13		116	146				L. A. Davidson
1960	BM 09091, C1 BM 73075, C1	6	4.332	24' & 24' dual conc	M 47 from Sarle Rd N to US 10		100	128				Denton Construction Co.
1960	BI 11015, C1	7	3.962	24' dual conc	I 94 from Ridge Rd NE'y to St. Joseph River		115	145				L. A. Davidson
1960	BI 11016, C1 BI 11017, C3	7	3.801	24' dual conc	I 94 from I 94 BL NE'y to Carmody Rd		100	147				Pierson Contracting Co.

⁷ Subcontract from Holloway Construction Co.

⁸ Subcontract from Sterling Garrett Contracting Co., Inc.

⁹ Subcontract from Louis Garavaglia Contracting, Inc.

¹⁰ Subcontract from S. D. Solomon & Sons; Louis Garavaglia Contractors, Inc.

¹¹ Contract awarded to Chas. J. Rogers Construction Co. & Chas. J. Rogers, Inc.; Cooke Contracting Co.; Jutton-Kelley Company

TABLE 8 (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	
1960	BI 11016, C2	7	1.396	24' dual conc	I 94 from the St. Joseph River NE'y to 0.3 mi S of Pipestone Rd		139		166			C. A. Hull Co., Inc.
1960	BI 11016, C3	7	3.352	24' dual conc	I 94 from 1842' N of Townline Rd NE'y to I 94 BL		115		150			L. W. Edison Co.
1960	BF 13031, C5	7	3.380	24' conc	M 66 from N of Graham Lake Rd N'y to 0.5 mi S of I 94		127		167			Bairley and Lindley, ¹² Inc.
1960	BF 13033, C1	7	1.411	24' dual conc	I 94 from 2150' N of I 94 N to 1412' S of Columbia Rd		129		163			Bairley and Lindley, ¹² Inc.
1960	BI 16091, C1	4	3.126	24' dual conc	I 75 from 1200' NW of US 27 NW'y to Topinabee Rd		126		137			Gilliland Construction Co.
1960	BI 16091, C2 BI 16092, C9	4	5.861	24' dual conc	I 75 from Topinabee Rd N'y to N of Riggsville Rd		113		129			Denton Construction ¹³ Co.
1960	BI 16092, C5	4	6.640	24' dual conc	I 75 from N of Riggsville Rd N'y to Hebron Mail Rd		116		135			Johnson-Green Co. & Jagco, Inc.
1960	BI 16092, C6	4	6.059	24' dual conc	I 75 from Hebron Mail Rd N'y to US 31		106		126			Denton Construction ¹⁴ Co.
1960	F 38072, C1	8	0.737	11' dual conc	M 50 from W North St N'y to North city limits of Jackson		201		250			The Kutchins Co. & Subsidiaries
1960	BI 38103, C7	8	4.826	24' dual conc	I 94 from I 94 BL E'y to Willis Rd		95		141			Pierson Contracting Co.
1960	BI 38103, C4	8	5.066	24' conc	I 94 WB from Willis Rd E to Jackson - Washtenaw County line		113		159			Loselle Construction ¹⁵ Co.
1960	BI 41024, C7	5	2.003	24' dual conc	I 96 from 1566' NW of M 11 SE to 930' NW of Thornapple River Dr		128		148			L. W. Edison Co.
1960	BF 47013, C1 BF 47013, C4	8	5.041	24' dual conc	US 23 from S of M 36 N'y to 1.0 mi S of I 96		105		141			L. W. Edison Co.
1960	I 49025, C5 I 49025, C6	2	4.055	24' dual conc	I 75 from N of Mackinaw Bridge N'y to N of the N limits of St. Ignace		150		161			Gilliland Construction Co.
1960	BF 52042, C5 BF 52042, C6	1	1.92	24' & 22' conc	US 41 from 1.38 mi W of W limits of Marquette E 1.92 mi		186		211			L. W. Brumm
1960	BU 56023, C2 BU 56023, C3	6	3.486	24' & 36' conc	US 10 BR from Ellsworth St E'y to US 10	24' pour 12' pour	140 153		175 197			W. H. Knapp, Inc. ¹⁶
1960	BU 56044, C3 BU 56044, C4 BM 09101, C4	6	4.192	24' dual conc	US 10 from M 20 NW'y to Swede Rd		108		147			C. E. Utterback ¹⁷
1960	BM 56044, C9 BU 56044, C11	6	5.341	24' dual conc	US 10 from 677' W of Stark Rd E'y to Swede Rd		114		144			C. E. Utterback ¹⁷
1960	F 73063, C2 F 73111, C7	6	1.310	24' dual 60' conc	M 46 at I 75		140		186			W. H. Knapp, Inc. ¹⁶

¹² Subcontract from Canonic Construction Co.

