STATE OF FLORIDA

2002
RIGID PAVEMENT
CONDITION SURVEY
FACTS & FIGURES

FL/DOT/SMO/02-458
August 2002

STATE MATERIALS OFFICE

Table of Contents

Executive Summary

Since 1985, the Pavement Condition Unit of the Pavement Systems Evaluation Section has been collecting, processing and analyzing the information on the condition and performance of the State Roadway System on an annual basis. The information provided by such a Pavement Condition Survey (PCS) program has been critical to the Department's effort to support informed highway planning, policy and decision making at State and local levels. This includes the apportionment and allocation of funding needs as well as the determination of appropriate cost-effective strategies to rehabilitate and preserve existing highway transportation infrastructure.

The condition survey is traditionally performed on the pavement lane that has deteriorated the most in each direction, and pavement sections are determined by construction limits or uniformity of conditions. All the sections rated are rated in terms of varying levels and amounts of specific distresses, namely, (1) ride quality, (2) surface deterioration, (3) spalling, (4) patching, (5) transverse cracking, (6) longitudinal cracking, (7) corner cracking, (8) shattered slabs, (9) faulting, (10) pumping, and (11) joint condition. Items 2 through 11 are combined into a Defect Rating.

The survey data is collected, reviewed, processed, and analyzed by the Pavement Systems Evaluation Section of the State Materials Office. Once the data collection process is complete, the Central Pavement Management Office is responsible for processing, analysis and making the data available for use by the Department, consultants and others. Thereafter, the Central Program Development Office becomes responsible for reporting the condition of the State Highway System for Pavement Management purposes.

The present report provides essential information on the current condition of the Florida roadway system data collected as part of the PCS program. It also includes a summary of the historical condition ratings.

SECTION I

Introduction

The Pavement Systems Evaluation Section of the State Materials Office is responsible for the Department's Annual Pavement Condition Survey. The Survey is conducted on the total State-maintained Highway System.

A highly trained and experienced engineering staff completes the survey requiring about 27 weeks of travel each year to complete (both flexible and rigid). However, since rigid pavements represent only about 3% of the State-maintained Highway System, much less time is spent evaluating rigid pavement.

- Determine the present condition of the State Roadway System;
- Compare the present with past conditions;
- Predict deterioration rates;
- Predict rehabilitation funding needs;
- Provide justification for annual rehabilitation budget;
- Provide justification for project rehabilitation; and
- Provide justification for distribution of rehabilitation funds to Districts.

The PCS is conducted in terms of varying levels and amounts of specific distresses, namely, (1) Defect Rating, and (2) Ride Rating. For each of these values, the pavement sections are rated on a zero to ten scale, where a rating of ten indicates a section in excellent condition. Currently, any section with a rating of six or less would become eligible for rehabilitation.

Defect Rating is measured using ten different individual distress types. These distresses are counted and/or estimated (depending on the distress type) and classified according to severity. The rater collects this distress data from the shoulder of the road.

Ride Rating is measured using an automated vehicle-mounted instrument called a Profiler that measures the longitudinal profile of the roadway. The Ride Rating is quantified in terms of Ride Number (RN). Ride Number is a mathematical processing of longitudinal

profile measurements to produce an estimate of ride quality or user perception in accordance with ASTM Standard E1489.

In order to ensure a maximum accuracy and repeatability of the data collected, the testing equipment has to be well maintained and routinely calibrated. In addition, edit procedures are currently implemented to test both the data accuracy and compliance with other parameters of the Pavement Management System. Comparisons of annual survey data to that of earlier years to review trends and identify potential errors are also performed. When necessary, and as appropriate, efforts have been made to upgrade the survey equipment and to improve the data analysis software resulting in increased speed of data collection and substantially improved accuracy of the survey results. These types of improvements now allow in-depth analysis on any segment of the highway system while completing the PCS on time and maintaining a high level of accuracy in the survey results.

For more detailed information about the Rigid Pavement Condition Survey, please refer to the latest edition of the Rigid Pavement Condition Survey Handbook located online at *http://www11.myflorida.com/statematerialsoffice/Administration/Publications/ResearchReports/PavementResearch/2002rigidhandbook.pdf.*

The facts and figures contained in this report are for rigid pavements only unless otherwise noted.

Observations

- Defect Ratings have improved slightly during the past eleven years from an average rating of 6.67 in 1992 to 7.86 in 2002.
- Ride Rating values for the State-maintained Highway System have remained constant for the past eleven years with a mean rating of 7.27 (range of 7.00 to 7.55).
- 94.4% of this year's Defect Ratings were within one point as compared to the previous year's. (*)
- 97.8% of this year's Ride Ratings were within one point as compared to the previous year's. (*)
- Beginning with the 1999 survey, laser sensors were implemented along with the use of Ride Number as the method of calculating Ride Ratings. This may explain the increase in serviceability observed thereafter.

* Note: Sections that had known changes (under construction, rehabilitated, etc.) were excluded from analyses.

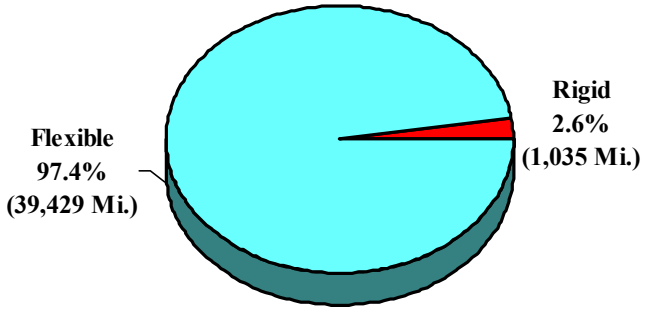
General Notes

- For multi-lane roadways: The worst lane in each direction is tested (normally the outermost traffic lane).
- For two lane roadways: The worst lane is tested (normally the same lane tested the previous year).
- Rated sections are determined by construction limits or significant changes in visual appearance (condition) of the pavement.
- Ride Rating data is collected with four road profilers.
- Defect Rating is based on the distress measurements collected by the rater from the shoulder of the roadway.

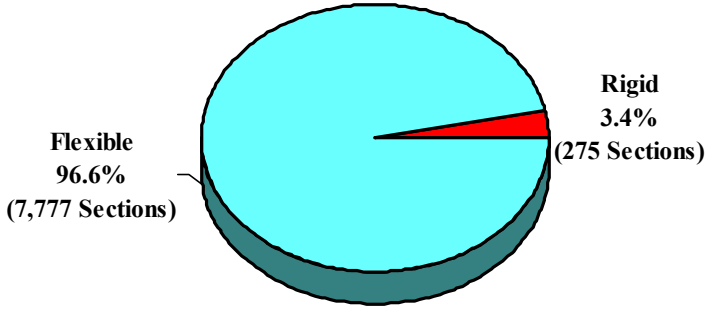
2002 Production Summary

Statewide

Total Lane Miles: 40,463 Mi.
(Flexible and Rigid Combined)

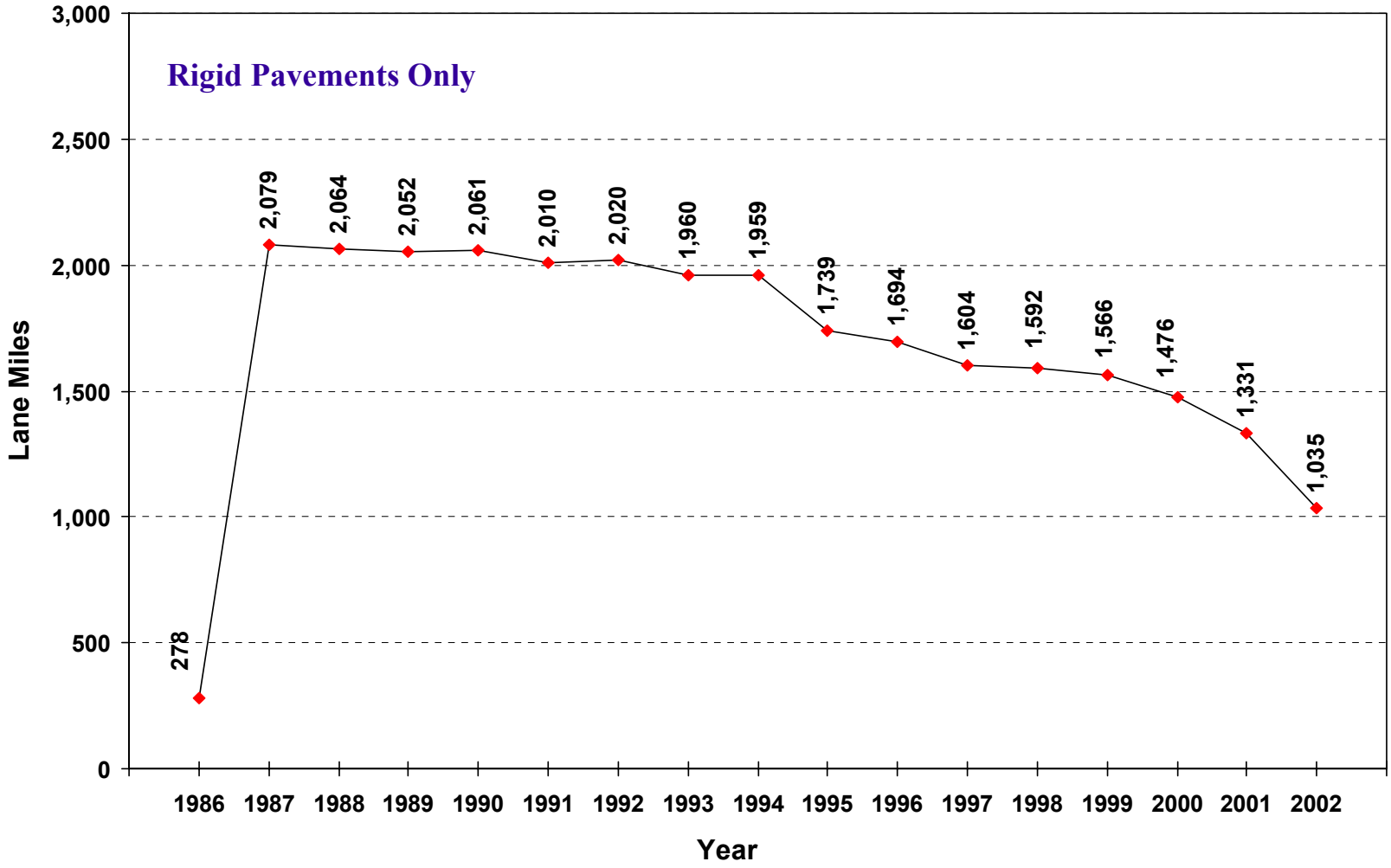


Total Rated Sections: 8,052
(Flexible and Rigid Combined)

