EVALUATION OF THE SHRP MODIFIED GEORGIA DIGITAL FAULTMETER

FINAL REPORT
FOR
MLR-93-1

APRIL 1993

Highway Division

Iowa Department of Transportation

Evaluation of the SHRP Modified Georgia Digital Faultmeter

Final Report
MLR-93-1

By

Kevin Jones
Special Investigations Engineer
515-239-1232
Office of Materials
Highway Division
Iowa Department of Transportation

April 1993

TECHNICAL REPORT TITLE PAGE

1. REPORT NO.	2. REPORT DATE
MLR-93-1	April 1993
3. TITLE AND SUBTITLE	**4. TYPE OF REPORT & PERIOD COVERED**
Evaluation of the SHRP Modified Georgia Digital Faultmeter	Final report, 4-93
5. AUTHOR(S)	**6. PERFORMING ORGANIZATION ADDRESS**
Kevin Jones Special Investigations Engineer	Iowa Department of Transportation Materials Department 800 Lincoln Way Ames, Iowa 50010

7. ACKNOWLEDGEMENT OF COOPERATING ORGANIZATIONS

8. ABSTRACT

The SHRP Modified Georgia Digital Faultmeter was loaned to the Iowa DOT in January 1993 for evaluation. A study was undertaken comparing the faultmeter to Iowa's current method of fault measurement.

The following conclusions were made after comparing the faultmeter to Iowa's gauge:

- The faultmeter was lighter and easier to maneuver and position.
- The faultmeter's direct readout was quicker to read.
- The faultmeter has increased precision.
- The faultmeter gave consistently lower fault readings than the Iowa gauge.

9. KEY WORDS	10. NO. OF PAGES
SHRP Modified Georgia Digital Faultmeter	5

TABLE OF CONTENTS

DISCLAIMER

INTRODUCTION

The SHRP Modified Georgia Digital Faultmeter was loaned to the Iowa DOT in January 1993 for evaluation. Iowa has many miles of jointed PCC pavement with no load transfer dowels. Fault measurements have been a part of Iowa's distress surveys since 1982.

Iowa uses a 4-foot straight edge for both rut depth and faulting measurements. The gauge is placed parallel to the roadway 1 foot in from the edge of pavement at the joint. Readings are rounded to the nearest 0.05 inches. Ten readings on each side of 2-lane roadways are taken in a 1/2-mile sample area.

EVALUATION DESCRIPTION

Twelve sample sections with average faulting varying from 0.06 to 0.20 inches were selected for the evaluation. The sections had been surveyed in December 1991 and January 1992 as part of the biennial distress survey.

The evaluation was conducted on February 9, 1993. Both the faultmeter and the rut depth gauge were operated by the same person. That person was instructed to make no effort to get the same answer for both gauges. He was instructed to place each gauge 1 foot from the edge of the slab and take a reading.

RESULTS

Table I is the summary test results for both gauges. Table II shows the individual readings for both gauges. Figure I shows the distribution and best fit line for the individual readings.

There was a slight bias in the data. The faultmeter gave consistently lower readings than the rut depth gauge. The rounding for the rut depth gauge would not account for the amount of bias. It appears that the support for the gauges on the high side of the slab may account for the difference. The rut depth gauge would be supported on the high points within the 2-foot distance back from the joint. The faultmeter is supported on four 2-inch wide feet at set locations behind the joint.

SUMMARY AND CONCLUSIONS

The SHRP Modified Georgia Digital Faultmeter out performed the Iowa rut depth gauge in about every aspect. The following are the advantages of the faultmeter:

- lighter and easier to maneuver and position
- direct readout quicker to read
- increase precision

The only disadvantage noted was the occasional negative readings when the leave slab was higher.

Based on the results of this evaluation, Iowa will likely build 2-3 of these gauges for use.

