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1958 SUMMARIES OF PAVEMENT ROUGHNESS

Prepared for Road Construction Division

Research Laboratory Division  
Office of Testing and Research  
Research Project 47 F-15

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Michigan State Highway Department  
John C. Mackie, Commissioner  
Lansing, January 1959

## 1958 SUMMARIES OF PAVEMENT ROUGHNESS

In addition to the standard surveys of roughness on newly constructed portland cement concrete pavements, the 1958 measurements included several pavement widening projects and one bituminous concrete project. These surveys were conducted in the usual manner, with the equipment and instrumentation used by the Research Laboratory Division in previous years. More than 600 lane miles of pavement were measured this year, approximately the same amount as in 1957.

### Concrete Pavement Construction

Individual concrete construction projects and their 1958 roughness values have been tabulated in Table 1--grouped by year of construction and ranked by increasing accumulated in. per mi roughness. In 1958, these values ranged from 93 to 155. During the seven years through 1957, roughness had varied from a low of 97 on one project to a high of 282 on another; however, in 1958, a new low figure of 93 accumulated in. per mi was measured on US 12 in Washtenaw County near the Willow Run airport (IN 81041 C2RN, Denton Construction Co.).

The roughness classifications "good" (90-130), "average" (131-174), and "poor" (over 175) shown in Figure 1, while arbitrarily determined, have a reasonable relationship to riding comfort. Since the surveys were initiated in 1951, 37, 50, and 13 percent of the projects examined have been in the good, average, and poor categories, respectively. It should be noted that this year, for the first time since 1955, no projects were classified in the poor category, and in addition, that more appeared in the good category than ever before. Figure 1 also shows that in 1958, for the first time, the weighted arithmetic mean dropped for the second consecutive year--a one-year decrease of 11 in. per mi, and a two-year decrease of 26 in. per mi.

The 1958 investigation thus indicated a continuation of "the recent trend toward more uniformity in roughness characteristics among concrete projects and an overall improvement in riding quality," which was mentioned in the 1957 roughness report. That report also attributed this

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improvement "to three recent changes in construction practice, namely: improved subbase preparation, new methods in joint construction, and the use of (improved) finishing equipment."

#### Concrete Pavement Widening

The data resulting from roughness tests conducted on three widened concrete pavements is presented in tabular form in Table 2 and in graphic form in Figure 2. The testing and reporting procedures used on these projects are identical to those employed on standard concrete pavements. However, due to the somewhat different procedures required for pavement widening construction, it is expected that the range of roughness values encountered will show some variation from that of standard concrete pavements. Therefore, in this report and in future annual roughness reports, concrete widening projects will be reported and tabulated as a classification separate from standard concrete pavements.

#### Bituminous Concrete Projects

One Dual 24-ft Bituminous Concrete Class 1 and Aggregate Base Course project was surveyed in 1958; the accumulated in. per mi figures presented in Table 3 are the result of measuring runs in the separate wheel tracks in both the traffic and passing lanes.