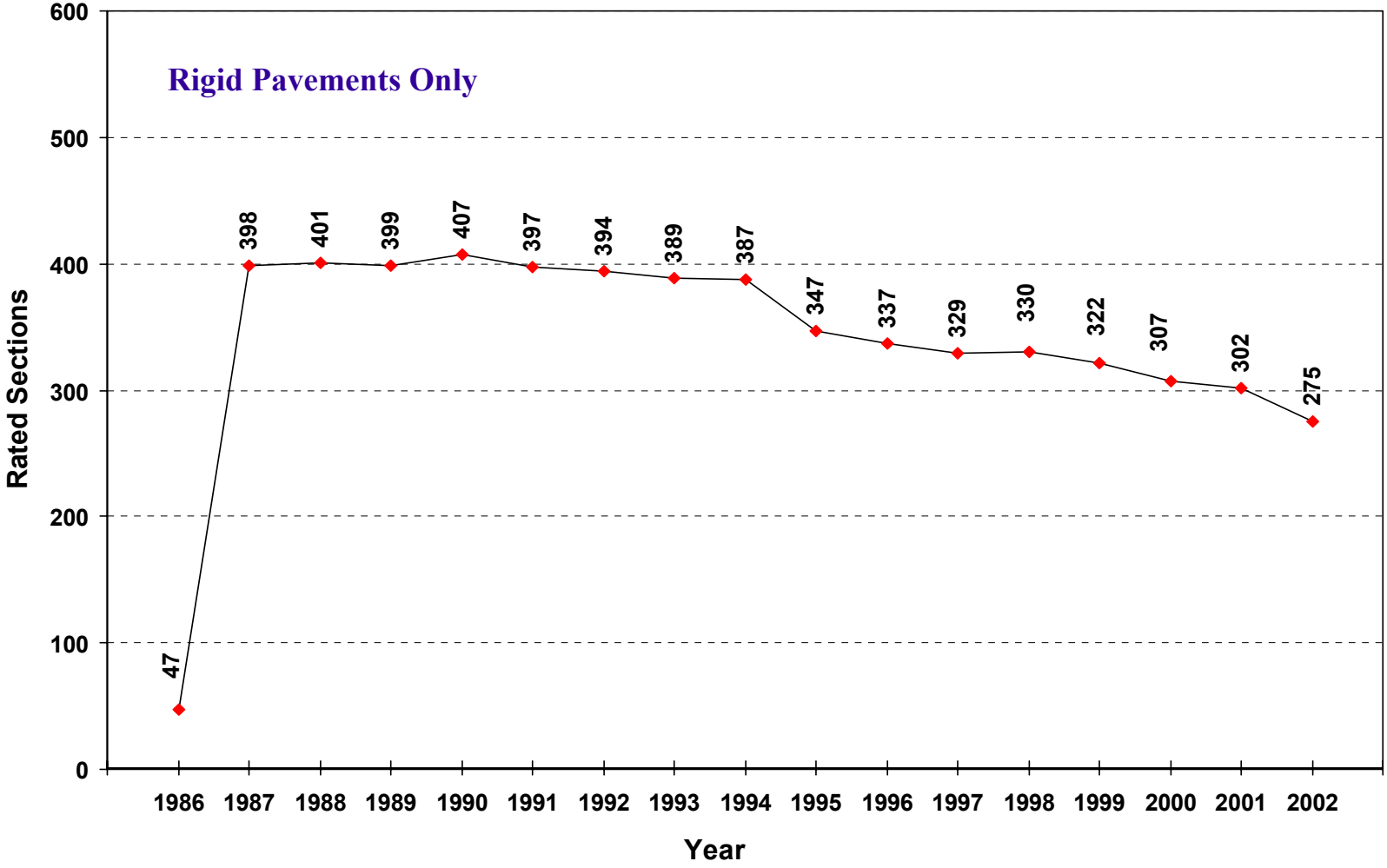


Production History

Lane Miles



Production History
Rated Sections



SECTION II

DEFECT RATING

BY

SYSTEM AND DISTRICT

SECTION II

Defect Rating by System and District

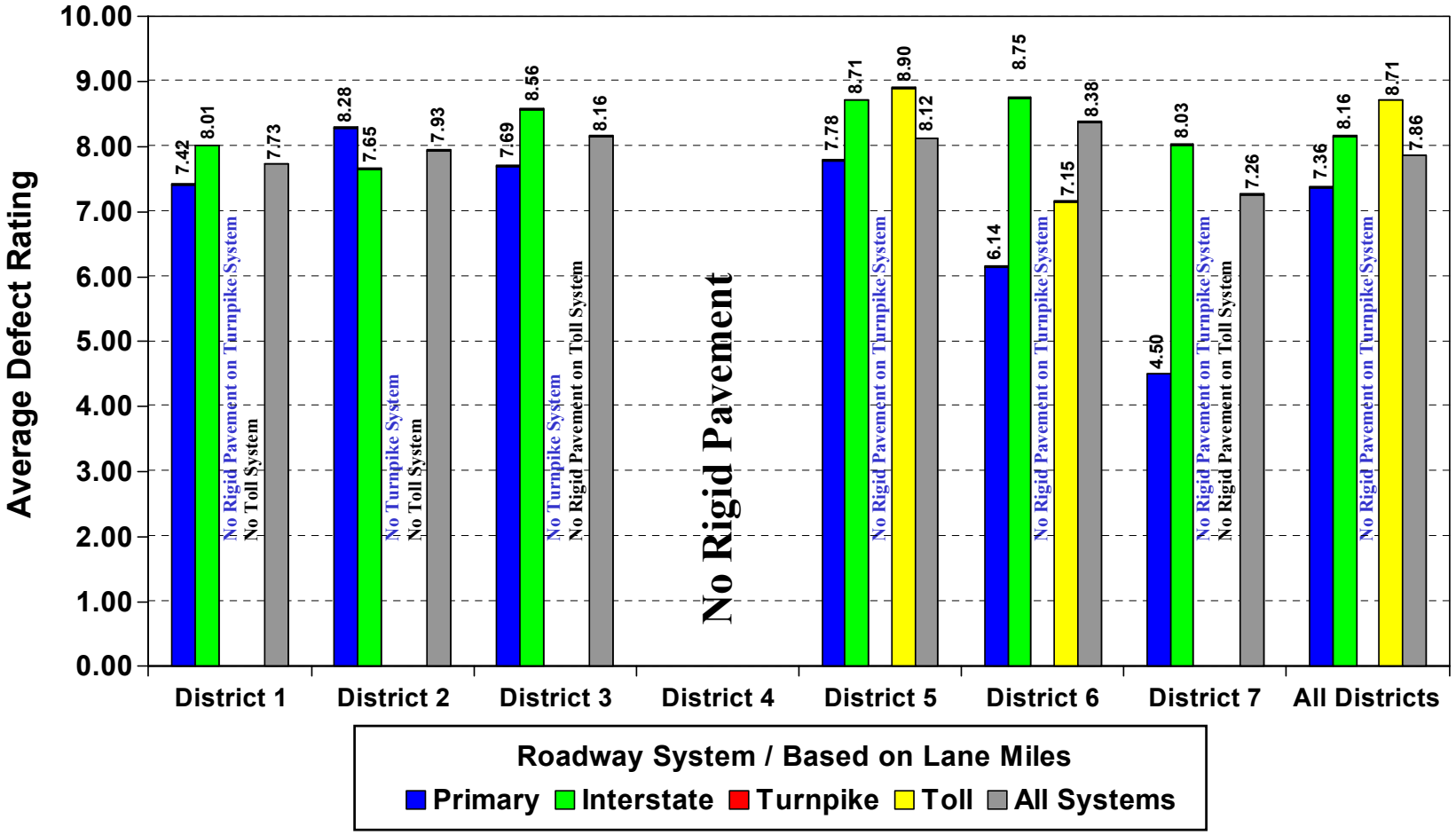
Defect Rating Criteria

- Ten different distresses are counted and/or estimated then classified by severity levels.
- Each distress has a numeric deduct value based on the severity level assigned by the rater.
- The Defect Rating is obtained by subtracting the deduct value associated with the various forms of distress from 100 and dividing by 10. A Defect Rating of 10 indicates a pavement without observable distress.

For more information on how Defect Rating is calculated see the 2002 Rigid Pavement Condition Survey Handbook.

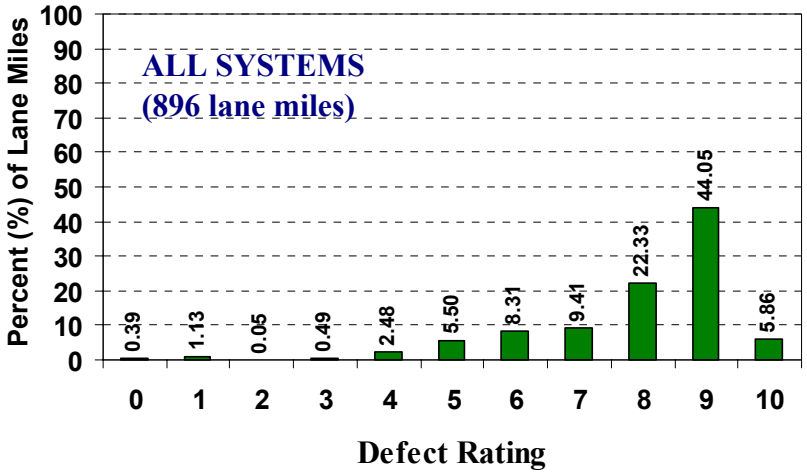
Defect Ratings by System and District

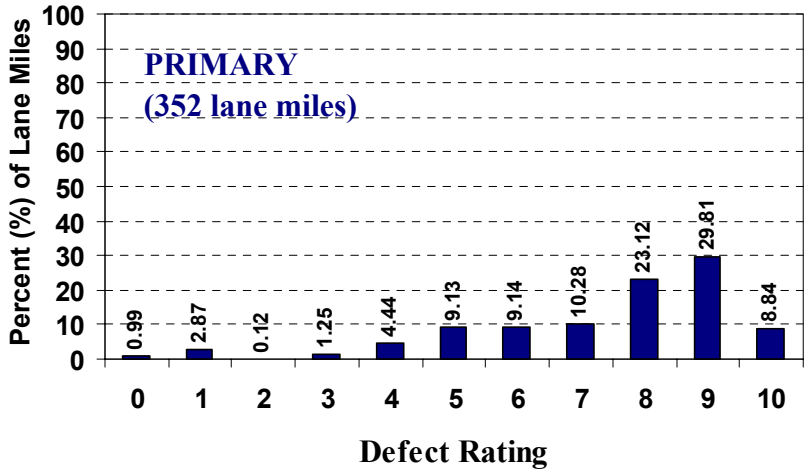
2002 Rigid Pavement Condition Survey

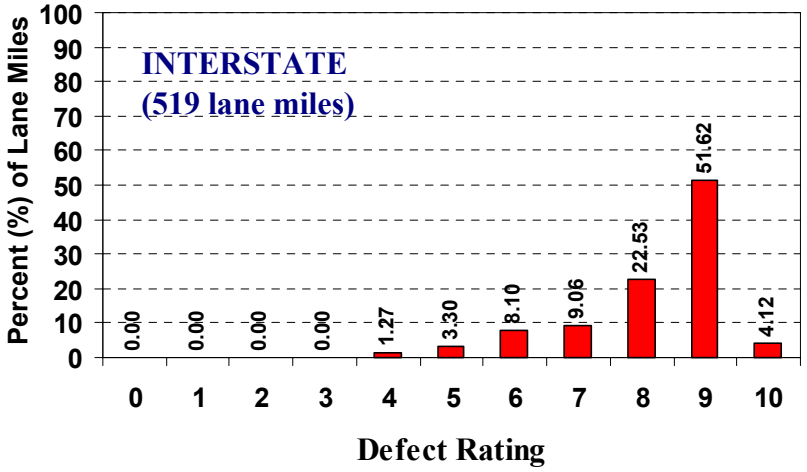


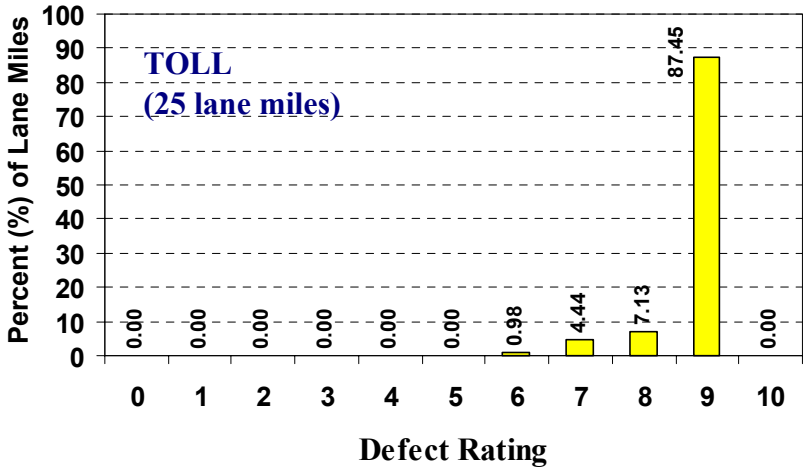
2002 Defect Distribution by System

Statewide





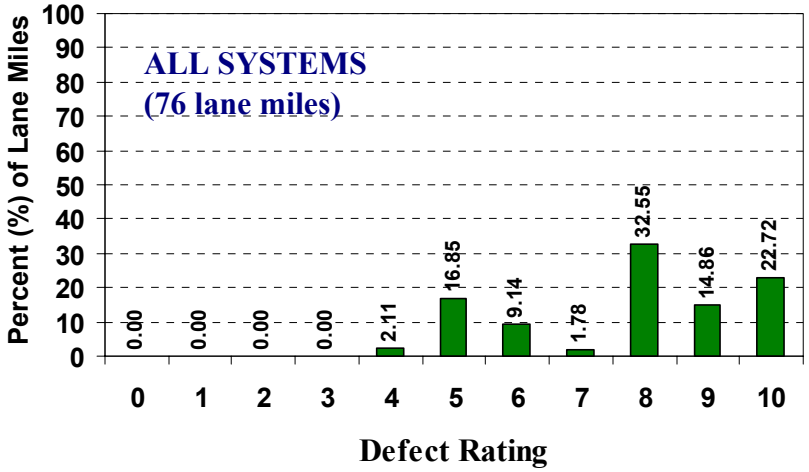


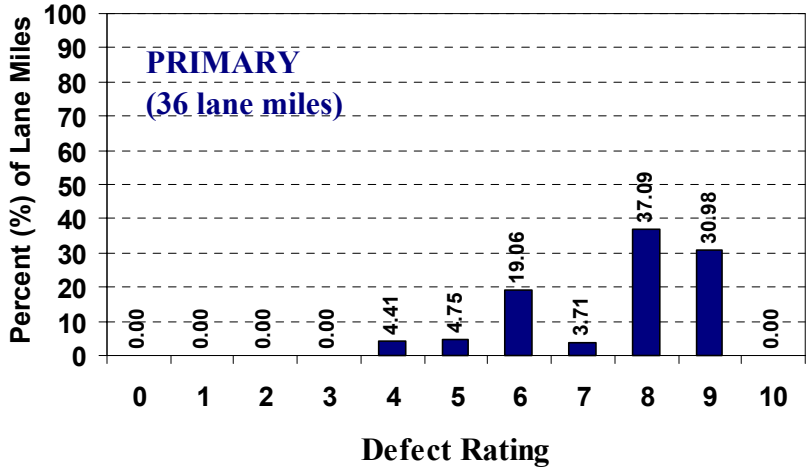


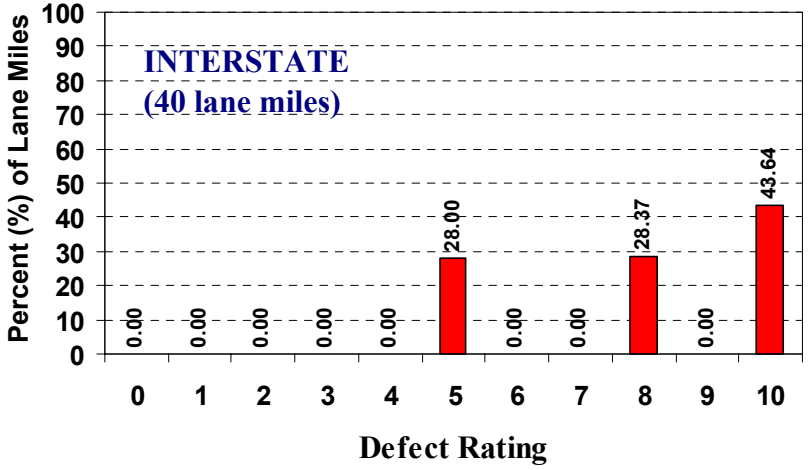
Note: No Rigid Pavement on Turnpike System

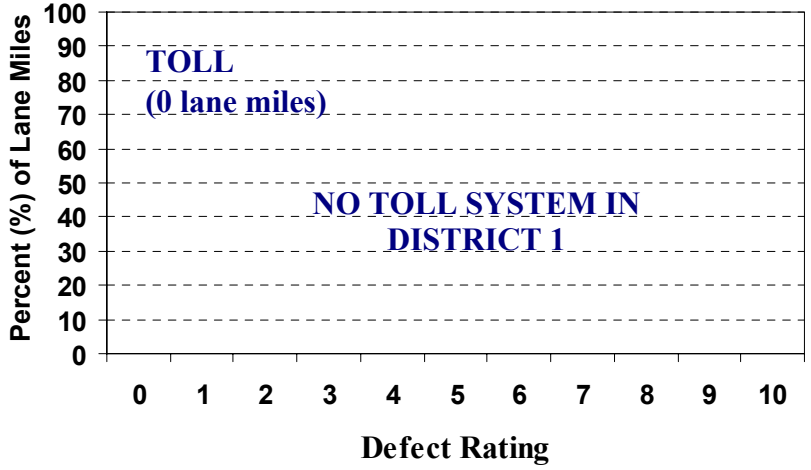
2002 Defect Distribution by System

District 1





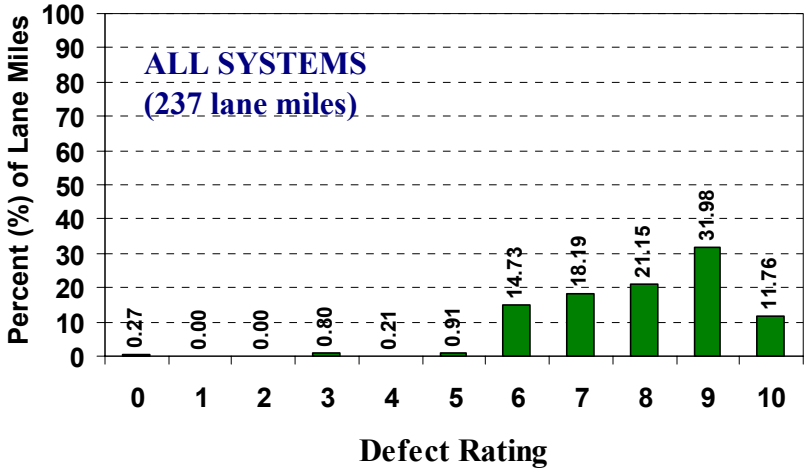


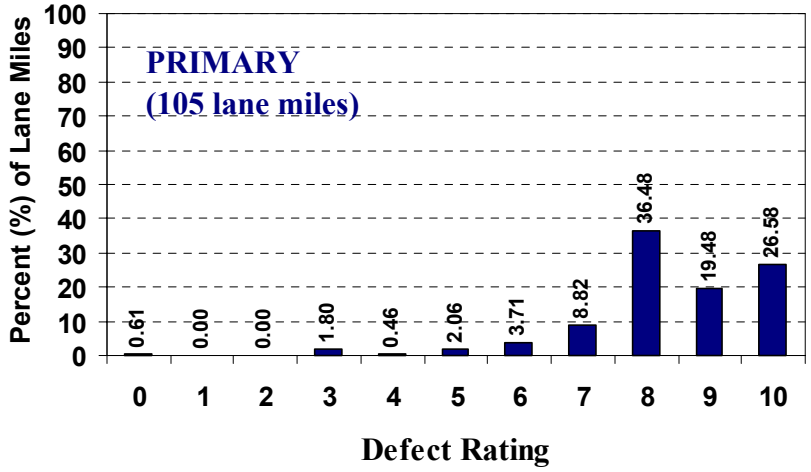


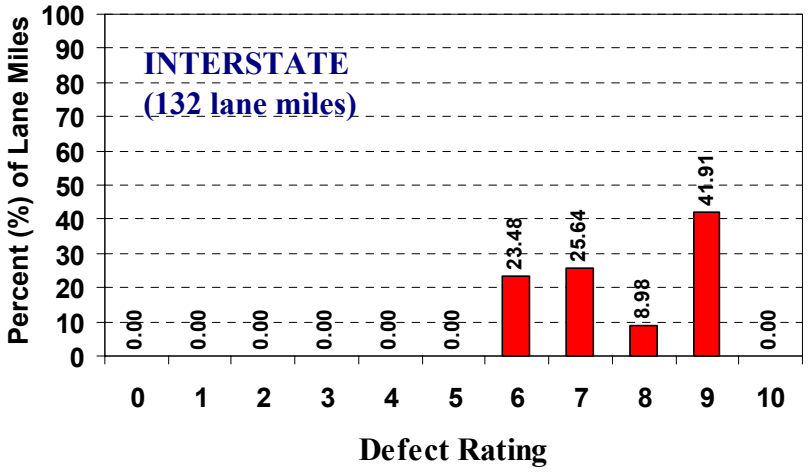
Note: No Rigid Pavement on Turnpike System