TABLE I SUMMARY OF FAULTING MEASUREMENTS

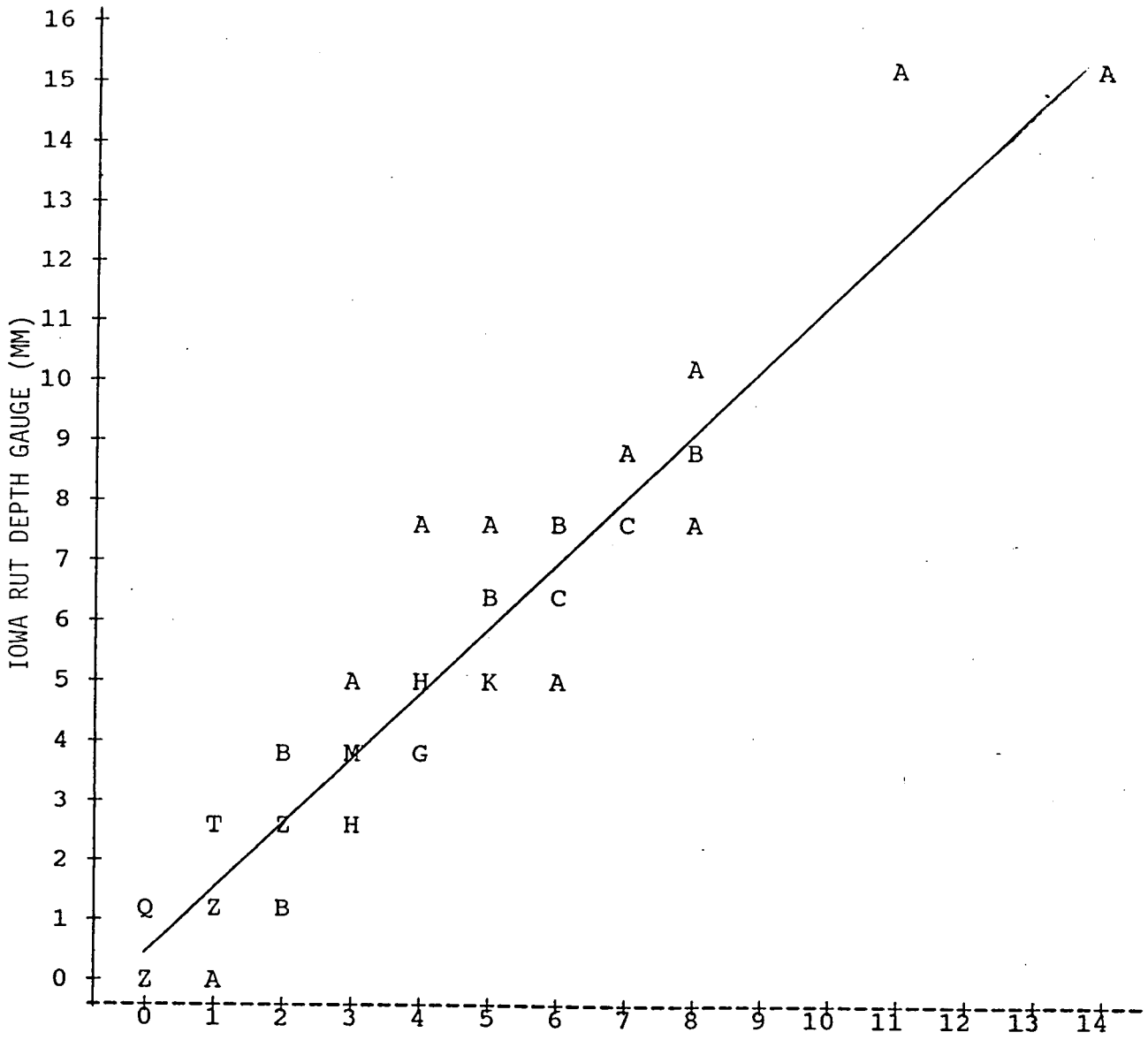
COUNTY	RTE	BMP	EMP	IOWA RUT DEPTH GAUGE (IN) (MM)	GEORGIA FAULT METER (IN) (MM)	91/92 CRACK AND PATCH ** (IN) (MM)
GRUNDY	175	194.0	194.5	0.11 2.8	0.09 2.4	0.20 5.1
GRUNDY	214	1.0	1.5	0.13 3.4	0.09 2.4	0.13 3.3
GRUNDY	214	4.0	4.5	0.06 1.6	0.03 0.9	0.12 3.0
MARSHALL	330	17.0	17.5	0.03 0.8	0.02 0.5	0.06 1.5
MARSHALL	330	19.0	19.5	0.05 1.1	0.03 0.7	0.07 1.8
MARSHALL	330	23.0	23.5	0.15 3.9	0.13 3.3	0.17 4.3
MARSHALL	14	105.0	105.5	0.14 3.6	0.11 2.9	0.14 3.6
TAMA	63	128.0	128.5	0.12 2.9	0.09 2.3	0.10 2.5
TAMA	63	131.0	131.5	0.12 3.0	0.10 2.5	0.15 3.8
TAMA	63	134.0	134.5	0.07 1.7	0.06 1.5	0.17 4.3
TAMA	63	137.0	137.5	0.09 2.3	0.09 2.2	0.18 4.6
TAMA	8	8.0	8.5	0.10 2.6	0.08 2.2	0.11 2.8

