

**PROFILOMETER MEASUREMENT OF BRIDGE ROUGHNESS**  
**Second Progress Report**

Research Laboratory Division  
Office of Testing and Research  
Research Project R-61 F-65  
Research Report No. R-430

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Michigan State Highway Department  
John C. Mackie, Commissioner  
Lansing, June 1963

PROFILOMETER MEASUREMENT OF BRIDGE ROUGHNESS  
Second Progress Report

This is the second progress report on profilometer measurement of the roughness of bridge decks. The first report (No. R-421) described the profilometer, the test procedure and analysis, and contained the results of the first group of measurements on 35 bridges. This report contains results on the measurement of 22 additional bridges, 12 of which were finished with a transverse finishing machine and 10 by hand finishing.

As mentioned in the first report, a tentative roughness classification for bridges has been established as follows:

<u>Good</u>	less than 100
<u>Average</u>	100-160
<u>Poor</u>	above 160

On the basis of this classification the 12 machine finished bridges separate as follows: 4 in good, 8 in average, and 0 in poor classifications, while the 10 hand finished bridges separate into 3, 7, and 0 in the same respective classifications. The 12 machine finished bridges represent a total of 96 bridge spans; 35, 57, and 4 fall into good, average, and poor classifications, respectively. For 10 hand finished bridges, a total of 78 spans, 26, 45, and 7 spans fall into the same respective classifications.

Explanation of Notation on Attached Data Sheets:

O. W. P. = Outer wheel path, I. W. P. = Inner wheel path.

PROFILOMETER BRIDGE ROUGHNESS MEASUREMENTS  
TEST RESULT TABULATION  
Research Project 61 F-65

Bridge Number S06 of 19022, Location I-96 over Grand River Form 511  
Dual Structures (separate for each roadway) Yes  No   
Single Structure Yes  No   
Number of Spans 4 Machine Finished Yes  No

E 3-14-63

W Bound Roadway DISTRICT 5 Date Measured W11/24/62

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O.W.P.	I.W.P.	O.W.P.	I.W.P.	
<u>W</u> Approach	100.0	92.1	123.0	99.3	106.1	104.5
Span 1	50.0	54.4	72.4	82.4	69.0	70.8
2	70.4	52.8	53.0	74.0	83.7	68.2
3	57.6	69.7	94.8	143.6	125.0	113.7
4	53.9	98.4	89.6	108.1	107.8	101.9
5						
6						
<u>E</u> Approach	100.0	99.0	117.2	156.1	193.2	147.8
Average	431.9	80.6	96.4	113.4	121.1	105.8

E Bound Roadway

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O.W.P.	I.W.P.	O.W.P.	I.W.P.	
<u>W</u> Approach	100.0	96.1	99.6	105.3	103.0	100.8
Span 1	54.1	67.0	73.2	80.0	66.4	71.2
2	57.3	56.2	88.4	106.9	99.6	87.5
3	70.5	60.6	92.9	74.5	84.8	77.9
4	50.0	76.6	81.8	63.8	81.8	76.0
5						
6						
<u>E</u> Approach	100.0	76.6	79.7	58.9	72.6	71.8
Average	431.9	74.6	87.0	81.8	85.4	82.2

Remarks Joints and spans numbered from west to east.

Joint #1, 2 and 3 - expansion; #4 - construction; #5 - expansion; #6 - steel expansion  
#7 - expansion; #8 - construction; #9, 10 and 11 - expansion.

Concrete approaches.

Revised 4-24-63 to include E.B. Roadway.

PROFILOMETER BRIDGE ROUGHNESS MEASUREMENTS  
TEST RESULT TABULATION  
Research Project 61 F-65

Form 511

Bridge Number X01 of 25131, Location I 75 over C & O RR  
 Dual Structures (separate for each roadway) Yes  No   
 Single Structure Yes  No   
 Number of Spans 3 Machine Finished Yes  No

N Bound Roadway DISTRICT 5 Date Measured 5-7-63

Item	Length	Profilometer Roughness Value - R inches per mile						
		Traffic Lane		Passing Lane		Center Lane		Avg.
		O.W.P.	I.W.P.	O.W.P.	I.W.P.	O.W.P.	I.W.P.	
<u>S</u> Approach	100.0	86.8	74.0	81.8	82.4	82.4	94.0	83.4
Span 1	74.3	100.9	78.9	106.6	106.2	100.6	108.4	100.2
2	90.0	116.2	123.8	94.8	84.2	123.2	113.8	109.1
3	65.4	96.5	91.6	115.4	66.2	84.8	88.0	90.4
4								
5								
6								
<u>N</u> Approach	100.0	77.4	109.6	117.0	123.3	105.8	104.0	106.1
Average	429.7	94.7	96.2	102.1	94.0	100.0	102.0	98.2