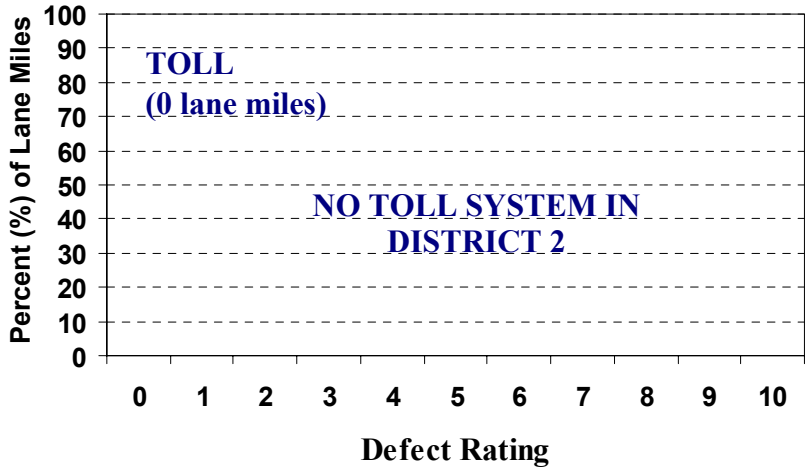
2002 Defect Distribution by System

District 2





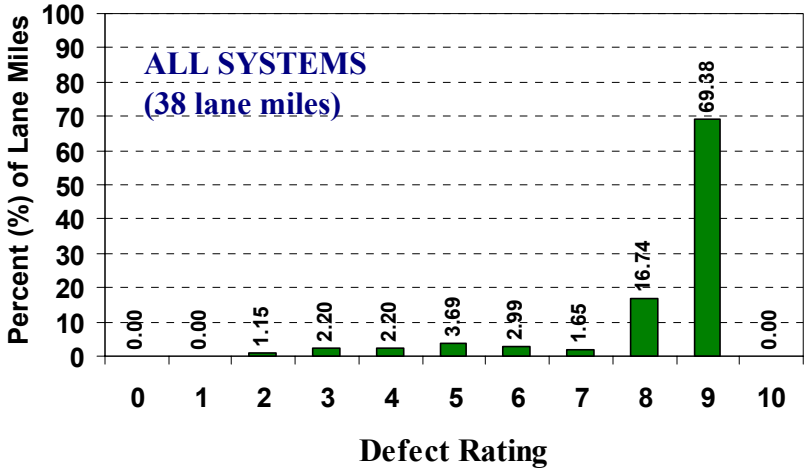


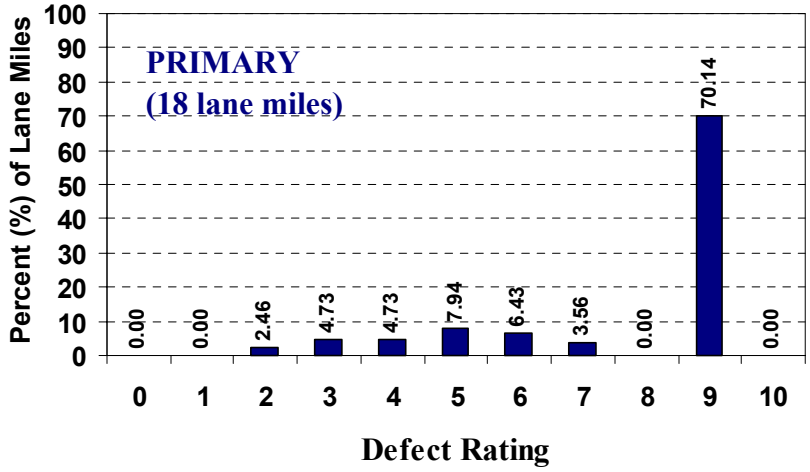


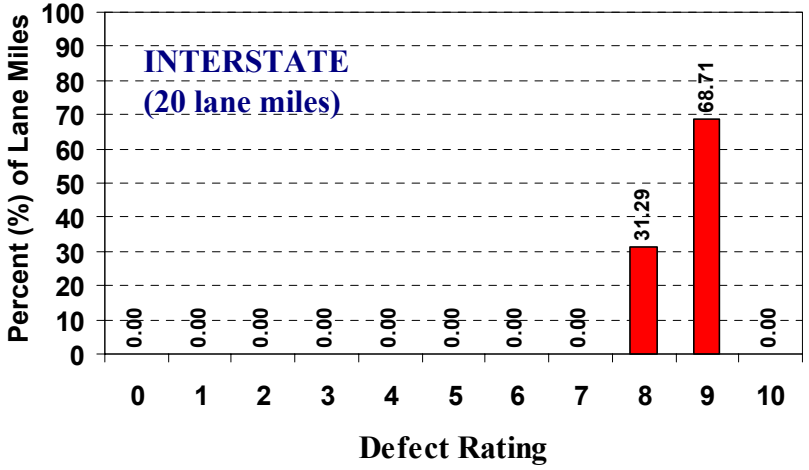
Note: No Turnpike System in District 2

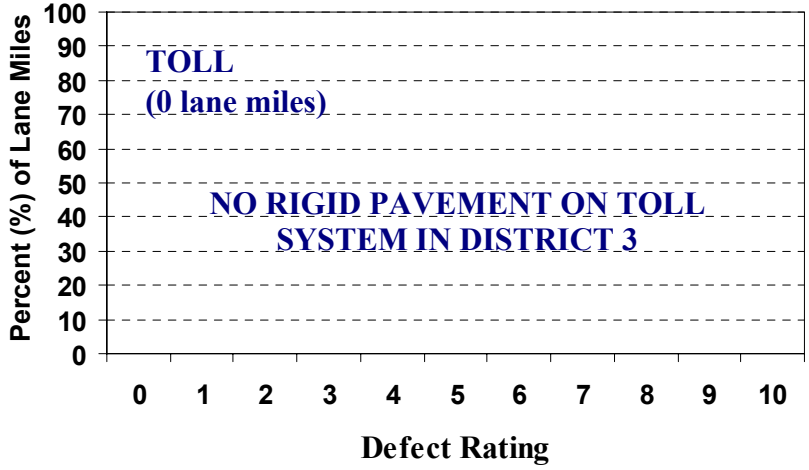
2002 Defect Distribution by System

District 3





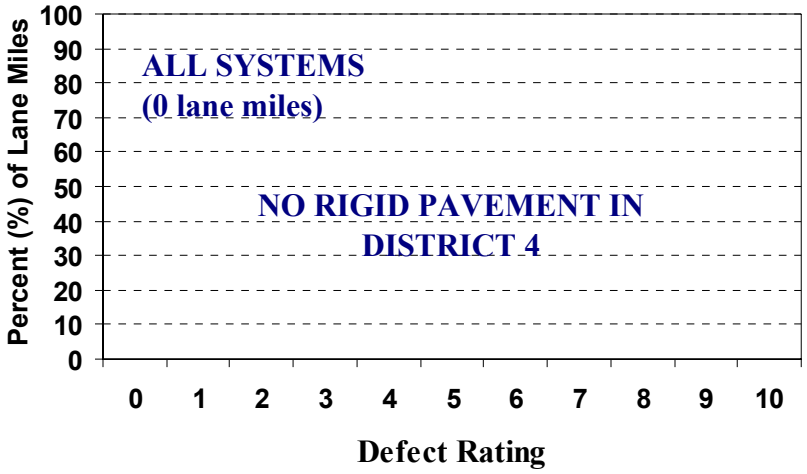


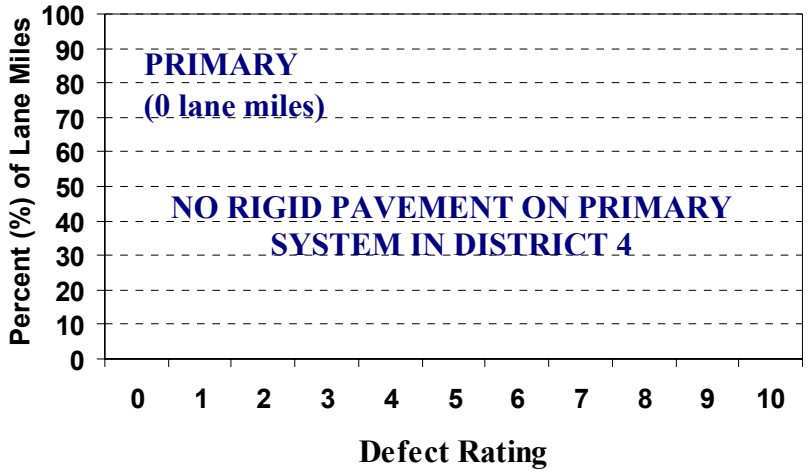


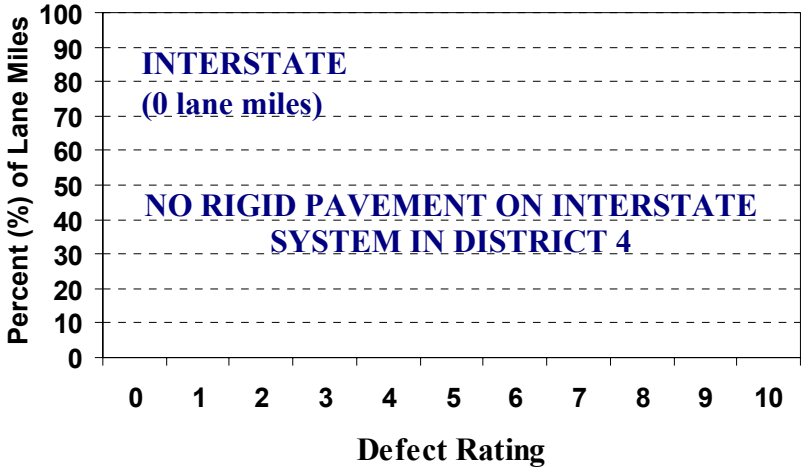
Note: No Turnpike System in District 3

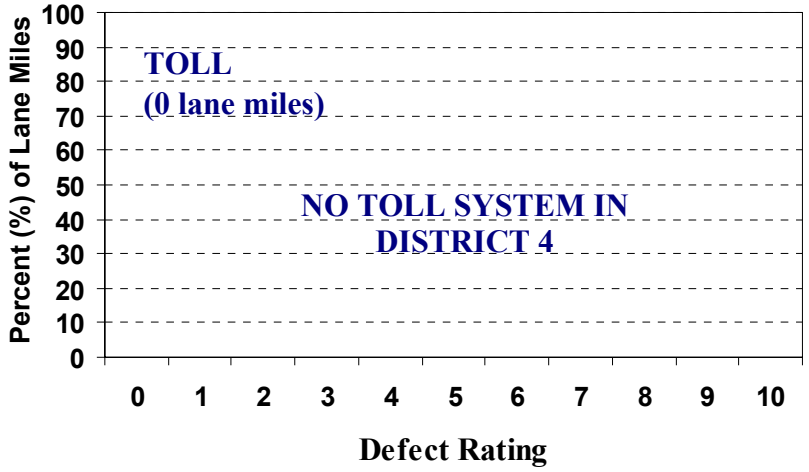
2002 Defect Distribution by System

District 4





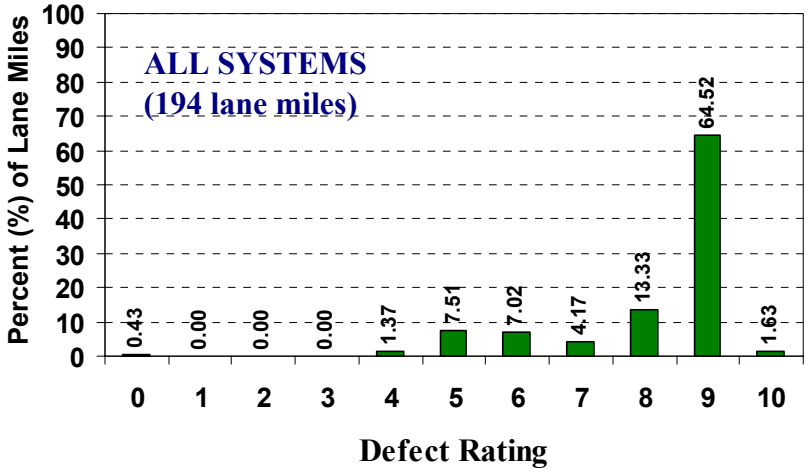


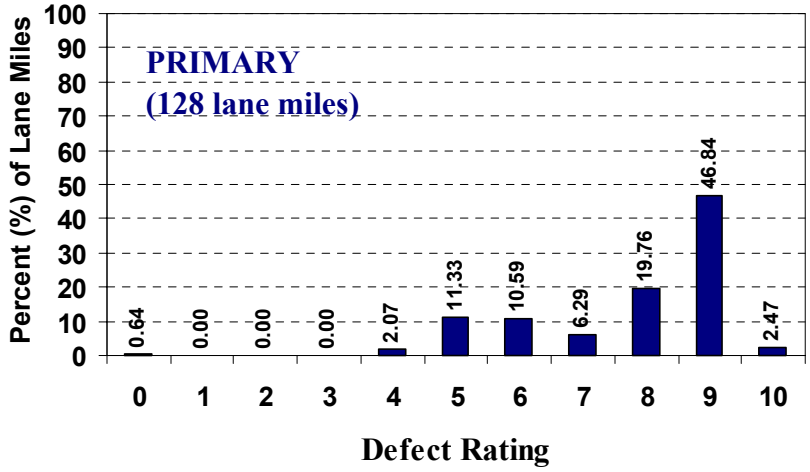


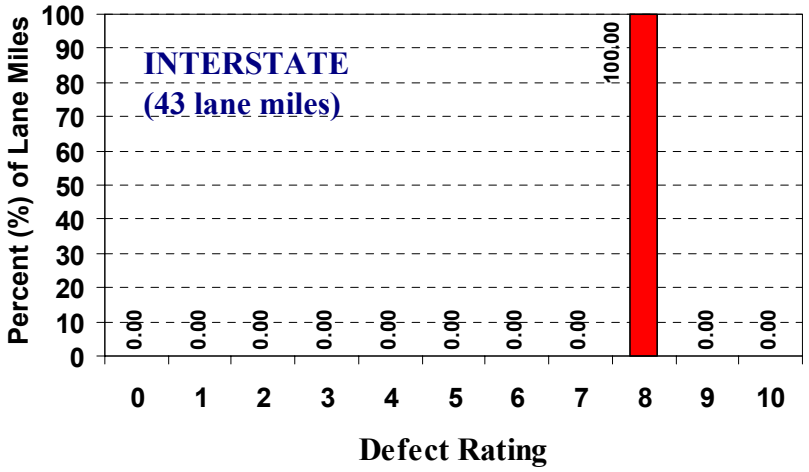
Note: No Rigid Pavement on Turnpike System