¹³ Subcontract from Angell Construction Co.

¹⁴ Subcontract from Johnson-Green Co. & Jagco, Inc.

¹⁵ Subcontract from D. J. McQuestion & Sons

¹⁶ Contract awarded to W. H. Knapp, Inc.; W. F. McNally Co.

¹⁷ Contract awarded to Hertel-Deyo Co.; C. E. Utterback

TABLE 8 (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	
1960	BI 73111, C3	6	1.871	24' conc	I 75 SB from M 81 S to Wadsworth Rd and from 0.2 mi N of M 46 S to 0.5 mi S of M 46		151		170			Sargent Construction Co. ⁹
1960	BF 76023, C1	6	5.07	24' dual conc	M 78 from Durand NE'y to M 13		120		144			Denton Construction Co.
1960	BI 80023, C2	7	5.985	24' dual conc	I 94 from 409' W of Thomas Rd E'y to 2317' E of Kane Rd		125		151			L. W. Edison & Carl Goodwin & Sons ¹⁸
1960	BI 80023, C3	7	3.641	24' dual conc	I 94 from 2317' E of Kane Rd E'y to 2453' W of M 40		124		159			L. W. Edison & Carl Goodwin & Sons ¹²
1960	BI 80023, C4 BI 80024, C3	7	4.097	24' dual conc	I 94 from 0.8 mi W of M 40 E 4.097 mi		132		145			Denton Construction Co. ⁹
1960	BI 81062, C3 BI 81104, C3	8	5.176	24' dual conc	I 94 from 200' W of Baker Rd E'y to 3120' E of Wagner Rd		98		151			Pierson Contracting Co.
1960	BI 81104, C1	8	4.978	24' dual conc	I 94 from 2000' W of Baker Rd W to 1529' W of Fletcher Rd		107		140			Sargent Construction Co. ⁷
1960	BF 37013, C1	5	4.352	24' dual conc	US 27 from Montcalm-Isabella County line N'y 4.352 mi		116		131			Sargent Construction Co. ⁷
1960	BF 29014, C3	5	4.130	24' dual conc	US 27 from M 46 N'y to Isabella County line		94		123			Denton Construction Co. ¹⁹
1960	EBBF 37011, C2 EBBF 37013, C4	5	6.700	24' & 24' dual conc	US 27 from N of Blanchard Rd NW'y to exist. US 27 S of Mt. Pleasant		130		136			C. E. Utterback
1960	BI 70064, C3	5	2.053	24' dual bit conc	I 96 from Muskegon-Ottawa County line E'y 2.053 mi		124	105	116			Paul C. Miller
1960	BI 81104, C5	8	2.325	24' conc	I 94 EB from Jackson-Washtenaw County line E'y to NYC RR		114		153			Pierson Contracting Co.
1960	BI 81104, C7	8	5.439	24' conc	I 94 EB from NYC RR E'y to W of Fletcher Rd		129		158			Sargent Construction Co. ⁷
1959	BF 50031, C2 BF 50031, C3 BF 50031, C4	9	7.754	24' & 12' dual conc	M 97 from 14 Mile Rd N to M 59	24' pour 12' pour	125 126		180 187			Cooke Contracting Co.
1959	BU 82053, C6 BU 82053, C15	10	1.682	36' dual conc	US 24 from 5 Mile Rd N to Grand River Ave	24' pour 12' pour	182 146		175 149			H. J. Brighton
1955	F 07-23, C2	1	5.189	22' conc	M 28 from US 41 SW'y to 1.0 mi SW of US 141		143		195			Bacco Construction Co.
1955	F 09-15, C7 F 09-15, C8	6	5.5	22' dual conc	M 15 from Columbus Ave S to N of M 138			189	191			Sargent Construction Co.
1955	F 20-13, C6 F 20-13, C7	4	0.960	24' conc	I 75 BL SB from M 72 S to 0.2 mi N of 5 Mile Rd		137	158	191			Hertel-Deyo Co. ¹⁷

7 Subcontract from Holloway Construction Co.
9 Subcontract from Louis Garavaglia Contracting, Inc.
12 Subcontract from Canonic Construction Co.
17 Contract awarded to Hertel-Deyo Co.; C. E. Utterback
18 Subcontract from S. D. Solomon & Sons
19 Subcontract from A. Lindberg & Sons, Inc.