** IOWA RUT DEPTH GAUGE USED WITH SAME PROCEDURE AS CURRENT DATA COLLECTION.

TABLE II INDIVIDUAL FAULT MEASUREMENTS

COUNTY	RTE	BMP	EMP		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
													(INCHES X 100)											
													(MILLIMETERS)											
GRUNDY	175	194.0	194.5	IA GAUGE	20	0	15	30	10	10	10	0	15	0	20	25	10	10	15	5	10	0	15	0
				GA METER	6	0	3	7	2	2	1	0	3	0	4	6	2	3	3	1	1	0	3	0
GRUNDY	214	1.0	1.5	IA GAUGE	5	10	10	0	10	10	10	15	0	15	5	10	15	5	20	10	20	60	30	5
				GA METER	1	1	1	0	1	2	3	3	0	3	1	1	3	1	4	2	4	11	4	1
GRUNDY	214	4.0	4.5	IA GAUGE	5	10	15	5	10	0	10	10	10	10	0	0	5	10	0	0	10	5	0	10
				GA METER	0	1	4	0	1	0	1	2	1	1	0	0	0	3	0	0	1	1	0	1
MARSHALL	330	17.0	17.5	IA GAUGE	5	0	0	5	0	5	10	0	10	5	0	0	0	0	5	0	5	5	5	5
				GA METER	0	0	0	1	0	1	2	0	1	0	0	0	0	0	0	0	1	1	0	2
MARSHALL	330	19.0	19.5	IA GAUGE	10	0	5	0	5	0	5	15	5	0	5	0	0	5	10	0	10	10	5	0
				GA METER	2	0	0	0	0	0	1	4	1	0	1	0	0	0	1	0	2	2	0	0
MARSHALL	330	23.0	23.5	IA GAUGE	10	30	15	35	20	20	10	20	20	5	10	20	0	20	0	10	20	0	15	25
				GA METER	2	6	4	7	4	4	2	3	5	0	3	5	0	5	0	2	5	0	3	5
MARSHALL	14	105.0	105.5	IA GAUGE	5	0	20	0	10	10	5	0	15	40	15	5	0	15	10	60	10	25	5	30
				GA METER	0	0	4	0	2	2	1	0	2	8	2	0	1	4	2	14	1	6	1	7
TAMA	63	128.0	128.5	IA GAUGE	10	0	10	20	5	10	20	10	15	20	30	10	10	5	10	10	10	5	10	10
				GA METER	1	0	2	5	0	2	4	3	3	4	6	2	2	1	3	2	2	1	1	2
TAMA	63	131.0	131.5	IA GAUGE	30	15	5	5	10	30	10	10	15	10	0	15	10	5	0	15	10	20	10	15
				GA METER	5	4	1	1	2	7	2	2	3	2	0	3	2	0	0	3	3	5	1	3
TAMA	63	134.0	134.5	IA GAUGE	0	20	5	10	0	10	0	5	10	0	0	0	5	0	0	5	15	35	5	10
				GA METER	0	5	1	2	0	2	0	1	2	0	0	0	1	0	0	1	4	8	1	2
TAMA	63	137.0	137.5	IA GAUGE	0	10	0	10	0	30	20	10	20	0	0	0	0	10	35	10	0	10	0	20
				GA METER	0	2	0	2	0	8	5	2	5	0	0	0	0	3	8	2	0	2	0	5
TAMA	8	8.0	8.5	IA GAUGE	10	20	25	15	10	25	10	10	0	5	5	0	10	10	10	5	10	10	5	10
				GA METER	1	5	5	4	2	6	2	2	0	1	0	0	2	2	2	1	2	2	2	2

FIGURE I INDIVIDUAL FAULT MEASUREMENTS



NOTE: 52 obs hidden.

A = 1 OBS, B = 2 OBS, ECT