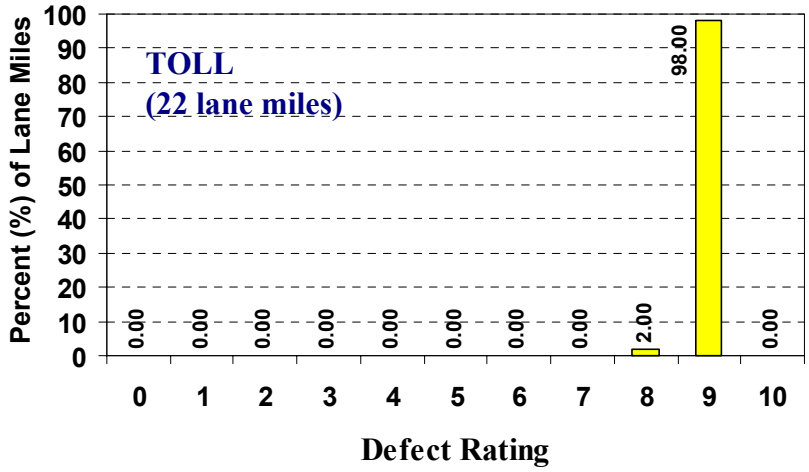
2002 Defect Distribution by System

District 5





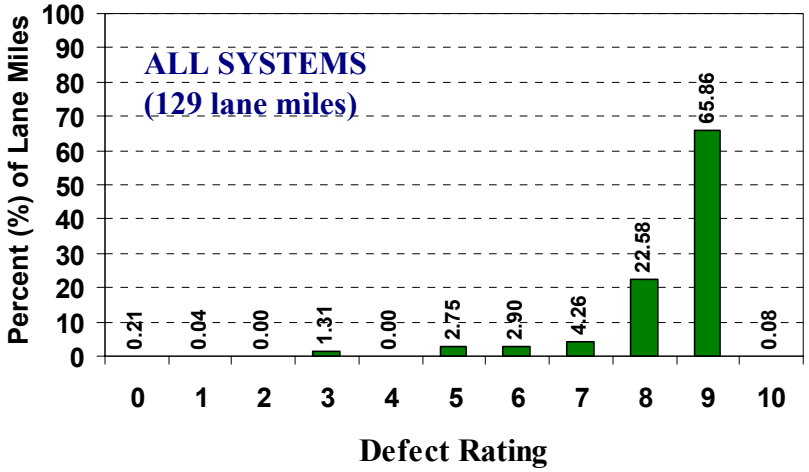


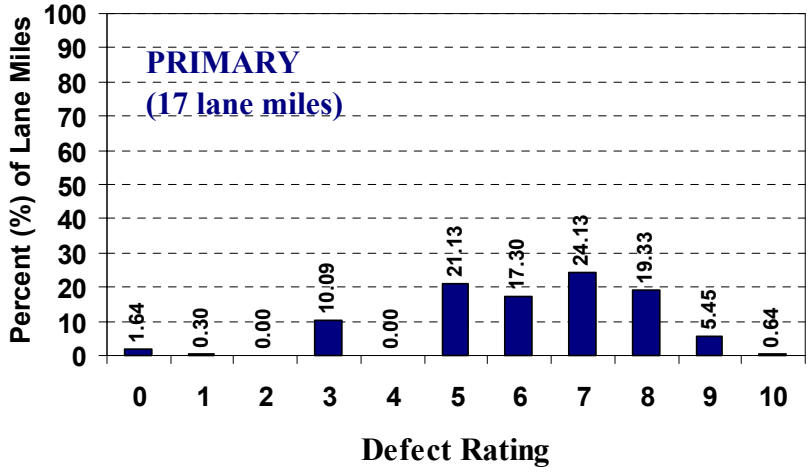


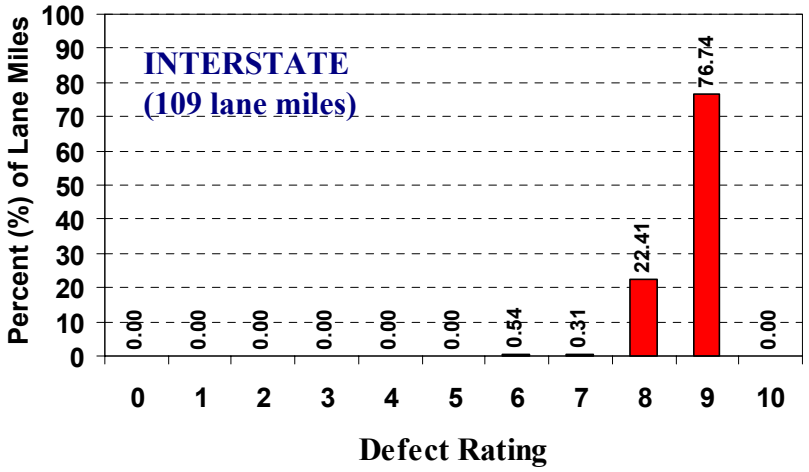
Note: No Rigid Pavement on Turnpike System

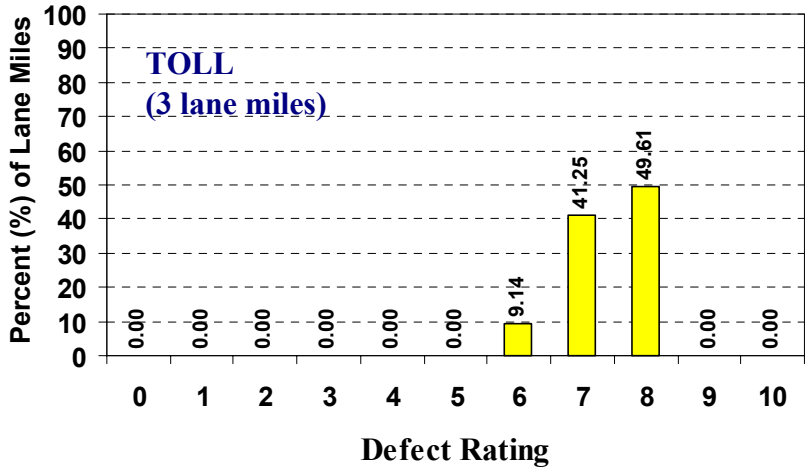
2002 Defect Distribution by System

District 6





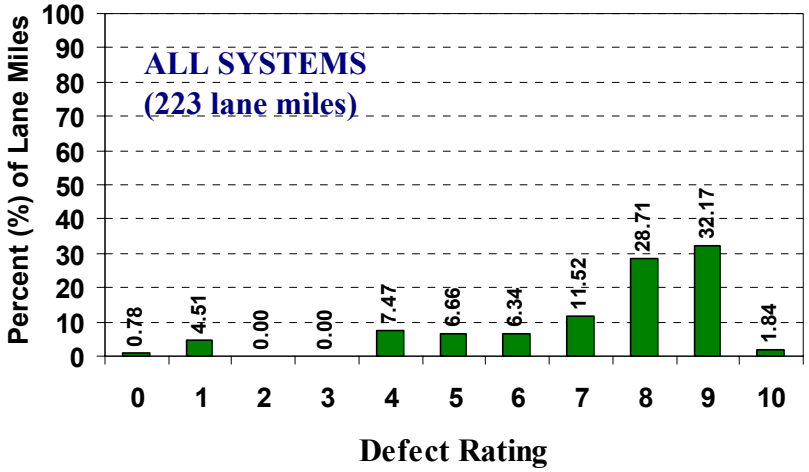


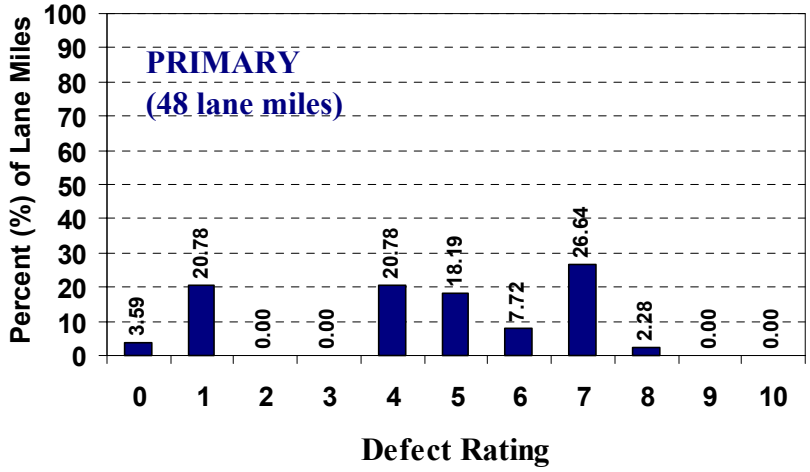


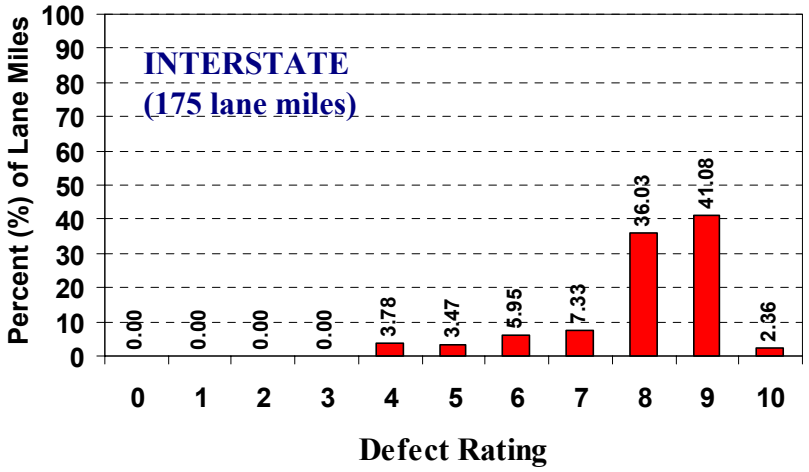
Note: No Rigid Pavement on Turnpike System

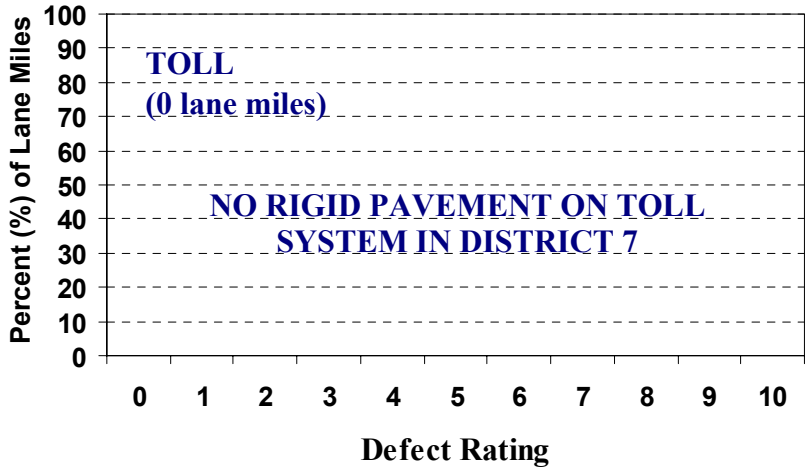
2002 Defect Distribution by System

District 7









Note: No Rigid Pavement on Turnpike System

SECTION III

RIDE RATING

BY

SYSTEM AND DISTRICT

SECTION III

Ride Rating by System and District

Ride Rating Criteria

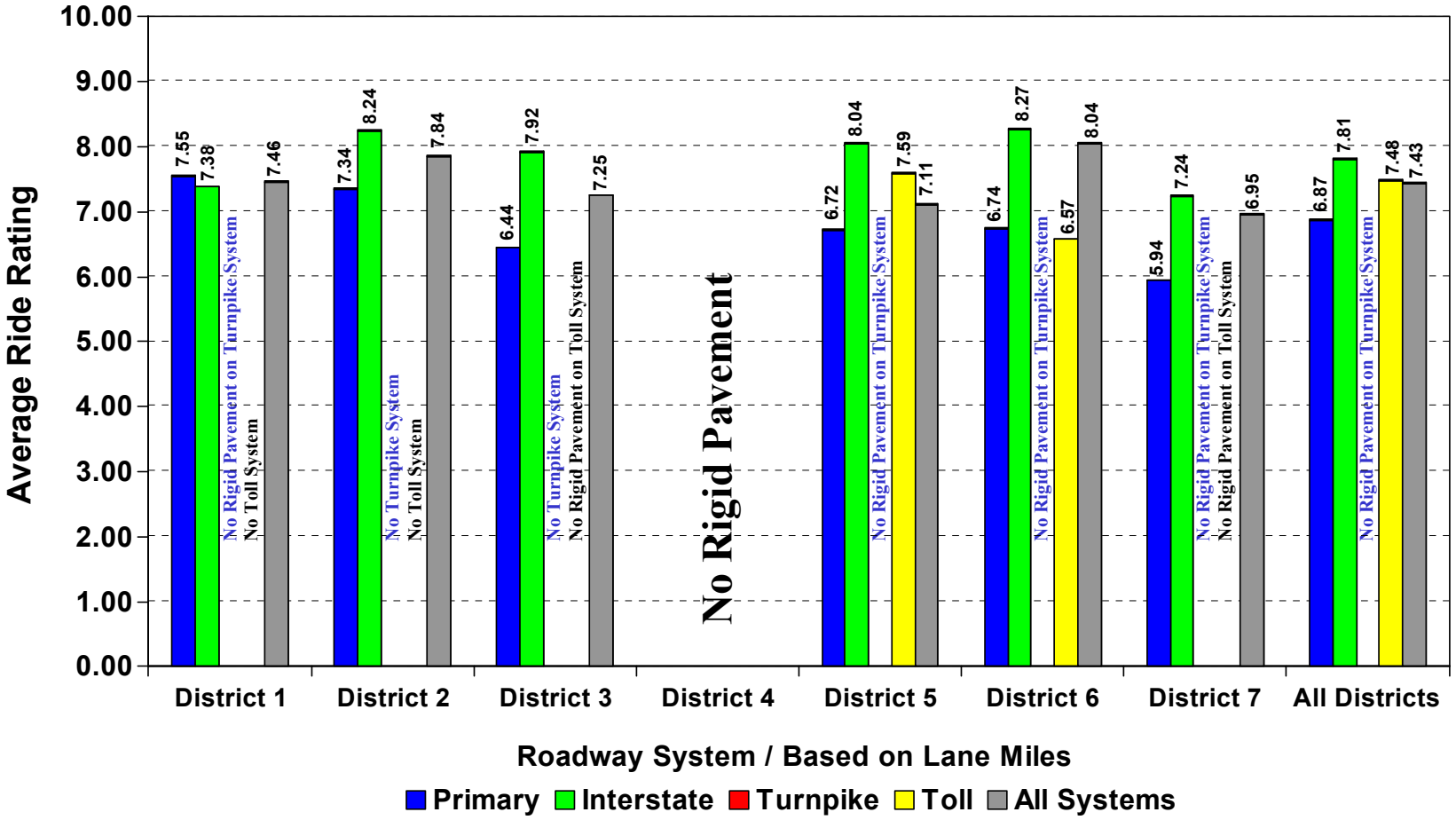
- Ride Ratings measure the ride quality of a pavement section. It is an indication of the degree of smoothness or roughness of the wearing surface.
- Ride Ratings are calculated from Ride Number collected with a 12 inch recording interval and filtered to a 300 ft wavelength (ASTM E-1489).