TABLE 8 (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	
1955	F 30-31, C2 F 38-07, C5 F 46-03, C8	8	10.471	22' conc	US 127 from US 12 N to M 50		124			191		Carl Goodwin & Sons
1955	SS 32-20, C3 SS 32-20, C4	6	0.822	40' conc	M 142 from the West city limits of Elkton E to West of the East city limits		131	139		167		Hertel-Deyo Co.
1955	F 39-51, C1	7	2.675	22' conc	I 94 BL WB from I 94 W'yly to M 96		131	162		183		Carl Goodwin & Sons
1955	F 51-10, C5 F 51-10, C6	3	4.311	22' & 44' conc	US 31 from 0.7 mi N of Mason-Manistee County line N to First St in Manistee		161	197		198		L. W. Edison
1955	F 53-25, C1 F 64-22, C2	3 5	5.284	22' conc	US 31 from 0.1 mi N of Oceana-Mason County line S'yly to US 31 BR (Monroe Rd)		150	177		189		L. W. Edison
1955	F 56-26, C2	6	1.513	22', 44', & 46' conc	M 20 from 0.5 mi E of W limits of Midland E'yly 1.513 mi		107	138		160		W. J. Muehlenbeck
1955	F 64-03, C2 F 64-21, C8 F 64-21, C9	5	3.988	22' & 22' dual conc	US 31 from 0.2 mi S of Hart N'yly to 0.1 mi S of US 31 BR			168		200		L. W. Edison
1955	F 73-33, C4	6	2.081	22' conc	M 15 SB from M 81 N'yly to Bay-Saginaw County line			150		176		W. F. McNally
1955	F 73-57, C2	6	1.171	44' conc	M 46 from E of the Tittabawassee River E'yly to Center Rd		106	128		169		W. J. Muehlenbeck
1955	SS 77-71, C1	9	1.012	46' conc	M 29 from Chartier St N'yly to the Belle River		161			201		Cooke Contracting Co.
1950	SS 22-38, C1	1	0.746	22' conc	M 95 from the State line N to Kingsford				137		191	Gould and Cross ²⁰
1950	F 64-07, C10	5	5.313	22' conc	US 31 from 0.3 mi N of Muskegon-Oceana County line N'yly to 0.2 mi N of Arthur Rd				155	197	207	Hertel-Deyo Co.
1950	F 70-41, C2	5	8.924	22' conc	US 31 from 0.2 mi N of C&O RR N'yly to 0.2 mi N of West Olive				131		172	Carl Goodwin & Sons
1950	F 77-68, C2	9	5.386	22' conc	M 21 from the Lapeer-St. Clair County line E to Knoll Rd					233	280	Carl Goodwin & Sons
1950	F 80-35, C2	7	6.825	22' & 44' conc	M 140 from I 196 BL S to S of 36th Ave				131		142	Sargent Construction Co.

²⁰ Contract awarded to Gould and Cross; Paul C. Miller

TABLE 9
ROUGHNESS DATA SUMMARY FOR FLEXIBLE PAVEMENT (Freeway Specification)

Const. Year	Project	District	Test Length, mi.	Width	Surface Type	Route and Project Location	Roughness Integrator, in./mile	Paving Contractor
1970	I 20052-001* Job No. 00256	4	5.88	24' dual	Bit Conc	I 75 from Roscommon- Crawford County Line N'ly to 4 Mile Rd	130	Proksch Construction Co.

* Leveling course only, wearing course to be applied at future date.

TABLE 10
ROUGHNESS SUMMARY FOR FLEXIBLE PAVEMENT (Freeway Specification)

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	1	6.040	24.160	100	0	0	81
1961	7	39.525	158.100	100	0	0	104
1962	17	99.385	374.825	88	6	6	113
1963 & 1964	7	30.506	120.316	100	0	0	106
1965	9	46.889	166.257	100	0	0	86
1966	3	25.030	36.370	100	0	0	95
1970	1	5.880	23.520	100	0	0	130
1958-1970	45	253.255	903.548	96	2	2	104

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

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

TABLE 11
ROUGHNESS DATA SUMMARY FOR FLEXIBLE PAVEMENT (Non-Freeway Specification)

Const. Year	Project	District	Test Length, mi.	Width	Surface Type	Route and Project Location	Roughness, Integrator, in./mile	Paving Contractor
1969	F 41122-006	5	2.503	24'	Bit Conc	M 57 from US 131 E'ly to Tefft Ave	100	Rieth-Riley Construction Co., Inc. ¹
1970	F 61012-002 Job No. 00824 A	5	5.745	24'	Bit Conc	M 20 from the Village of Holton NE'ly to M 82	89	Paul C. Miller Co.
1970	SS 41101-002 Job No. 00591 A	5	5.11	24'	Bit Conc	M 44 from Ramsdell Dr E'ly to 217 ft E of Lincoln Lake Ave	97	J. V. Burkell Construction Co.
Weighted arithmetic mean for 1970 construction tested in 1970							93	
Weighted arithmetic mean for 1970 test year							94	

(1) Subcontract from Maclean Construction Co.; Kamminga & Roodvoets, Inc.