S Bound Roadway

Item	Length	Profilometer Roughness Value - R inches per mile						
		Traffic Lane		Passing Lane		Center Lane		Avg.
		O.W.P.	I.W.P.	O.W.P.	I.W.P.	O.W.P.	I.W.P.	
<u>S</u> Approach	100.0	126.2	103.8	122.8	115.9	139.1	160.0	127.8
Span 1	74.3	114.8	108.8	85.6	95.2	85.3	84.2	95.9
2	90.0	98.0	98.9	118.5	114.2	91.5	108.6	105.0
3	65.4	67.0	73.5	79.5	75.9	80.3	72.2	75.1
4								
5								
6								
<u>N</u> Approach	100.0	144.2	116.4	110.6	141.0	108.5	99.5	119.9
Average	429.7	113.5	102.0	106.0	111.7	103.8	108.7	107.7

Remarks Joints and spans numbered from south to north. Joint #1, 2, & 3 - Expansion;  
#4 - Construction; #5 - Steel Expansion; #6 - Expansion; #7 - Construction #8, 9, & 10 - Expansion.  
Concrete approaches.

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PROFILOMETER BRIDGE ROUGHNESS MEASUREMENTS

TEST RESULT TABULATION

Research Project 61 F-65

Bridge Number S07 of 25131, Location Grand Blanc Road over I 75 Form 511

Dual Structures (separate for each roadway) Yes  No

Single Structure Yes  No

Number of Spans 4 Machine Finished Yes  No

W Bound Roadway DISTRICT 5 Date Measured 5-7-63

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O. W. P.	I. W. P.	O. W. P.	I. W. P.	
<u>W</u> Approach	100.0	150.8	162.6			156.8
Span 1	44.6	91.2	116.6			104.2
2	109.8	99.6	100.8			100.0
3	109.7	109.0	116.7			112.6
4	45.7	141.5	139.8			141.0
5						
6						
<u>E</u> Approach	100.0	136.5	138.6			137.3
Average	509.8	122.0	128.7			125.4

E Bound Roadway

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O. W. P.	I. W. P.	O. W. P.	I. W. P.	
<u>W</u> Approach	100.0	125.2	172.1			148.9
Span 1	44.6	148.0	119.6			133.8
2	109.8	104.8	103.2			103.9
3	109.7	116.0	123.7			119.8
4	45.7	100.0	91.3			95.9
5						
6						
<u>E</u> Approach	100.0	101.6	139.6			120.4
Average	509.8	114.0	128.7			121.3

Remarks Joints and spans numbered from west to east. Joint #1, 2, 3, - Expansion;  
#4 - Construction; #5 - Steel Expansion; #6 - Expansion; #7 - Steel Expansion; #8 - Construction;  
#9, 10, 11 - Expansion.

Concrete approaches.

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PROFILOMETER BRIDGE ROUGHNESS MEASUREMENTS  
TEST RESULT TABULATION  
Research Project 61 F-65

Form 511

Bridge Number S01 of 23151, Location Crietz Road over EB I 96

Dual Structures (separate for each roadway) Yes  No

Single Structure Yes  No

Number of Spans 3 Machine Finished Yes  No

N Bound Roadway

DISTRICT 8

Date Measured 3-15-63

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O. W. P.	I. W. P.	O. W. P.	I. W. P.	
Approach						
Span 1	68.5	117.7	119.6			118.6
2	72.3	117.9	119.0			118.3
3	71.0	118.1	97.3			107.7
4						
5						
6						
Approach						
Average		118.0	112.3			115.1

S Bound Roadway

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O. W. P.	I. W. P.	O. W. P.	I. W. P.	
Approach						
Span 1	68.5	128.1	103.4			115.5
2	72.3	179.6	91.3			135.8
3	71.0	96.9	91.0			94.2
4						
5						
6						
Approach						
Average		138.1	95.0			116.4

Remarks Joints and spans numbered from south to north. Joint #1 - Construction; #2 - Expansion; #3 - Steel Expansion; #4 - Construction.

Approaches too rough to run - tar and chip.

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PROFILOMETER BRIDGE ROUGHNESS MEASUREMENTS  
TEST RESULT TABULATION  
Research Project 61 F-65

Form 511

Bridge Number S02 of 23151, Location Crietz Road over WB I 96

Dual Structures (separate for each roadway) Yes  No

Single Structure Yes  No

Number of Spans 3 Machine Finished Yes  No

N Bound Roadway

DISTRICT 8

Date Measured 3-15-63

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O. W. P.	I. W. P.	O. W. P.	I. W. P.	
Approach						
Span 1	82.7	136.9	142.4			139.8
2	80.0	160.4	97.7			129.4
3	69.5	148.7	134.9			141.6
4						
5						
6						
Approach						
Average	232.2	149.1	123.4			136.1

S Bound Roadway

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O. W. P.	I. W. P.	O. W. P.	I. W. P.	
Approach						
Span 1	82.7	159.8	144.7			152.3
2	80.0	138.0	122.8			130.7
3	69.5	110.7	120.2			115.1
4						
5						
6						
Approach						
Average	232.2	134.8	128.0			131.4

Remarks Joints and spans numbered from south to north. Joint #1 - Construction; #2 - Steel Expansion; #3 - Expansion #4 - Construction.