  Ride Number x 2 = Ride Rating

  Ride Number is a mathematical processing of longitudinal profile measurements to produce an estimate of subjective ride quality or user perception. Ride Number is an ASTM Standard (E-1489) and is based on an algorithm published in National Cooperative Highway Research Project (NCHRP) 1-23.
- Rideability is greatly affected by factors that include the following:
  - Original pavement profile
  - Profiles from intersecting roads
  - Utility patches and manhole covers
  - Surface and structural deterioration
- Ride Rating is based on a zero to ten scale, where ten is best. A ten would indicate a very smooth surface. Currently pavement sections with ratings of six or less are eligible for rehabilitation.

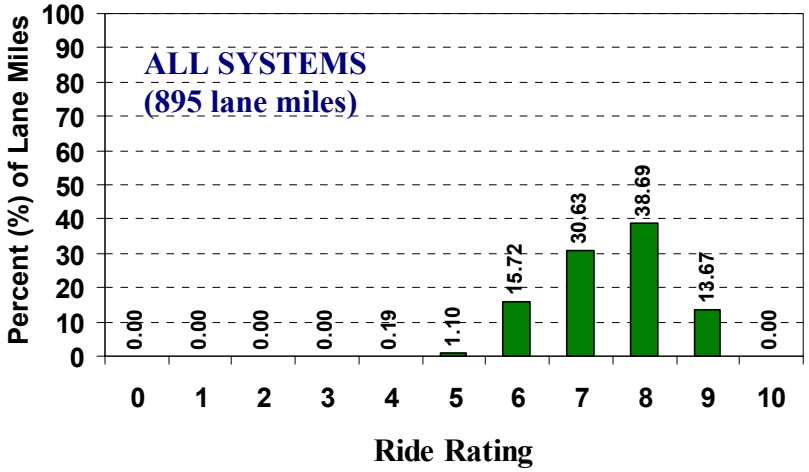
Ride Ratings by System and District

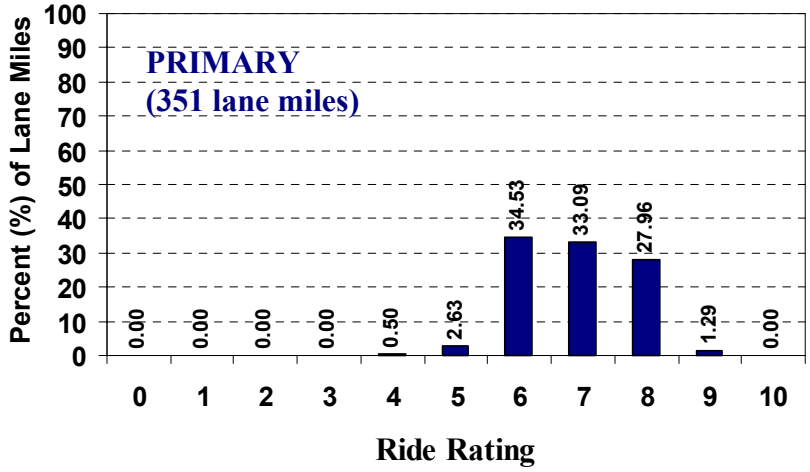
2002 Rigid Pavement Condition Survey

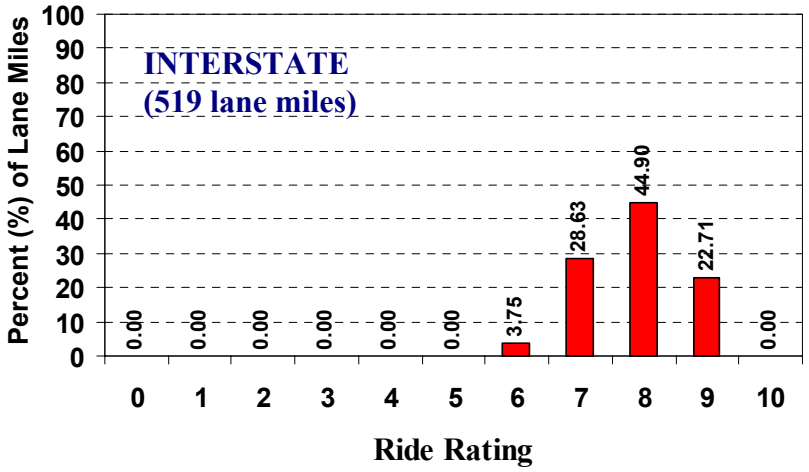


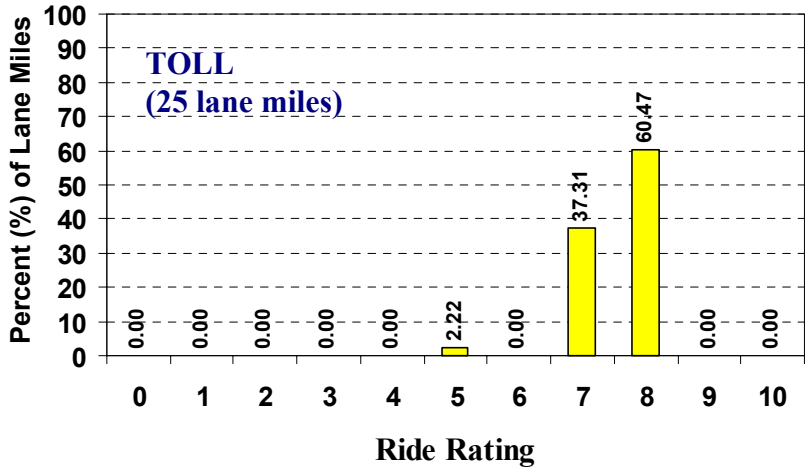
2002 Ride Distribution by System

Statewide





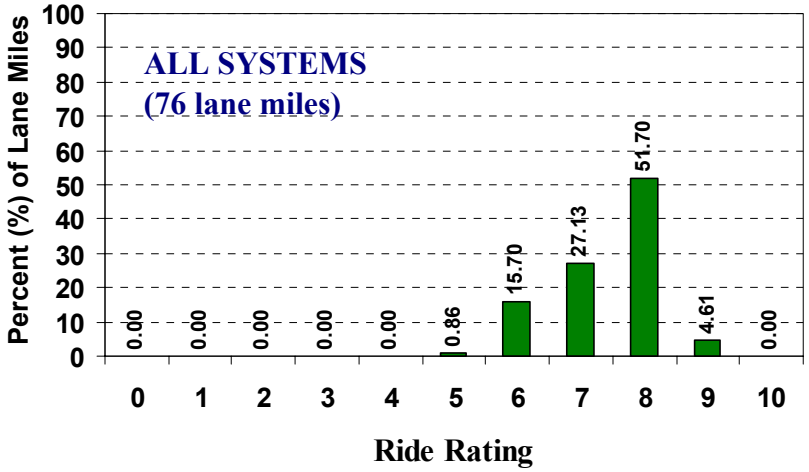


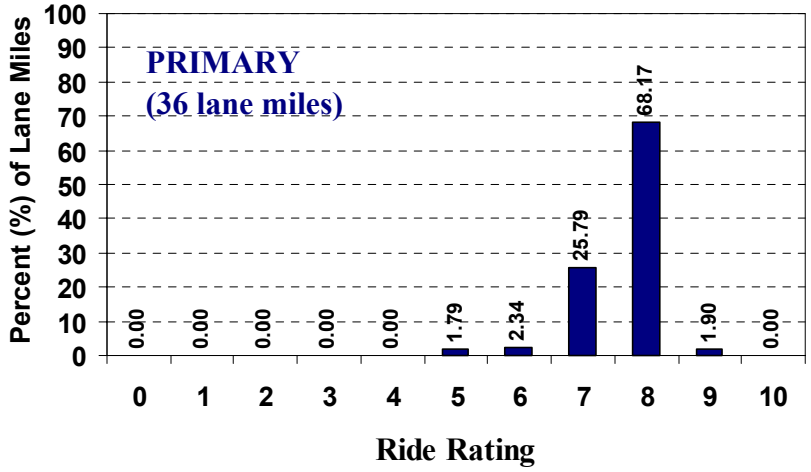


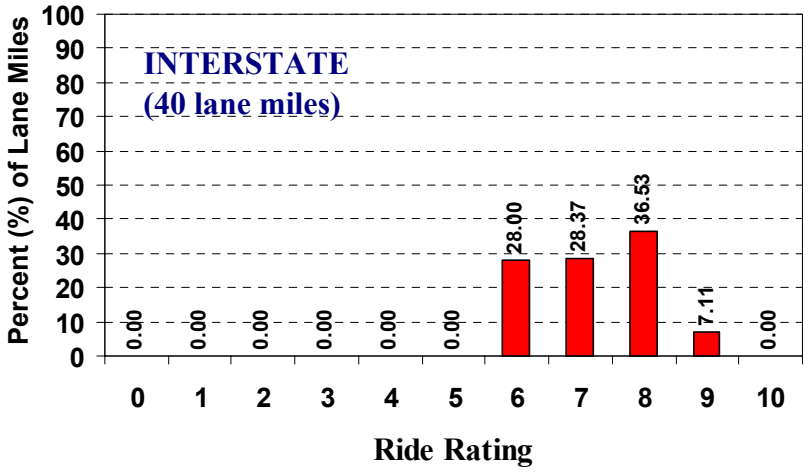
Note: No Rigid Pavement on Turnpike System

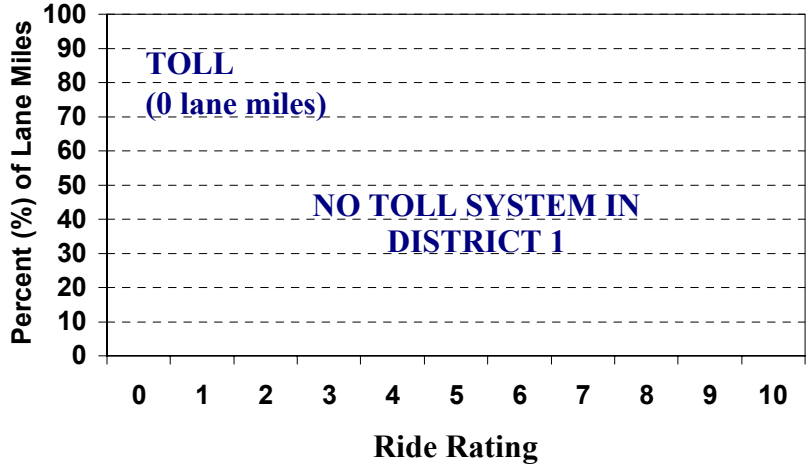
2002 Ride Distribution by System

District 1





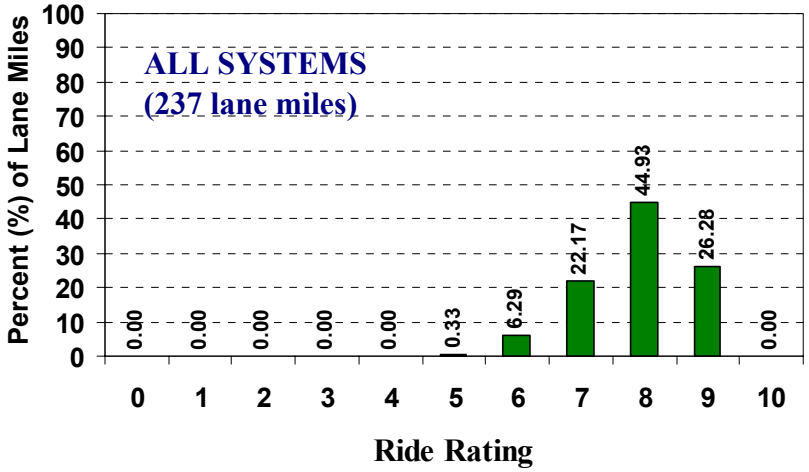


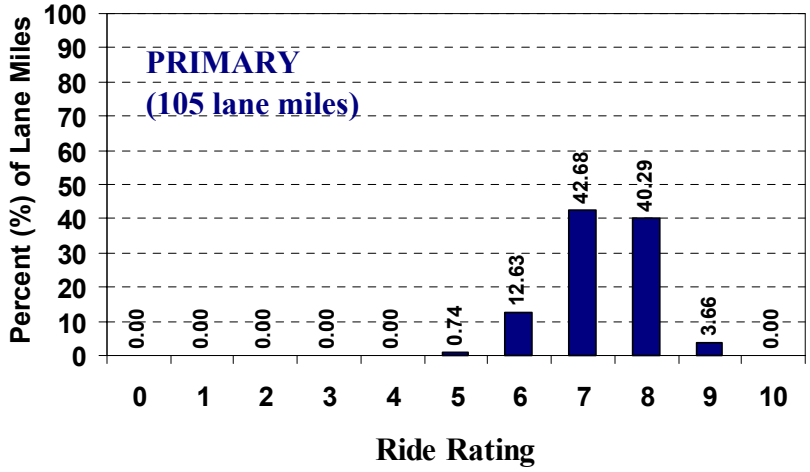


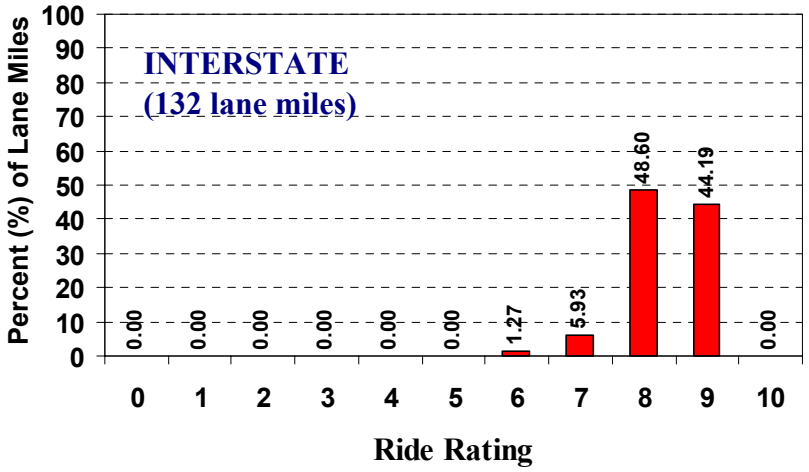
Note: No Rigid Pavement on Turnpike System