TABLE 12
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 44031-003	6	1.957	22', 20', 27' & 30'	Bit. Conc.	M 53 from the Macomb-Lapeer County line N'yly to 250 ft N of Water St in Almont	143	Ayling-Cunningham Asphalt Paving Co.
1969	Mb 07041-006 (Portion)	1	6.125	22'	Bit. Agg. 4.11	M 38 from 550 ft E of County Rd 651 (Pelke Rd) E'yly to 0.3 mi E of E limits of Baraga	140	Fox Valley Construction Co.
1969	Mb 31012-005 (Portion)	1	10.781	20', 22', 40' & 50'	Bit. Conc.	M 26 from County Rd 540 NE'yly to West limits of Houghton omitting 0.269 mi in South Range	144	Mathey Construction Co.
1969	Mb 36051-001 (Portion)	1	10.02	20' & 36'	Bit. Conc.	US 2 & US 141 from the State Line N'yly to M 69 in Crystal Falls	135	Payne & Dolan of Wisconsin, Inc.
1969	Mb 48042-004 (Portion)	2	15.0	22'	Bit. Agg. 4.11	M 28 from 0.61 mi E of M 117 E'yly to the Luce-Chippewa County line	131	George Hocking Construction Co.
		2	4.0	22'	Bit. Agg. 4.11	M 123 from Helen St in Newberry N'yly to County Rd 407	144	George Hocking Construction Co.
1969	Mb 57011-003 (Portion)	3	12.14	20'	Bit. Conc.	M 66 from Osceola-Missaukee County line N'yly & W'yly to M 42 omitting from M 55 W to M 55 E	140	The Hicks Company
1969	Mb 67032-003 (Portion)	3	9.200	20'	Bit. Conc.	M 66 from M 115 N'yly to Missaukee County line	125	Reith-Riley Construction Co., Inc.
1969	Mtb 25052-008	6	2.687	52'	Bit. Conc.	M 54 BR from S limits of Mt. Morris N'yly to M 54	113	Flint Asphalt & Paving Co.
1969	Mm OSC-6A (74023)	6	8.834	22'	Single Seal Coat	M 90 from the E limits of Brown City E'yly to M 19	184	C. R. Hunt Construction Co.
1969	Mtb 13071-010	7	10.4	24'	Bit. Conc.	US 27 (Old) from the South County line N'yly to Marshall	144	Reith-Riley Construction Co., Inc.
1969	Mb 78012-004 (Portion)	7	8.458	20'	Bit. Conc.	US 131 from US 12 N'yly to M 60 omitting 0.82 mi in Constantine	98	Reith-Riley Construction Co., Inc.
1969	Mb 78021-001	7	10.24	20'	Bit. Conc.	US 12 from Mann Rd E'yly to 200 ft E of Penn Central RR omitting from US 131 E'yly to 430 ft E of East limits of White Pigeon	93	Reith-Riley Construction Co., Inc.