Approaches too rough to run - tar and chip.

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PROFILOMETER BRIDGE ROUGHNESS MEASUREMENTS  
TEST RESULT TABULATION  
Research Project 61 F-65

Form 511

Bridge Number S05 of 23152, Location Mt Hope over I 96  
Dual Structures (separate for each roadway) Yes  No   
Single Structure Yes  No   
Number of Spans 4 Machine Finished Yes  No

W Bound Roadway

DISTRICT 8

Date Measured 3-14-63

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O. W. P.	I. W. P.	O. W. P.	I. W. P.	
<u>W</u> Approach	50.0	223.4	147.8			185.9
Span 1	36.8	95.4	86.8			91.8
2	71.9	76.0	62.4			69.0
3	71.9	79.7	74.9			77.1
4	36.8	165.0	152.8			159.3
5						
6						
<u>E</u> Approach	50.0	198.6	159.0			178.5
Average		132.0	107.2			119.6

E Bound Roadway

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O. W. P.	I. W. P.	O. W. P.	I. W. P.	
<u>W</u> Approach	50.0	144.6	88.7			116.2
Span 1	36.8	73.2	57.4			66.0
2	71.9	56.6	65.4			61.0
3	71.9	96.2	80.8			88.1
4	36.8	200.2	142.0			170.7
5						
6						
<u>E</u> Approach	50.0	111.4	63.4			87.6
Average		106.6	80.2			93.4

Remarks Joints and spans numbered from West to East. Joint #1 - Construction; #2 - #3- #4 - Expansion; #5 - Construction.

Bituminous approaches.

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PROFILOMETER BRIDGE ROUGHNESS MEASUREMENTS  
TEST RESULT TABULATION  
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Form 511

Bridge Number S06 of 23152, Location Millet Road over I 96

Dual Structures (separate for each roadway) Yes  No

Single Structure Yes  No

Number of Spans 4 Machine Finished Yes  No

W Bound Roadway

DISTRICT 8

Date Measured 3-16-63

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O. W. P.	I. W. P.	O. W. P.	I. W. P.	
Approach						
Span 1	35.0	212.9	198.0			204.4
2	71.0	181.1	172.9			177.0
3	71.0	137.6	125.6			131.6
4	38.1	145.7	100.3			123.0
5						
6						
Approach						
Average		164.2	148.5			156.2

E Bound Roadway

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O. W. P.	I. W. P.	O. W. P.	I. W. P.	
Approach						
Span 1	35.0	174.6	198.0			187.4
2	71.0	136.8	148.0			142.8
3	71.0	145.0	110.4			127.9
4	38.1	112.6	107.0			109.8
5						
6						
Approach						
Average		141.2	134.8			138.0

Remarks Joints and spans numbered from West to East. Joint #1 - Construction, #2, 3, & 4 - Expansion; #5 - Construction.

Approaches tar and chip - too rough to run.

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PROFILOMETER BRIDGE ROUGHNESS MEASUREMENTS  
TEST RESULT TABULATION  
Research Project 61 F-65

Form 511

Bridge Number S05 of 33084, Location College Rd. over I 96  
 Dual Structures (separate for each roadway) Yes  No   
 Single Structure Yes  No   
 Number of Spans 4 Machine Finished Yes  No

S Bound Roadway

DISTRICT 8

Date Measured 4-6-63

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O.W.P.	I.W.P.	O.W.P.	I.W.P.	
<u>S</u> Approach	50.0	150.5	115.1			133.1
Span 1	36.3	124.4	157.1			141.1
2	70.4	101.3	86.3			93.8
3	70.4	120.8	117.4			119.2
4	36.1	138.2	109.0			122.9
5						
6						
<u>N</u> Approach	50.0	156.8	138.8			147.8
Average	313.2	129.3	117.1			123.2

N Bound Roadway

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O.W.P.	I.W.P.	O.W.P.	I.W.P.	
<u>S</u> Approach	50.0	144.7	124.1			134.1
Span 1	36.3	234.2	181.8			208.0
2	70.4	133.5	72.0			102.8
3	70.4	111.0	81.4			96.0
4	36.1	122.1	102.4			112.6
5						
6						
<u>N</u> Approach	50.0	166.3	137.2			152.1
Average	313.2	145.8	109.1			127.4

Remarks Joints and spans numbered from south to north. Joint #1 - construction;  
#2, 3, and 4 - expansion; #5 - construction.