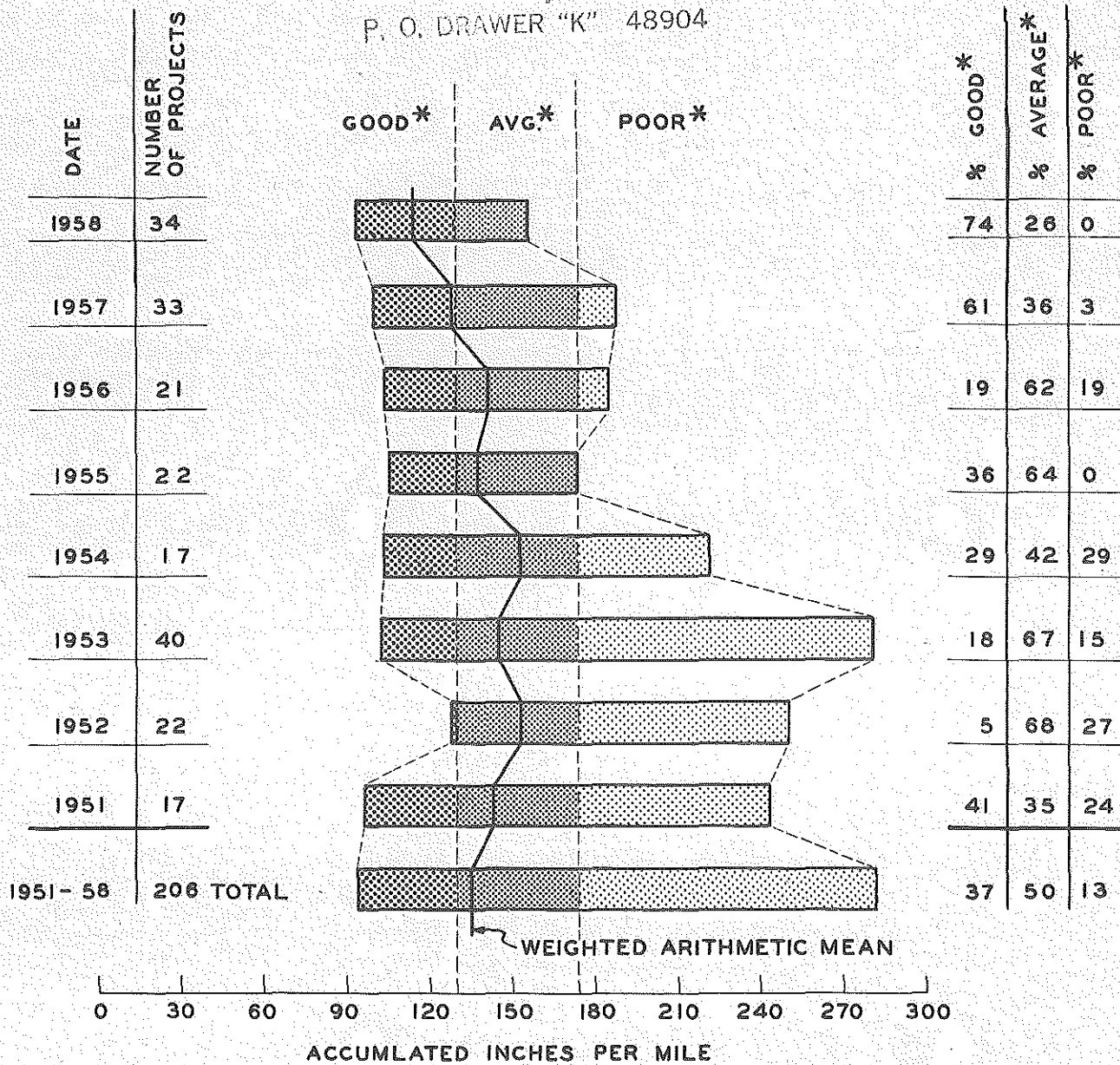
As in the case of concrete pavement widening, this type of roughness measurement represents a new expansion of the Department's roughness program, and will be included in all future roughness reports. Normally, only bituminous pavements of the type described above will be included in future surveys although other bituminous projects may be measured if and when special roughness conditions warrant.