TABLE 12 (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	Mtb 33032-016 (Portion)	8	1.0	2 @ 22' & 48'	Bit. Conc.	US 127 (Old) from S of Miller Rd S'yly to Aurelius Rd	107	Spartan Asphalt Paving Co.
1969	Mb 38071-010	8	9.037	22', 28', & 42'	Stone-Filled Sand-Asphalt	M 50 from 2400 ft E of Hand Rd (Lenawee Co) W'yly & N'yly to Stoney Lake Rd omitting at US 12 & divided roadway in Brooklyn	101	Reith-Riley Construction Co., Inc.
1969	Mm OSC-8A (81013)	8	5.2	24'	Single Seal Coat	M 52 from US 12 N'yly to Austin Rd	264	Detroit Concrete Products Corp.
1970	Mb 48032-005	2	0.65	Var.	Bit. Agg. 4. 11	M 123 from South limits of Newberry N to Helen St.	167	George Hocking Construction Co.
1970	Mb 21014-011	2	12.853	20' & 22'	Stone-Filled Sand-Asphalt	US 2 from the Big Fishdam River E'yly to M 149	127	Bacco Construction Co.
1970	Mb 67051-002 Job No. 01613 A (Portion)	3	8.508	22'	Bit. Conc.	M 115 from 1.51 mi NW of M 61 SE'yly to M 66	117	Hodgkiss & Douma, Inc.
1970	Mb 20051-002 Job No. 00255 A	4	4.56	20' & 22'	Bit. Agg. 4. 11	M 18 & M 76 from US 27 E'yly to I 75 at the Crawford- Roscommon County line	161	Lake Construction Co. & Howell Construction Co.
1970	Mb 72093-002	4	2.812	20'	Bit. Agg. 4. 11	M 18 & M 76 from I 75 at the Crawford- Roscommon County line E'yly to E of Billman Rd	175	Lake Construction Co. & Howell Construction Co.
1970	RF 01051-001 Job No. 00004 A	4	10.117	24'	Bit. Conc.	US 23 from the Iosco-Alcona County line N'yly to N of the S limits of Harrisville	95	Hodgkiss & Douma, Inc.
1970	Mb 41031-005 Job No. 00576 A (Portion)	5	6.057	22'	Bit. Conc.	M 37 from Kraft Rd NW'yly to 1000 ft S of M 11	123	Woodland Paving Co.
1970	Mb 19031-008 Job No. 00241 A (Portion)	5	2.68	22' dual	Bit. Conc.	US 27 from 1350 ft S of Herbison Rd N'yly to 3125 ft N of Round Lake Rd	102	Spartan Asphalt Paving Co.
1970	Mb 62014-006	5	6.0	20'	Bit. Agg. 4. 11	M 20 from Croswell Ave E'yly to Tullip St	142	Reith-Riley Construction Co., Inc.
1970	Mb 62021-002 Job No. 01611 A (Portion)	5	6.75	20'	Bit. Agg. 4. 11	M 82 from 647 ft N of 48 th St N'yly to 360 ft S of Church St in Hesperia	107	Paul C. Miller Co.

TABLE 12 (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
1970	Mb 62031-012 Job No. 01610 A (Portion)	5	2.75	24'	Bit. Conc.	M 46 & M 37 from N of Grant N'y to S of 96 th St	133	Paul C. Miller Co.
1970	Mb 44041-004 Job No. 00624 A	6	1.216	36' & 41'	Bit. Conc.	M 21 from Millville Rd E'y to M 24 in Lapeer	188	Ajax Asphalt Paving, Inc. & Affiliates
1970	Mb 56021-005 Job. No. 1793 A	6	6.11	22'	Bit. Conc.	M 20 from 61 ft W of the Isabella-Midland County line E'y to 76 ft E of Castor Rd	143	The Hicks Co.
1970	Mb 44042-004 Job. No. 01566 A	6	14.22	20' & 22'	Bit. Conc.	M 21 from East limits of Lapeer E'y to Dorrow Rd	161	Williams Bros. Asphalt Paving Co.
1970	Mb 13031-018	7	3.738	24'	Bit. Conc.	M 66 from 100 ft S of "L" Drive N'y to 350 ft N of "E" Drive	97	Reith-Riley Construction Co., Inc.
1970	Mb 03072-006	7	11.80	20'	Bit. Conc.	M 40 from Sherman St in Allegan NW'y to Holland city limits omitting from 125 th Ave to 136 th Ave & from 3715 ft SE of Holland city limits NW'y 2700 ft	92	Reith-Riley Construction Co., Inc.
1970	Mb 33042-001 Job. No. 00447 C	8	2.38	48'	Bit. Conc.	M 43 EB from W of Logan St. E'y to Grand River Ave omitting from Capitol Ave to Pennsylvania Ave	140	Reith-Riley Construction Co., Inc.
1970	Mb 23052-002 Job. No. 00290 A (Portion)	8	26.85	22'	Bit. Conc.	M 50 from M 43 SE'y to M 99 omitting from M 78 to Flanders Rd E of Charlotte	104	Spartan Asphalt Paving Co.
1970	Mb 77041-002 (Portion)	9	9.893	18' to 45'	Bit. Agg. 4.11	M 136 from 325 ft E of M 19 E'y to 950 ft E of the Black River	147	McIntyre, Teeple & Lardner Asphalt Paving Co.
1970	Mb 77021-001	9	4.33	22	Bit. Conc.	M 21 from E of the Lapeer-St. Clair County line E'y to E of Sheridan Rd omitting from 130 ft W of Inlay City Drive to 190 ft E of Connors Rd	143	Molesworth Contracting Co.
1970	Mb 63041-017	9	12.22	20 to 44	Bit. Conc.	M 59 from Tipsico Lake Rd E'y to Williams Lake Rd omitting at Duck Lake Rd	117	Detroit Concrete Products Corp.