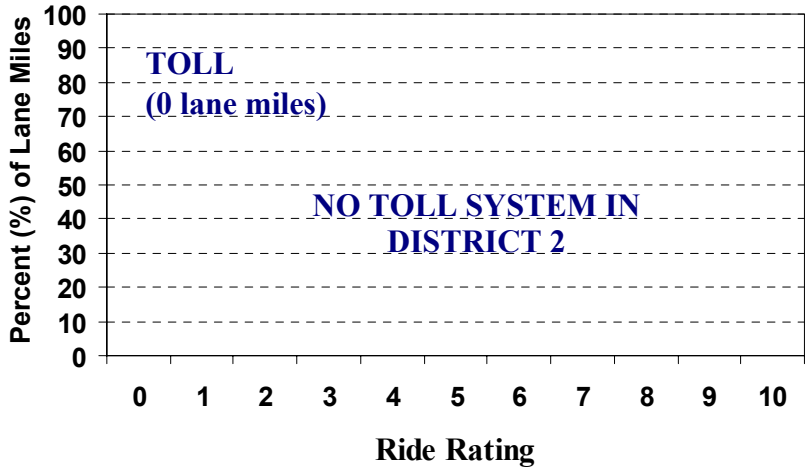
2002 Ride Distribution by System

District 2





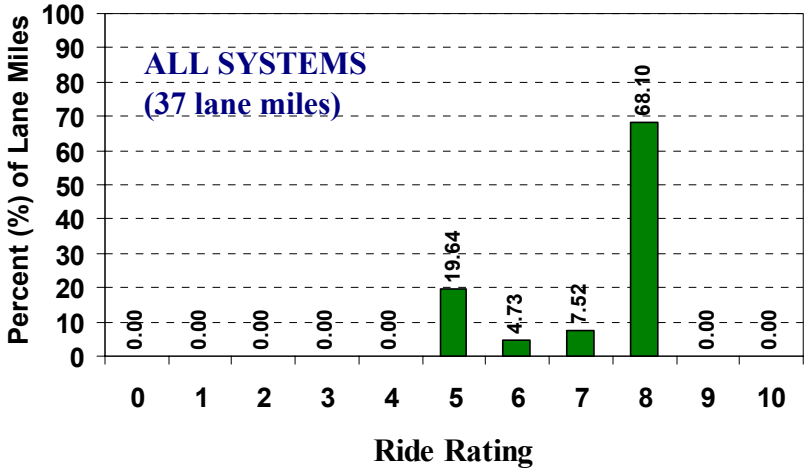


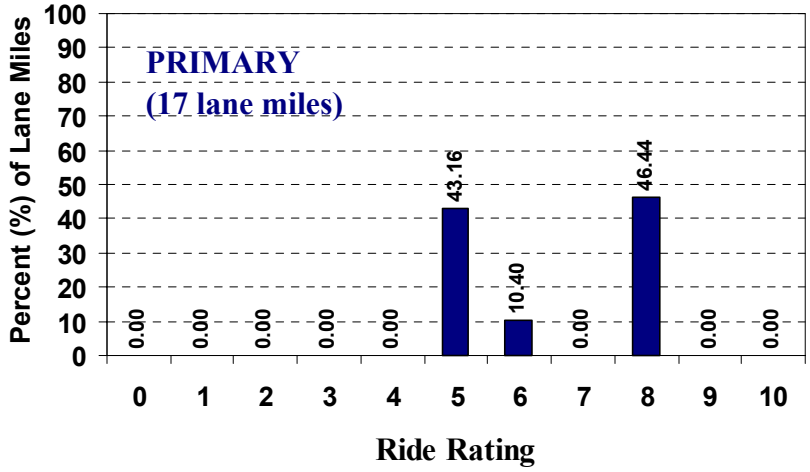


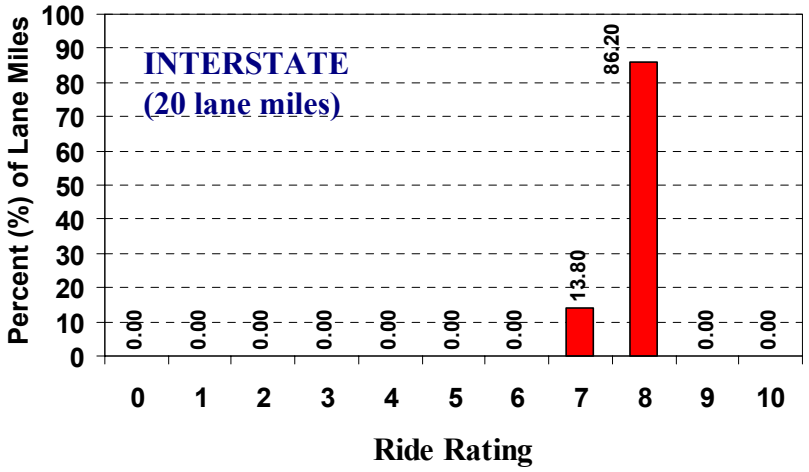
Note: No Rigid Pavement on Turnpike System

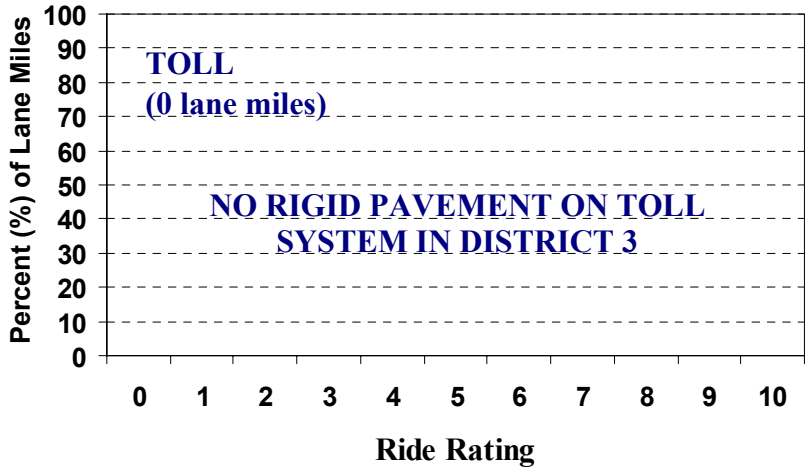
2002 Ride Distribution by System

District 3





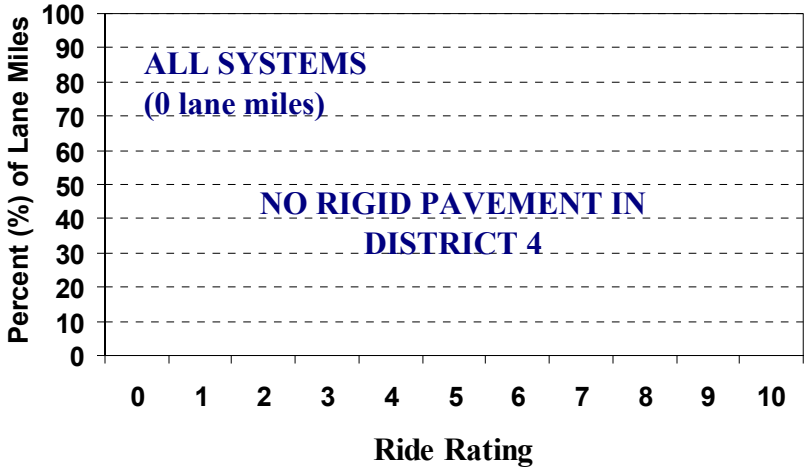


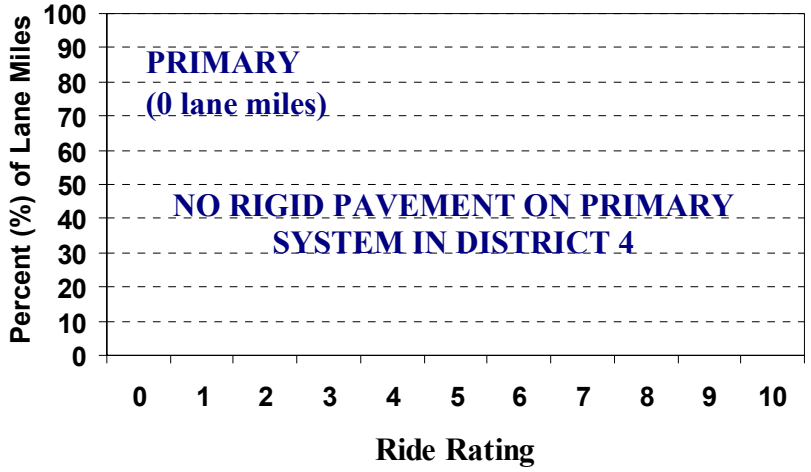


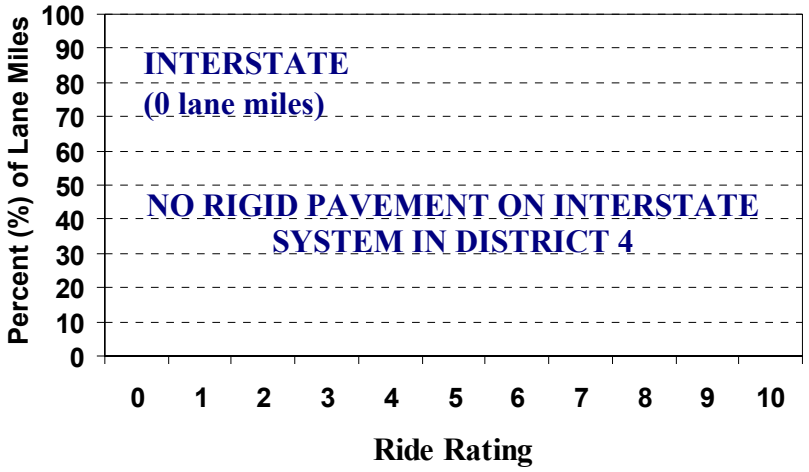
Note: No Rigid Pavement on Turnpike System

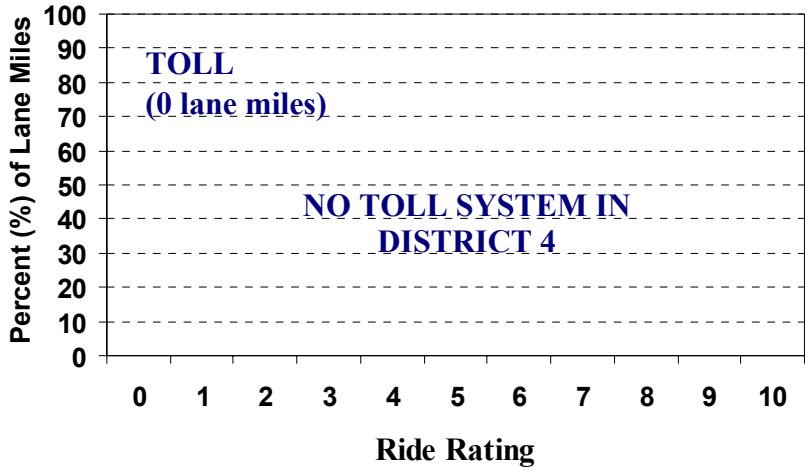
2002 Ride Distribution by System

District 4





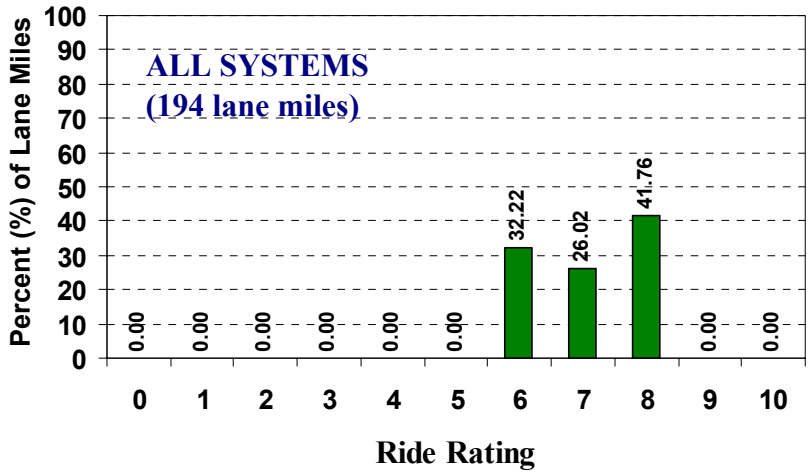


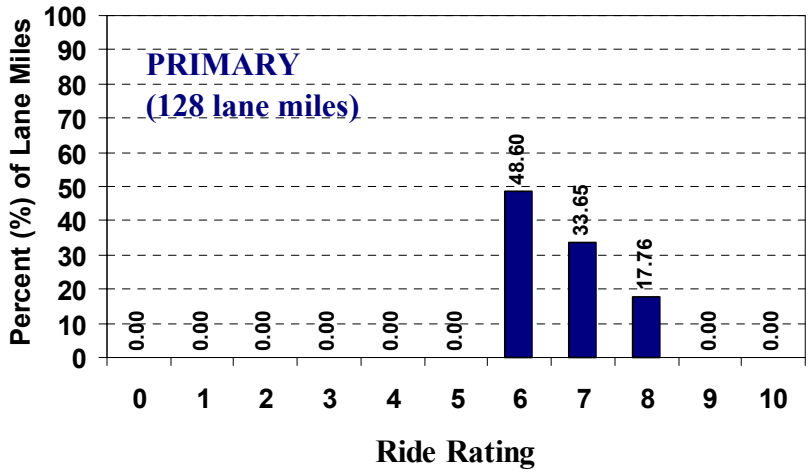


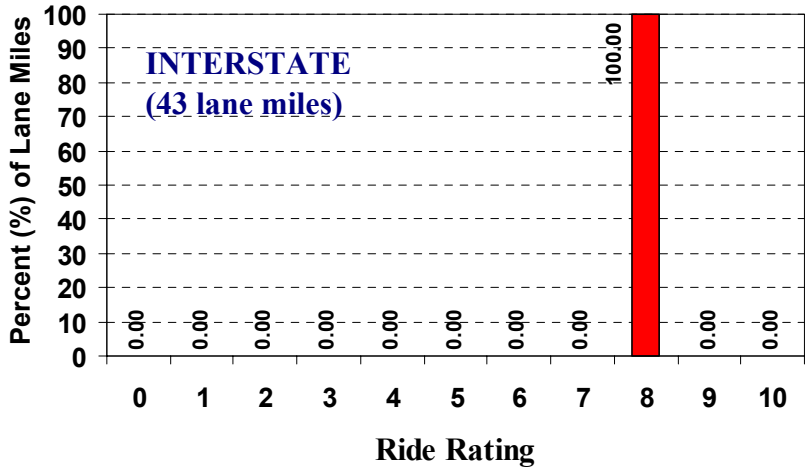
Note: No Rigid Pavement on Turnpike System