Bituminous approaches.

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PROFILOMETER BRIDGE ROUGHNESS MEASUREMENTS  
TEST RESULT TABULATION  
Research Project 61 F-65

Form 511

Bridge Number S06 of 33084, Location Phillips Road over I 96

Dual Structures (separate for each roadway) Yes  No

Single Structure Yes  No

Number of Spans 4 Machine Finished Yes  No

N Bound Roadway

DISTRICT 8

Date Measured 4-6-63

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O.W.P.	I.W.P.	O.W.P.	I.W.P.	
<u>S</u> Approach	50.0	148.4	164.8			156.3
Span 1	38.5	122.8	161.2			142.6
2	71.9	69.4	80.4			74.9
3	71.8	91.6	91.2			91.2
4	36.1	142.6	130.2			136.0
5						
6						
<u>N</u> Approach	50.0	172.6	141.0			156.3
Average	318.3	117.8	121.0			119.4

S Bound Roadway

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O.W.P.	I.W.P.	O.W.P.	I.W.P.	
<u>S</u> Approach	50.0	182.7	158.9			171.1
Span 1	38.5	152.2	135.8			148.1
2	71.9	90.0	69.8			80.8
3	71.8	82.0	86.8			85.3
4	36.1	149.2	173.3			160.9
5						
6						
<u>N</u> Approach	50.0	172.1	202.2			185.9
Average	318.3	129.9	128.2			130.1

Remarks Joints and spans numbered from south to north. Joint #1 - Construction; #2, 3, & #4 - Expansion; #5 - Construction.

Bituminous approaches.

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PROFILOMETER BRIDGE ROUGHNESS MEASUREMENTS  
TEST RESULT TABULATION  
Research Project 61 F-65

Form 511

Bridge Number S09 of 33084, Location Meridian Road over I 96

Dual Structures (separate for each roadway) Yes  No

Single Structure Yes  No

Number of Spans 4 Machine Finished Yes  No

S Bound Roadway

DISTRICT 8

Date Measured 4-2-63

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O.W.P.	I.W.P.	O.W.P.	I.W.P.	
<u>S</u> Approach	50.0	164.7	154.7			159.5
Span 1	36.5	146.8	161.3			153.3
2	73.7	149.4	121.1			135.4
3	73.7	86.7	80.6			82.8
4	36.4	107.3	136.4			121.8
5						
6						
<u>N</u> Approach	50.0	183.8	213.4			198.5
Average	320.3	137.6	137.7			137.6

N Bound Roadway

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O.W.P.	I.W.P.	O.W.P.	I.W.P.	
<u>S</u> Approach	50.0	79.8	97.2			88.7
Span 1	36.5	102.0	109.9			105.6
2	73.7	97.0	111.4			104.6
3	73.7	79.2	82.4			81.0
4	36.4	142.2	129.8			136.3
5						
6						
<u>N</u> Approach	50.0	164.7	174.8			170.0
Average	320.3	106.4	114.2			110.4

Remarks Joints numbered from south to north. Joint #1 - Construction; #2, 3, & 4 - Expansion; #5 - Construction.

Bituminous approaches.

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PROFILOMETER BRIDGE ROUGHNESS MEASUREMENTS

TEST RESULT TABULATION

Research Project 61 F-65

Form 511

Bridge Number S12 of 33084, Location Williamston Road over I 96

Dual Structures (separate for each roadway) Yes  No

Single Structure Yes  No

Number of Spans 6 Machine Finished Yes  No

S Bound Roadway

DISTRICT 8

Date Measured 4-1-63

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O. W. P.	I. W. P.	O. W. P.	I. W. P.	
<u>S</u> Approach	50	191.6	171.6			181.6
Span 1	35.5	154.6	142.8			148.7
2	68.5	87.1	72.0			79.4
3	66.0	70.4	64.4			67.2
4	66.0	59.2	62.0			60.8
5	68.5	72.8	71.0			71.7
6	35.5	125.0	76.6			101.1
<u>N</u> Approach	50	231.8	157.8			194.3
Average		115.0	96.4			105.7

N Bound Roadway

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O. W. P.	I. W. P.	O. W. P.	I. W. P.	
<u>S</u> Approach	50.0	119.8	86.0			103.5
Span 1	35.5	104.1	106.8			105.6
2	68.5	52.0	61.6			57.0
3	66.0	59.6	66.4			63.2
4	66.0	61.6	51.2			56.0
5	68.5	73.2	111.0			92.5
6	35.5	162.2	89.2			124.9
<u>N</u> Approach	50.0	147.3	156.8			152.1
Average		89.5	87.9			88.7

Remarks Joint #1 - Construction #2, 3, 4, 5, & 6 - Expansion; #7 - Construction.