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TABLE I  
SUMMARY OF ROUGHNESS DATA FOR CONCRETE PAVEMENT

	Project Number	District	Test Length, MI	Type	Route and Project Location	Accumulated Inches/Mile	Paving Contractor
1956 CONST.	BM 25-52 C1RO	6	6.618	Dual	US 23 Relocation, from south of Thompson Rd. north to Hill Rd.	113	S. J. Groves and Sons Co.
	WEIGHTED ARITHMETIC MEAN FOR 1956 CONSTRUCTION						113
1957 CONSTRUCTION	I 49025 C3RN	2	3.477	Dual	US 2 from Castle Rock north to M 123	104	Pierson Construction Co.
	BI 19022 C1RN	5	9.244	Dual	US 16 Relocation, from M 100 to Portland	105	Carl Goodwin and Sons
	M 19022 C2R						
	BI 34044 C1RN						
	BLN 25-54 C1RO	6	6.248	Dual	US 23 Relocation, from north of Pasadena Ave. to south of Dodge Rd.	106	Denton Construction Co.
	BM 38131 C2RN	8	2.007	Dual	US 127 (Van Horn Rd.)	107	Denton Construction Co.
	I 70963 C1RN, C2UN, C3RN	5	3.136	Dual	US 16 Relocation, east from 1 mi west of Coopersville	109	S. J. Groves and Sons Co.
	M 70063 C4RN						
	BM 03112 C1UN, C2RN	3	7.629	Dual	US 131 from 100th St. south to Wayland	112	L. W. Edison Co.
	M 41131 C1RN						
	BM 38131 C1RN	8	2.641	Dual	US 127 north from US 12	113	L. A. Davidson
	F 23042 C2R	8	2.482	Dual	M 43 from Grand Ledge to Canal Rd.	114	Denton Construction Co.
	BM 25061 C1RO, C3RO	6	2.052	Dual	US 23 pavement and 3 bridges at intersection with M 121	118	L. A. Davidson
	M 25061 C1R						
	BM 33031 C1RN, C2UN, C3R	8	8.917	Dual	US 127 Relocation, south from Leslie	127	Sargent Construction Co.
	BM 35131 C3RN						
F 32042 C4R	1	7.388	11 ft	US 41-M 28 from Negaunee north city limit to 1.5 mi west of Marquette, inside lane, westbound only	137	Bacco Construction Co.	
F 28091 C1R	3	2.407	22 ft	US 131 north from about 2 mi north of Manton, northbound lane only	140	Hertel-Deyo Co.	
BM 25-53 C2RO, C3RO, C4RO	6	1.333	Dual	US 23 Relocation, from Rablee Rd. north to Arlene Dr.	140	Wm. J. Mushlenbeck	
WEIGHTED ARITHMETIC MEAN FOR 1957 CONSTRUCTION						117	
1958 CONSTRUCTION	IN 81041 C2RN	8	1.981	Dual	US 12 Relocation, from Harris Rd. to Wlard Rd.	93	Denton Construction Co.
	F 38111 C1RN	8	2.327	Dual	US 127 Relocation, north from Page Ave. to south of US 12 Bypass (interchange)	95	Sargent Construction Co.
	I 38111 C2RN						
	F 09042 C3RN	6	6.209	Dual	M 20 Relocation, west from Euclid Ave. to Eight Mile Rd.	98	Cooke Construction Co.
	BM 09101 C2R						
	F 70013 C1RN	5	8.914	24 ft	US 31-M 21 over Pigeon River, north to West Olive, southbound only	109	Carl Goodwin and Sons
	F 11072 C1R, C2U	7	6.558	24 ft	M 140 Relocation, from north limit of Watervliet north to Covert	109	L. W. Edison Co.
	F 80031 C1R						
	M 61151 C4RN	5	4.27	Dual	Norton-Glode Expressway in Muskegon Hts. and Norton Twp.	111	Carl Goodwin and Sons
	U 61151 C5RN						
	U 63091 C1U	9	1.376	22 ft	M 24 BR from Huron St., Pontiac, northeast to Opdyke Rd.	111	Denton Construction Co.
	M 63091 C2R						
	M 63098 C1						
	I 73171 C2RN, C3RN	6	7.127	Dual	US 23 Relocation, north from 0.5 mi south of Genesee-Saginaw Co. line	112	Loselle Construction
	I 25022 C3RN, and						
	BIN 25-54 C3RO						
	BM 09101 C3R	6	5.795	Dual	M 20 Relocation, from old M 20 to Eight Mile Rd.	119	Hertel-Deyo Co.
	F 38061 C1R	8	3.120	Dual	M 60 Relocation, from old M 60 north to US 12	120	Denton Construction Co.
	BI 25032 C2RO	6	2.374	Dual	US 23 Relocation, from south of Beecher Rd. to north of Pasadena Ave.	123	Loselle Construction Co.
	M 41033 C1R	5	5.161	Dual	M 37 north from Alpine Church to north of Ballard's Corners etc.	125	Lewis and Frisling Co.
	F 41033 C2R						
	BI 39025 C2RN	7	3.283	Dual	US 12 Relocation, from 40th St. east to GTW RR	125	Sargent Construction Co.
	BI 13081 C1RN						
	BU 41131 C2UN	5	0.893	44 ft	Century Ave., Grand Rapids, from Burton St. to Hall St.	126	Hertel-Deyo Co.
	F 28091 C1R	3	3.573	22 ft	US 131 north from about 2 mi north of Manton, southbound lane and balance of northbound	131	Hertel-Deyo Co.
	F 83032 C1R						
	DU 61022 C1U, C2R	5	0.678	44 ft	M 46 from Getty St., Muskegon, to a point 251 ft east of east city limit	132	Hertel-Deyo Co.
U 39121 C2UN	7	2.421	24 ft	US 12 northwest to M 96 in Kalamazoo	135	Carl Goodwin and Sons	
M 39121 C3UN							
U 09042 C5U	6	1.103	48 ft	M 25 (Center St.) Bay City, east to 0.5 mi east of east city limit	140	W. F. McNally Co.	
M 09042 C6R							
U 70014 C1UN	5	0.211	Dual	US 31 Relocation, Grand Haven, from Jackson St. north to South Channel Bridge	154	L. W. Edison Co.	
M 67021 C1R	3	1.005	24 ft	US 10 Relocation, north and east of Reed City	155	Sargent Construction Co.	
M 67022 C4U, C5R							
WEIGHTED ARITHMETIC MEAN FOR 1958 CONSTRUCTION						115	
WEIGHTED ARITHMETIC MEAN FOR 1956-58 CONSTRUCTION REPORTED ABOVE						116	