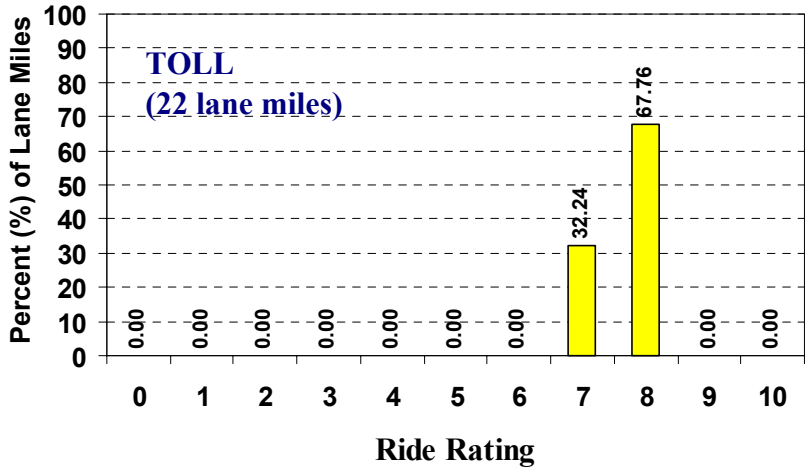
2002 Ride Distribution by System

District 5





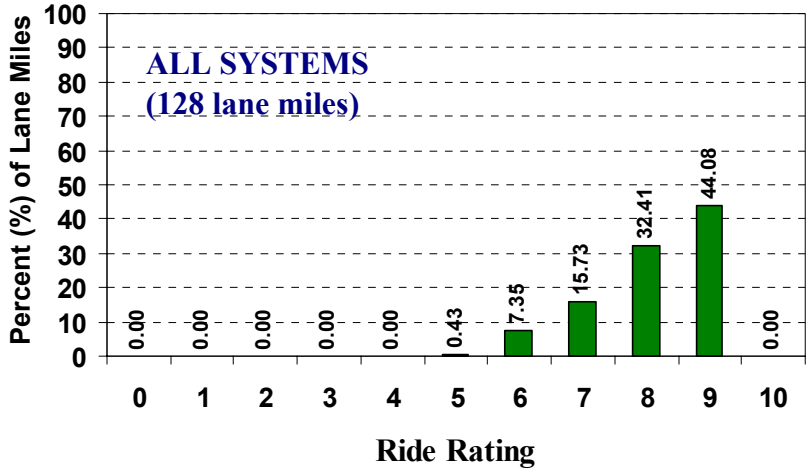


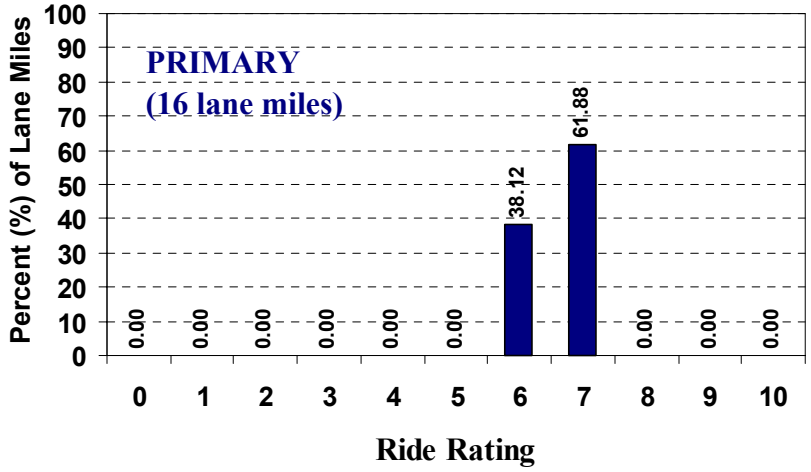


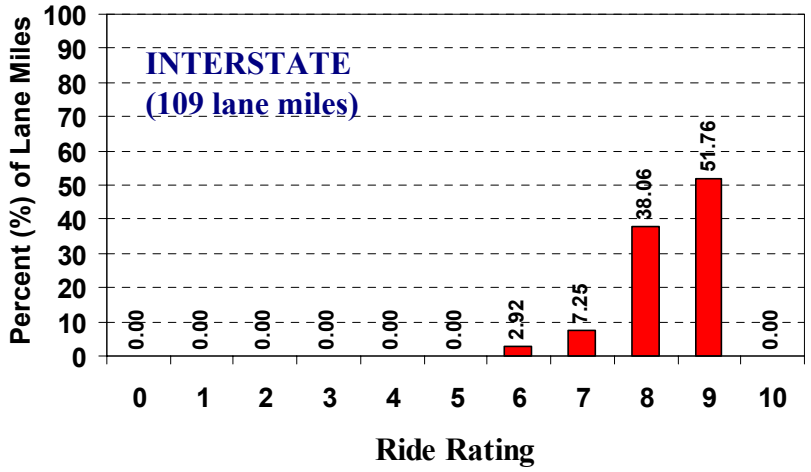
Note: No Rigid Pavement on Turnpike System

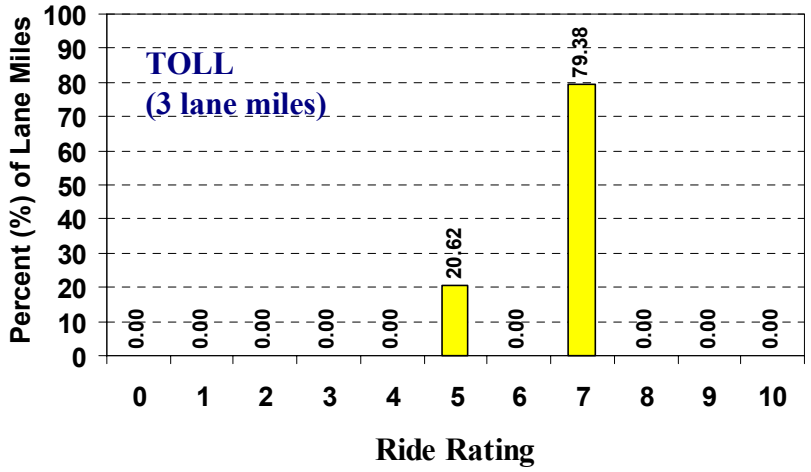
2002 Ride Distribution by System

District 6





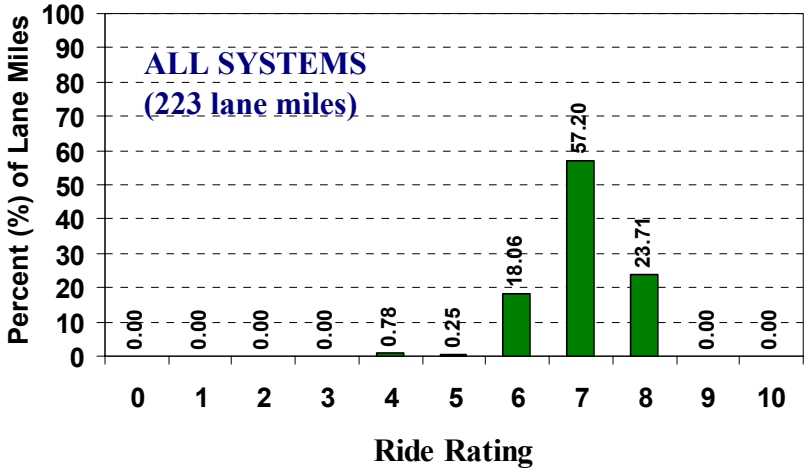


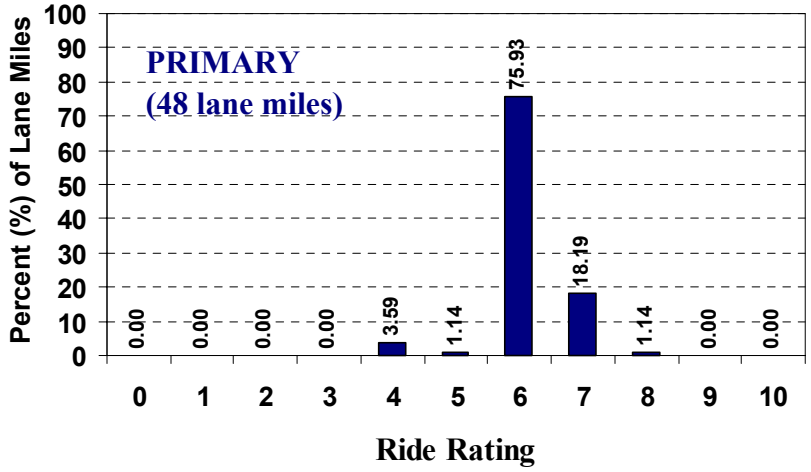


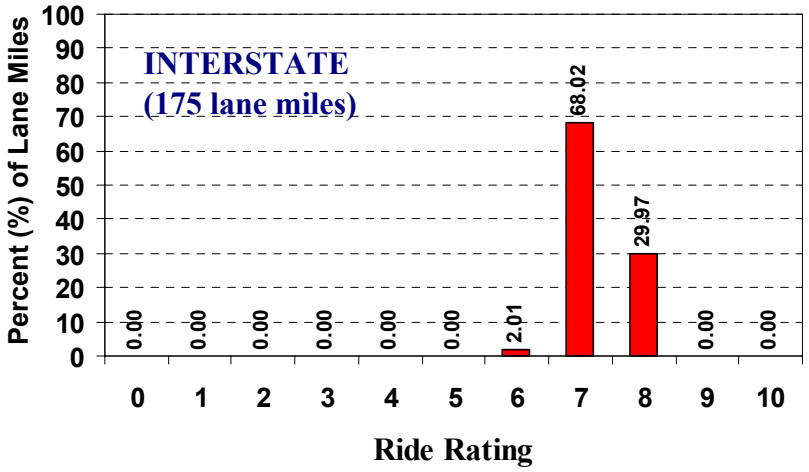
Note: No Rigid Pavement on Turnpike System

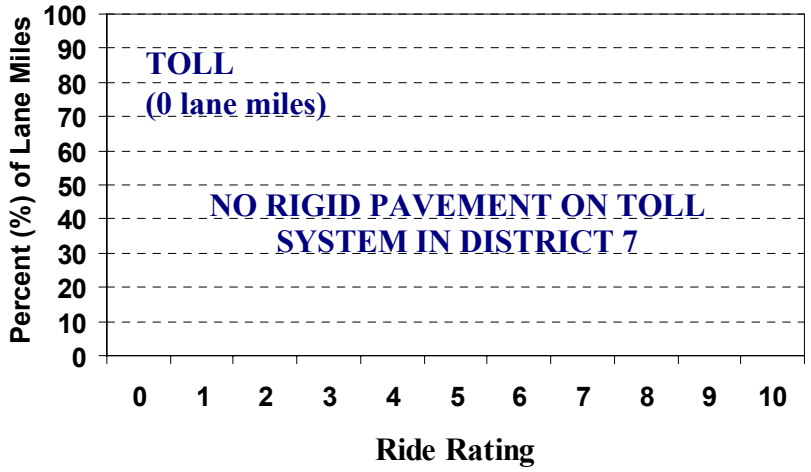
2002 Ride Distribution by System

District 7









Note: No Rigid Pavement on Turnpike System

SECTION IV

HISTORICAL

INFORMATION

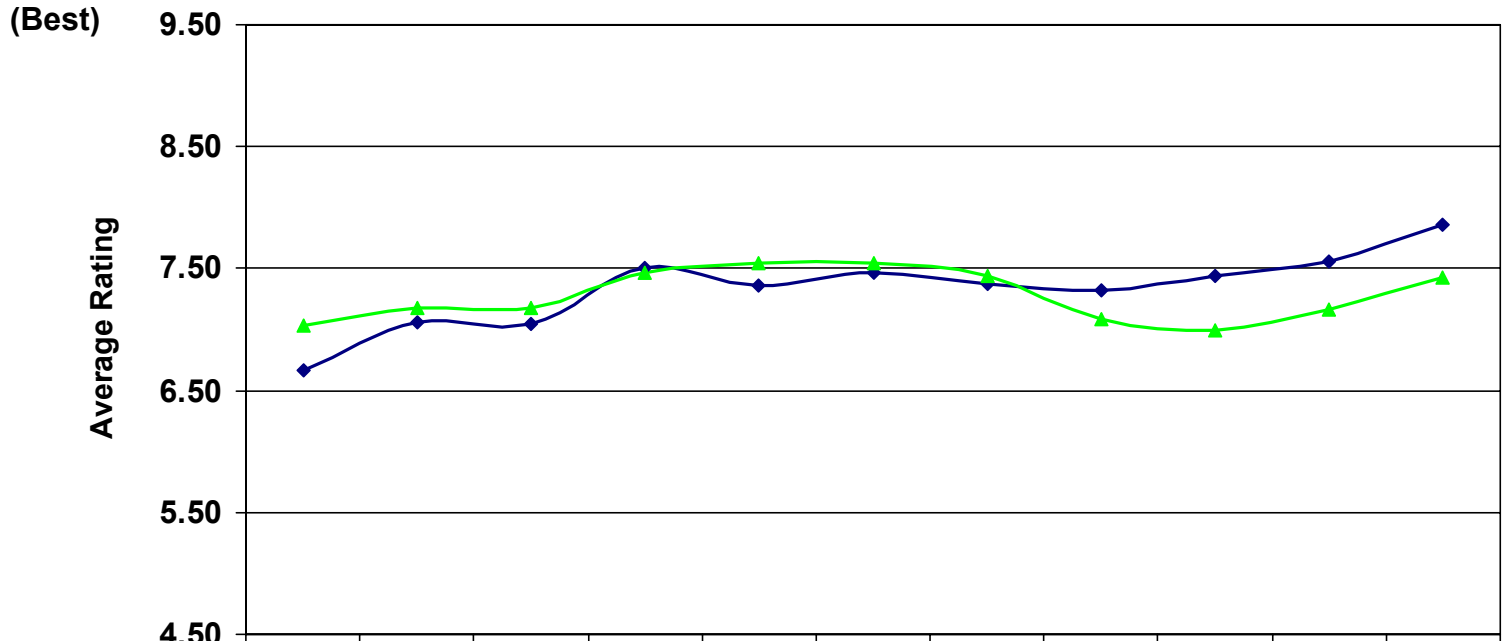
BY

DISTRICT

(ALL SYSTEMS COMBINED)

Historical Information

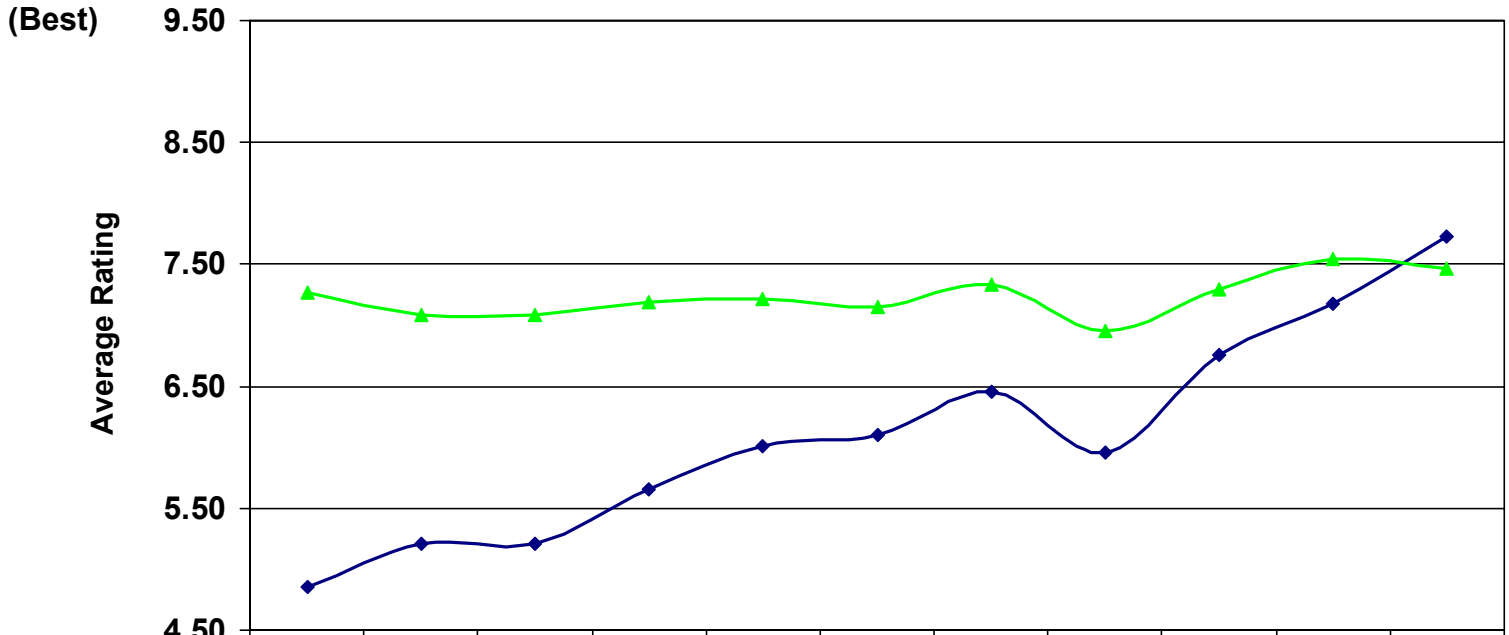
Statewide (All Systems)