Joints and spans numbered from south to north.

Bituminous approaches.

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PROFILOMETER BRIDGE ROUGHNESS MEASUREMENTS  
 TEST RESULT TABULATION  
 Research Project 61 F-65

Form 511

Bridge Number S13 of 33084, Location Dietz Road over I 36  
 Dual Structures (separate for each roadway) Yes  No   
 Single Structure Yes  No   
 Number of Spans 4 Machine Finished Yes  No

S Bound Roadway

DISTRICT 8

Date Measured 3-28-63

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O.W.P.	I.W.P.	O.W.P.	I.W.P.	
<u>S</u> Approach						
Span 1	35.5	81.4	94.4			87.7
2	70.6	58.7	63.6			61.0
3	70.6	62.6	89.2			75.9
4	35.5	46.4	87.1			66.8
5						
6						
<u>N</u> Approach						
Average	212.2	61.5	80.2			70.9

N Bound Roadway

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O.W.P.	I.W.P.	O.W.P.	I.W.P.	
<u>S</u> Approach						
Span 1	35.5	58.4	72.6			65.8
2	70.6	78.4	86.0			81.9
3	70.6	73.8	92.9			83.4
4	35.5	65.2	62.1			63.6
5						
6						
<u>N</u> Approach						
Average	212.2	72.3	83.6			77.9

Remarks Joints and spans numbered from south to north. Joint #1 - Construction; #2, 3, & 4 - Expansion; #5 - Construction.

No approaches run.

Report No. 2 - June, 1963

PROFILOMETER BRIDGE ROUGHNESS MEASUREMENTS  
TEST RESULT TABULATION  
Research Project 61 F-65

Form 511

Bridge Number S04 of 33085, Location Wallace Road over I 96  
 Dual Structures (separate for each roadway) Yes  No   
 Single Structure Yes  No   
 Number of Spans 6 Machine Finished Yes  No

S Bound Roadway

DISTRICT 8

Date Measured 4-5-63

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O.W.P.	I.W.P.	O.W.P.	I.W.P.	
<u>S</u> Approach						
Span 1	35.6	90.5	135.7			113.1
2	59.0	114.6	102.4			108.3
3	64.7	63.6	80.0			71.8
4	65.0	67.8	72.6			69.8
5	59.9	83.8	93.0			88.2
6	35.6	154.2	146.8			147.1
<u>N</u> Approach						
Average	319.8	90.7	98.8			94.7

N Bound Roadway

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O.W.P.	I.W.P.	O.W.P.	I.W.P.	
<u>S</u> Approach						
Span 1	35.6	125.4	150.8			139.0
2	59.0	95.3	77.4			85.9
3	64.7	103.2	66.5			84.9
4	65.0	106.8	64.6			86.1
5	59.9	104.9	88.6			97.0
6	35.6	140.2	192.8			166.4
<u>N</u> Approach						
Average	319.8	109.4	96.0			102.7

Remarks Joints and spans numbered from south to north. Joint #1 - Construction; #2 -  
3, 4, 5, & 6 - Expansion.

Approaches - tar and chip, too rough to read.

Report No. 2 - June, 1963

PROFILOMETER BRIDGE ROUGHNESS MEASUREMENTS  
TEST RESULT TABULATION  
Research Project 61 F-65

Form 511

Bridge Number S04 of 47013, Location Lee Road over US 23  
Dual Structures (separate for each roadway) Yes  No   
Single Structure Yes  No   
Number of Spans 4 Machine Finished Yes  No

E Bound Roadway

DISTRICT 8

Date Measured 4-11-63

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O. W. P.	I. W. P.	O. W. P.	I. W. P.	
<u>W</u> Approach	50.0	121.0	127.8			124.6
Span 1	39.0	138.8	149.6			143.5
2	70.0	147.8	113.9			131.2
3	77.0	134.0	142.0			137.8
4	38.8	236.1	154.4			196.0
5						
6						
<u>E</u> Approach	50.0	173.2	139.9			156.3
Average	324.8	153.8	135.8			144.9

W Bound Roadway

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O. W. P.	I. W. P.	O. W. P.	I. W. P.	
<u>W</u> Approach	50.0	117.8	167.4			142.6
Span 1	39.0	127.2	152.3			139.4
2	70.0	152.4	162.2			156.9
3	77.0	112.4	132.0			122.1
4	38.8	139.5	119.1			129.3
5						
6						
<u>E</u> Approach	50.0	165.2	81.8			123.6
Average	324.8	135.0	137.2			136.1

Remarks Joints and spans numbered from west to east. Joint # 1 - Construction; #2 - Expansion; #3 - Steel Expansion; #4 - Expansion; #5 - Construction.