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\* THESE CLASSIFICATIONS HAVE BEEN ARBITRARILY SELECTED ON THE BASIS OF RIDEABILITY BY THE ROUGHOMETER PERSONNEL

Figure 1. Comparison of roughness for annual concrete pavement construction.

TABLE 2

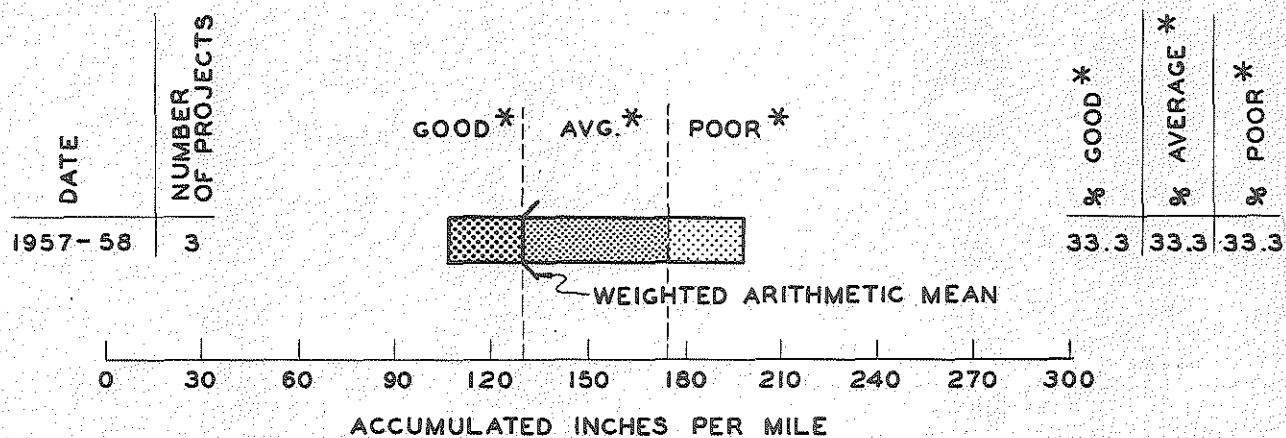
## SUMMARY OF ROUGHNESS DATA FOR CONCRETE PAVEMENT WIDENING

	Project Number	District	Test Length, Mi	Type	Route and Project Location	Accumulated Inches/Mile	PAVING CONTRACTOR
1957 CONSTR.	F 23042 C2R	7	3.965	Widening	M 43 from Grand Ledge to Canal Rd.	106	Denton Construction Co.
	WEIGHTED ARITHMETIC MEAN FOR 1957 WIDENING					106	
1958 CONSTRUCTION	F 04032 C2R	4	1.068	Widening	US 32 from Thunder Bay River in Alpena north to French Rd.	132	William H. Gilliland
	U 04032 C1U						
	M 06011 C1U	6	1.370	Widening	US 23-M 76 intersection in Standish	198	Lewis and Frisinger Co.
	M 06072 C1U						
WEIGHTED ARITHMETIC MEAN FOR 1958 WIDENING					169		
WEIGHTED ARITHMETIC MEAN FOR 1957-58 WIDENING					130		

TABLE 3

## SUMMARY OF ROUGHNESS DATA FOR BITUMINOUS CONCRETE PAVEMENT

	Project Number	District	Test Length, Mi	Type	Route and Project Location	Accumulated Inches/Mile	Contractor
1958 CONSTR.	BM 61074 C3RN BM 70016 C2RN	5	6.040	Dual	US 31 from Third St. in Ferrysburg north to Mile Rd.	81	Paul C. Miller



\* THESE CLASSIFICATIONS HAVE BEEN ARBITRARILY SELECTED ON THE BASIS OF RIDEABILITY BY THE ROUGHOMETER PERSONNEL

Figure 2. Comparison of roughness for annual concrete pavement widening.