Bituminous approaches.

Report No. 2 - June, 1963



PROFILOMETER BRIDGE ROUGHNESS MEASUREMENTS  
TEST RESULT TABULATION  
Research Project 61 F-65

Form 511

Bridge Number S01 of 47014, Location Spencer Road over US 23  
Dual Structures (separate for each roadway) Yes  No   
Single Structure Yes  No   
Number of Spans 4 Machine Finished Yes  No

E Bound Roadway

DISTRICT 8

Date Measured 4-6-63

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O. W. P.	I. W. P.	O. W. P.	I. W. P.	
<u>W</u> Approach	50.0	145.2	146.8			145.7
Span 1	51.0	92.6	83.4			88.0
2	76.4	191.4	132.4			161.7
3	75.2	160.4	128.5			144.6
4	35.7	157.6	116.8			137.5
5						
6						
<u>E</u> Approach	50.0	154.7	141.5			147.8
Average	338.3	153.8	125.9			139.8

W Bound Roadway

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O. W. P.	I. W. P.	O. W. P.	I. W. P.	
<u>W</u> Approach	50.0	113.6	136.8			124.6
Span 1	51.0	118.0	105.6			111.8
2	76.4	139.6	125.1			132.7
3	75.2	134.1	104.6			119.4
4	35.7	112.4	130.2			121.3
5						
6						
<u>E</u> Approach	50.0	145.7	155.2			150.0
Average	338.3	129.3	124.3			126.7

Remarks Joints and spans numbered from west to east. Joint #1 - Construction; #2 - Expansion; #3 - steel Expansion; #4 - Expansion; #5 - Construction.

Bituminous approaches.

Report No. 2 - June, 1963

PROFILOMETER BRIDGE ROUGHNESS MEASUREMENTS  
TEST RESULT TABULATION  
Research Project 61 F-65

Form 511

Bridge Number S02 of 47065, Location M 59 over I 96

Dual Structures (separate for each roadway) Yes  No

Single Structure Yes  No

Number of Spans 4 Machine Finished Yes  No

N Bound Roadway

DISTRICT 8

Date Measured 4-16-63

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O.W.P.	I.W.P.	O.W.P.	I.W.P.	
<u>S</u> Approach	100.0	110.6	96.1			103.5
Span 1	38.5	145.4	105.6			126.2
2	80.2	127.4	99.1			113.2
3	81.6	133.0	97.7			115.2
4	50.8	117.0	79.6			97.7
5						
6						
<u>N</u> Approach	100.0	95.0	96.1			95.6
Average	451.1	117.8	95.8			106.8

S Bound Roadway

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O.W.P.	I.W.P.	O.W.P.	I.W.P.	
<u>S</u> Approach	100.0	120.9	132.8			126.7
Span 1	38.5	186.5	196.1			192.0
2	80.2	126.1	95.5			110.6
3	81.6	96.1	93.5			94.5
4	50.8	117.5	113.8			115.4
5						
6						
<u>N</u> Approach	100.0	100.6	93.2			97.2
Average	451.1	118.0	113.5			115.7

Remarks Joints and spans numbered from south to north. Joint #1, 2, & 3 - Expansion; #4 - Construction; #5 - Expansion; #6 - Steel Expansion; #7 - Expansion; #8 - Construction; #9, 10, & 11 - Expansion.

Concrete approaches.

Report No. 2 - June, 1963

PROFILOMETER BRIDGE ROUGHNESS MEASUREMENTS  
TEST RESULT TABULATION  
Research Project 61 F-65

Form 511

Bridge Number X03 of 47065, Location I 96 over C & O RR

Dual Structures (separate for each roadway) Yes  No

Single Structure Yes  No

Number of Spans 3 Machine Finished Yes  No

W Bound Roadway

DISTRICT 8

Date Measured 4-25-63

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O. W. P.	I. W. P.	O. W. P.	I. W. P.	
<u>W</u> Approach	100.0	98.5	77.4	66.0	51.7	73.4
Span 1	65.2	96.0	125.9	94.0	85.0	100.4
2	64.2	125.8	148.0	93.4	85.5	113.5
3	65.2	153.1	115.4	96.0	97.2	115.0
4						
5						
6						
<u>E</u> Approach	100.0	91.9	72.4	58.9	90.6	78.1
Average	394.6	109.8	101.9	78.2	80.0	92.5

E Bound Roadway

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O. W. P.	I. W. P.	O. W. P.	I. W. P.	
<u>W</u> Approach	100.0	82.9	72.0	57.8	71.3	70.8
Span 1	68.2	80.9	99.4	132.4	133.2	111.5
2	67.3	160.4	143.2	184.8	175.3	166.3
3	67.3	102.0	134.5	134.2	135.7	126.3
4						
5						
6						
<u>E</u> Approach	100.0	73.6	77.1	96.1	81.3	81.8
Average	402.8	96.4	100.2	114.0	112.4	105.8

Remarks Joints and spans numbered from west to east. Joints #1, 2, & 3 - Expansion; #4 - Construction; #5 - Steel Expansion; #6 - Expansion; #7 - Construction; #8, 9, & 10 - Expansion.

Concrete Approaches.

Report No. 2 - June, 1963

PROFILOMETER BRIDGE ROUGHNESS MEASUREMENTS  
TEST RESULT TABULATION  
Research Project 61 F-65

Form 511

Bridge Number S09 of 47065, Location Dorr Rd. over I 96  
 Dual Structures (separate for each roadway) Yes  No   
 Single Structure Yes  No   
 Number of Spans 4 Machine Finished Yes  No

S Bound Roadway

DISTRICT 8

Date Measured 4-15-63

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O.W.P.	I.W.P.	O.W.P.	I.W.P.	
Approach						
Span 1	40.7	124.2	136.3			131.1
2	91.6	118.4	133.7			126.2
3	90.4	132.6	119.2			126.2
4	40.8	131.6	103.2			117.0
5						
6						
Approach						
Average	263.5	125.8	124.6			125.2

N Bound Roadway

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O.W.P.	I.W.P.	O.W.P.	I.W.P.	
Approach						
Span 1	40.7	133.8	90.6			112.2
2	91.6	110.4	86.2			98.0
3	90.4	113.0	97.6			105.1
4	40.8	141.0	95.4			118.7
5						
6						
Approach						
Average	263.5	118.0	92.0			104.9

Remarks Joints and spans numbered from south to north. Joint #1 - expansion;  
#2 - steel expansion; #3 - expansion;  
Gravel approaches not run.

Report No. 2 - June, 1963

PROFILOMETER BRIDGE ROUGHNESS MEASUREMENTS  
TEST RESULT TABULATION  
Research Project 61 F-65

Form 511

Bridge Number S02 of 47066, Location Nicholson Road over I 96

Dual Structures (separate for each roadway) Yes  No

Single Structure Yes  No

Number of Spans 4 Machine Finished Yes  No

S Bound Roadway

DISTRICT 8

Date Measured 4-5-63

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O. W. P.	I. W. P.	O. W. P.	I. W. P.	
<u>S</u> Approach	50.0	194.3	126.2			160.5
Span 1	39.5	81.6	120.3			101.6
2	78.0	62.0	62.6			62.3
3	76.8	79.8	88.7			83.9
4	39.5	87.6	86.2			86.9
5						
6						
<u>N</u> Approach	50.0	140.4	202.8			171.1
Average	333.8	103.0	108.8			105.8

N Bound Roadway

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O. W. P.	I. W. P.	O. W. P.	I. W. P.	
<u>S</u> Approach	50.0	141.0	104.6			122.5
Span 1	39.5	77.5	114.2			96.2
2	78.0	57.2	68.4			63.0
3	76.8	81.1	89.8			85.2
4	39.5	74.8	80.2			77.5
5						
6						
<u>N</u> Approach	50.0	207.5	207.5			207.0
Average	333.8	102.2	106.4			104.4

Remarks Joints and spans numbered from south to north. Joints #1 - Construction; #2 - Expansion; #3 - Steel Expansion; #4 - Expansion; #5 - Construction.

Bituminous approaches.

Report No. 2 - June, 1963

PROFILOMETER BRIDGE ROUGHNESS MEASUREMENTS

TEST RESULT TABULATION

Research Project 61 F-65

Bridge Number S04 of 47066, Location Fowlerville Road over I 96 Form 511

Dual Structures (separate for each roadway) Yes  No

Single Structure Yes  No

Number of Spans 4 Machine Finished Yes  No

N Bound Roadway

DISTRICT 8

Date Measured 4-16-63

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O. W. P.	I. W. P.	O. W. P.	I. W. P.	
<u>S</u> Approach	50.0	154.7	126.7			140.4
Span 1	36.7	119.4	87.0			103.6
2	81.5	116.6	105.9			111.4
3	82.8	108.4	110.6			109.7
4	36.6	139.2	108.2			124.1
5						
6						
<u>N</u> Approach	50.0	176.9	146.2			161.6
Average	337.6	131.9	114.4			123.1

S Bound Roadway

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O. W. P.	I. W. P.	O. W. P.	I. W. P.	
<u>S</u> Approach	50.0	119.3	112.4			116.2
Span 1	36.7	143.2	106.4			125.2
2	81.5	91.3	75.4			83.6
3	82.8	120.2	137.4			128.8
4	36.6	162.3	142.8			152.9
5						
6						
<u>N</u> Approach	50.0	144.2	92.4			118.3
Average	337.6	123.8	109.3			116.5

Remarks Joints and spans numbered from south to north. Joint #1 - Construction;  
#2 - Expansion; #3 - Steel Expansion; #4 - Expansion; #5 - Construction.

Bituminous approaches.

Report #2 - June 1963

PROFILOMETER BRIDGE ROUGHNESS MEASUREMENTS  
 TEST RESULT TABULATION  
 Research Project 61 F-65

Bridge Number X01 of 81074, Location US 23 over Huron River & NYC RR Form 511

Dual Structures (separate for each roadway) Yes  No

Single Structure Yes  No

Number of Spans 5 Machine Finished Yes  No

S: 3-30-63

N Bound Roadway

DISTRICT 8

Date Measured N: 4-2-63

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O.W.P.	I.W.P.	O.W.P.	I.W.P.	
<u>S</u> Approach	100.0	133.3	117.0	125.9	117.8	123.6
Span 1	79.6	162.8	133.6	158.2	183.0	159.2
2	89.2	161.0	117.2	122.2	142.4	135.5
3	106.0	107.6	92.4	121.5	112.1	108.6
4	109.0	95.0	87.0	85.8	102.7	92.5
5	89.1	186.1	130.4	107.8	156.2	145.2
6						
<u>N</u> Approach	100.0	110.1	142.0	119.8	156.0	132.0
Average	672.9	133.8	115.8	118.8	136.4	126.1

S Bound Roadway

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O.W.P.	I.W.P.	O.W.P.	I.W.P.	
<u>S</u> Approach	100.0	134.4	133.6	110.9	120.4	124.6
Span 1	79.7	138.2	134.2	96.4	142.8	127.9
2	89.0	134.1	103.5	136.5	127.6	125.2
3	108.5	119.2	111.6	108.2	114.4	113.4
4	107.0	113.2	119.4	134.4	139.6	126.8
5	89.3	140.7	154.6	175.3	158.2	157.3
6						
<u>N</u> Approach	100.0	100.4	126.0	109.6	118.0	111.9
Average	673.5	124.8	125.6	124.2	130.8	126.3

Remarks Spans and joints numbered from south to north. Joint #1 & 2 - Expansion; # 3 - Construction; #4 - Expansion; #5 - Steel Expansion; #6 - Plane of weakness; #7 - Steel Expansion; #8 - Construction; #9 & 10 - Expansion. Concrete approaches.

PROFILOMETER BRIDGE ROUGHNESS MEASUREMENTS  
TEST RESULT TABULATION  
Research Project 61 F-65

Form 511

Bridge Number S10 of 63173, Location I 75 NB over US 10  
 Dual Structures (separate for each roadway) Yes  No   
 Single Structure Yes  No   
 Number of Spans 4 Machine Finished Yes  No

N Bound Roadway

DISTRICT 9

Date Measured 5-7-68

Item	Length	Profilometer Roughness Value - R inches per mile						Avg.
		Traffic Lane		Passing Lane		Center Lane		
		O. W. P.	I. W. P.	O. W. P.	I. W. P.	O. W. P.	I. W. P.	
<u>S</u> Approach	100.0	74.7	64.4	112.5	88.7	97.7	84.5	87.1
Span 1	52.8	146.0	109.0	152.0	127.5	108.5	190.0	139.0
2	91.6	128.0	75.0	130.2	142.1	95.1	109.8	113.6
3	84.6	139.2	137.3	118.2	142.3	124.2	146.6	134.8
4	71.2	148.7	148.3	103.4	105.7	132.4	130.2	128.3
5								
6								
<u>N</u> Approach	100.0	82.4	88.2	131.2	109.3	102.2	100.3	102.4
Average	500.2	115.0	100.1	123.4	118.2	108.7	120.5	113.4

       Bound Roadway

Item	Length	Profilometer Roughness Value - R inches per mile				Average
		Traffic Lane		Passing Lane		
		O. W. P.	I. W. P.	O. W. P.	I. W. P.	
<u>      </u> Approach						
Span 1						
2						
3						
4						
5						
6						
<u>      </u> Approach						
Average						

Remarks Joints and spans numbered from south to north. Joint #1, 2, & 3 - Expansion;  
#4 - Construction; #5 - Steel Expansion; #6 - Expansion; #7 - Steel Expansion; #8 -  
Construction; #9, 10, & 11 - Expansion.

No joints at intersection of Span 1 and 2 or at intersection of Span 3 and 4.

Concrete approaches.

Report No. 2 - June, 1963