	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Defect Rating	6.67	7.06	7.05	7.51	7.36	7.47	7.38	7.32	7.44	7.56	7.86
Ride Rating	7.03	7.18	7.18	7.46	7.55	7.54	7.44	7.08	7.00	7.17	7.43
Lane Miles Defected	1984	1632	1632	1657	1572	1434	1442	1416	1373	1205	896

Historical Information

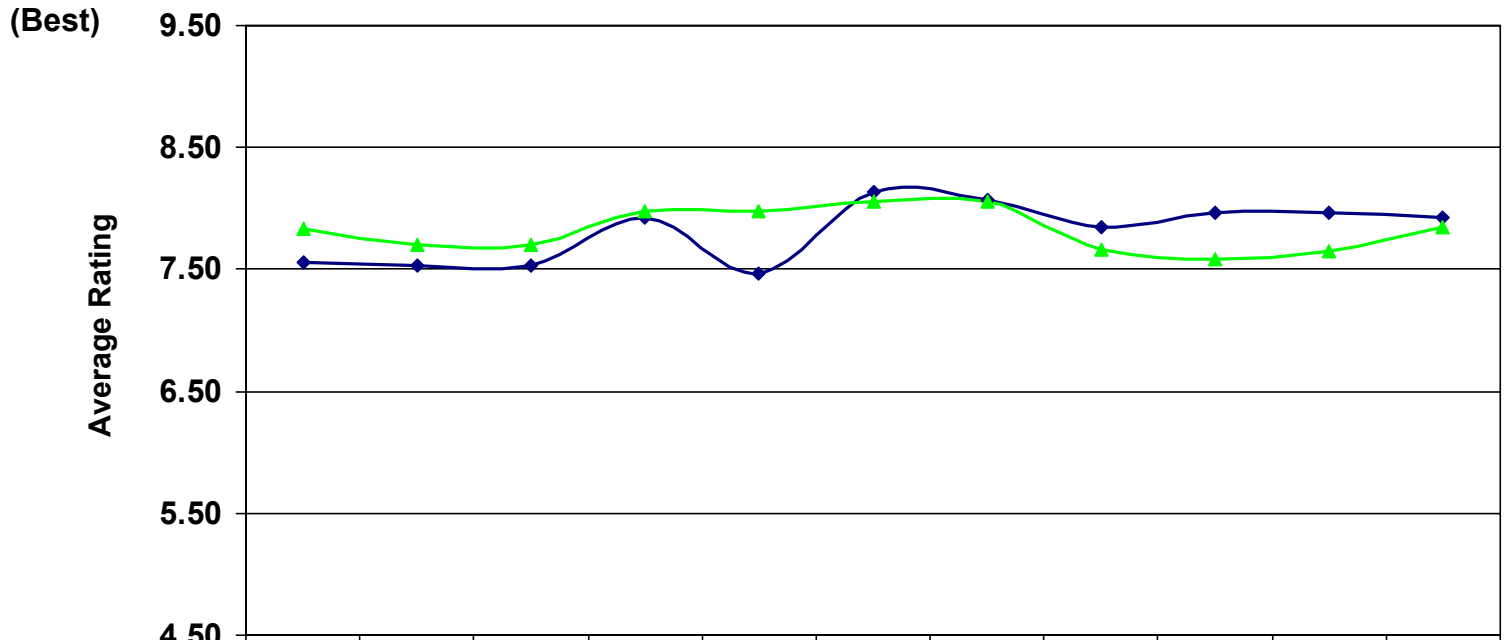
District 1 (All Systems)



	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Defect Rating	4.85	5.21	5.21	5.66	6.01	6.10	6.46	5.96	6.76	7.18	7.73
Ride Rating	7.27	7.09	7.09	7.19	7.21	7.15	7.33	6.95	7.29	7.54	7.46
Lane Miles Defected	234	198	198	153	153	92	70	59	76	76	76

Historical Information

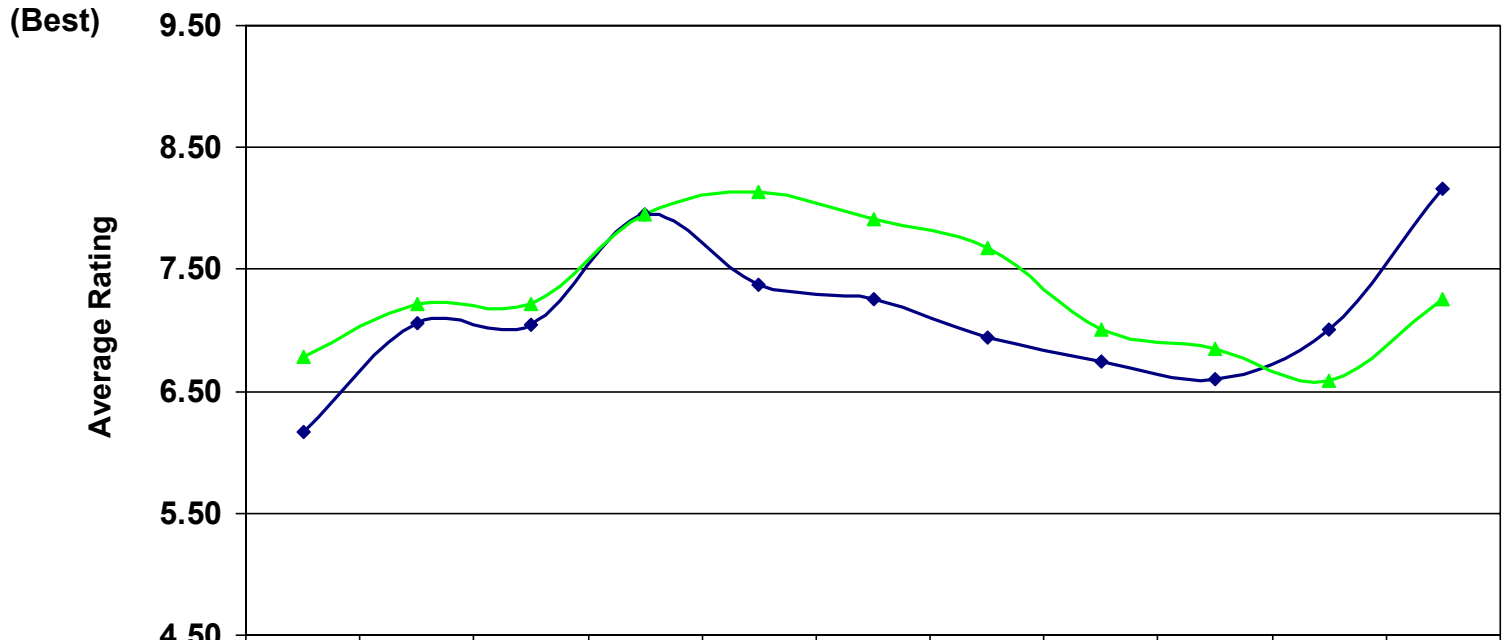
District 2 (All Systems)



	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Defect Rating	7.56	7.53	7.53	7.92	7.46	8.14	8.07	7.84	7.96	7.96	7.93
Ride Rating	7.83	7.70	7.70	7.98	7.98	8.05	8.06	7.66	7.58	7.65	7.84
Lane Miles Defected	213	214	214	200	202	152	147	208	228	216	237

Historical Information

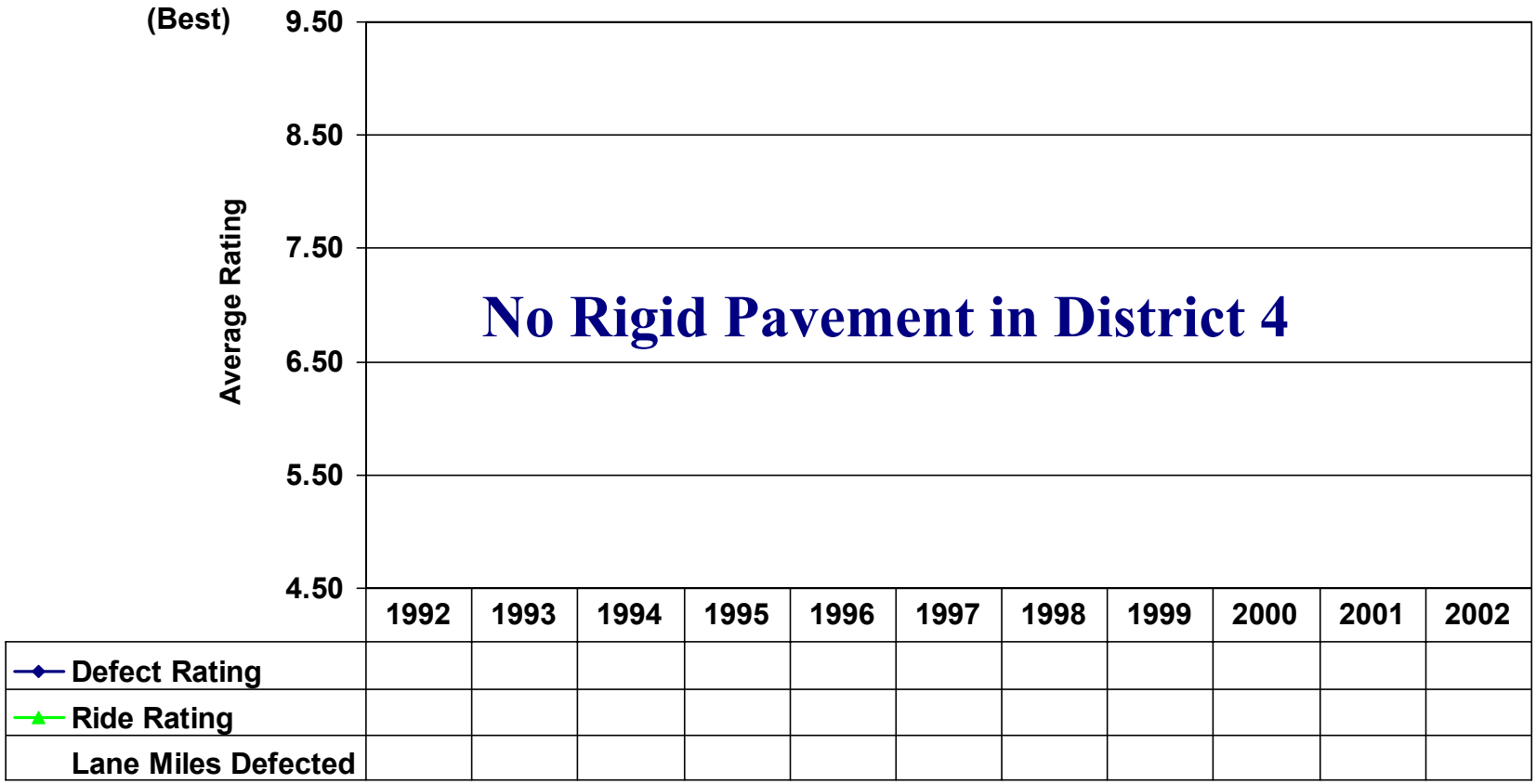
District 3 (All Systems)



	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Defect Rating	6.17	7.06	7.04	7.95	7.37	7.25	6.94	6.74	6.60	7.01	8.16
Ride Rating	6.78	7.21	7.21	7.95	8.14	7.91	7.67	7.01	6.85	6.59	7.25
Lane Miles Defected	828	524	524	585	520	571	570	516	443	335	38

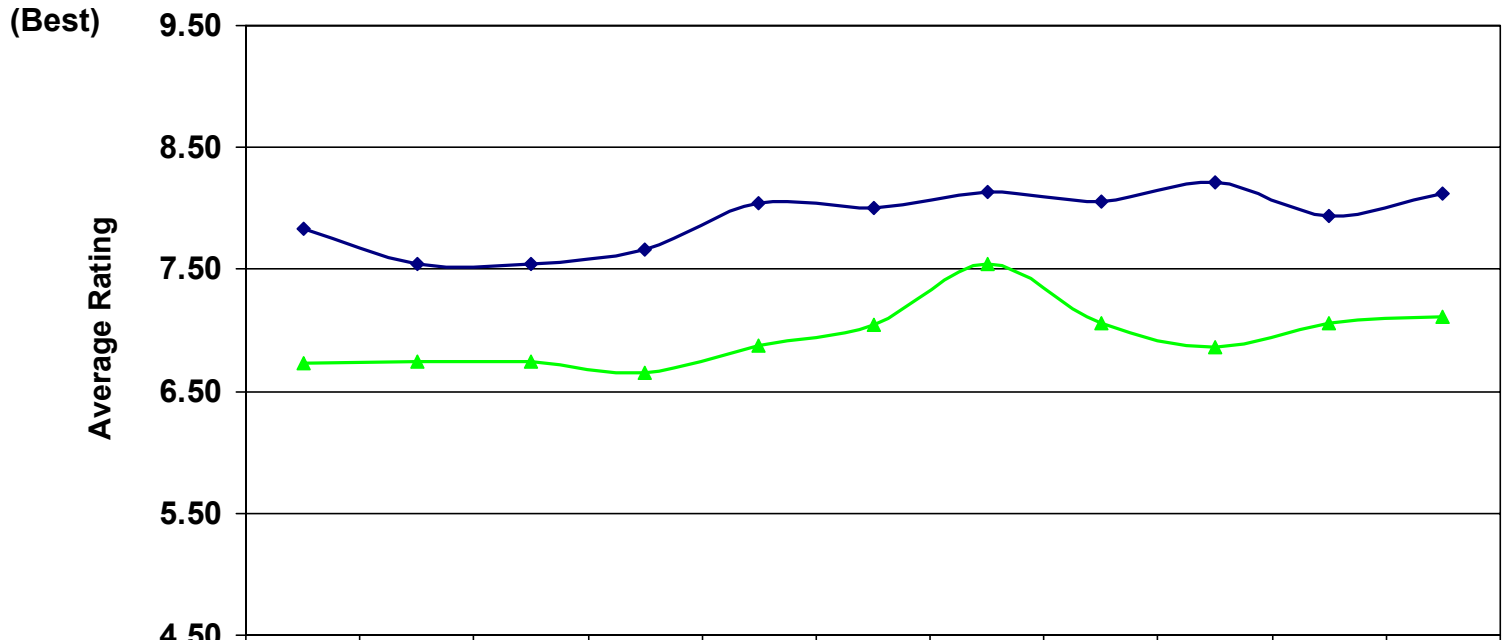
Historical Information

District 4 (All Systems)



Historical Information

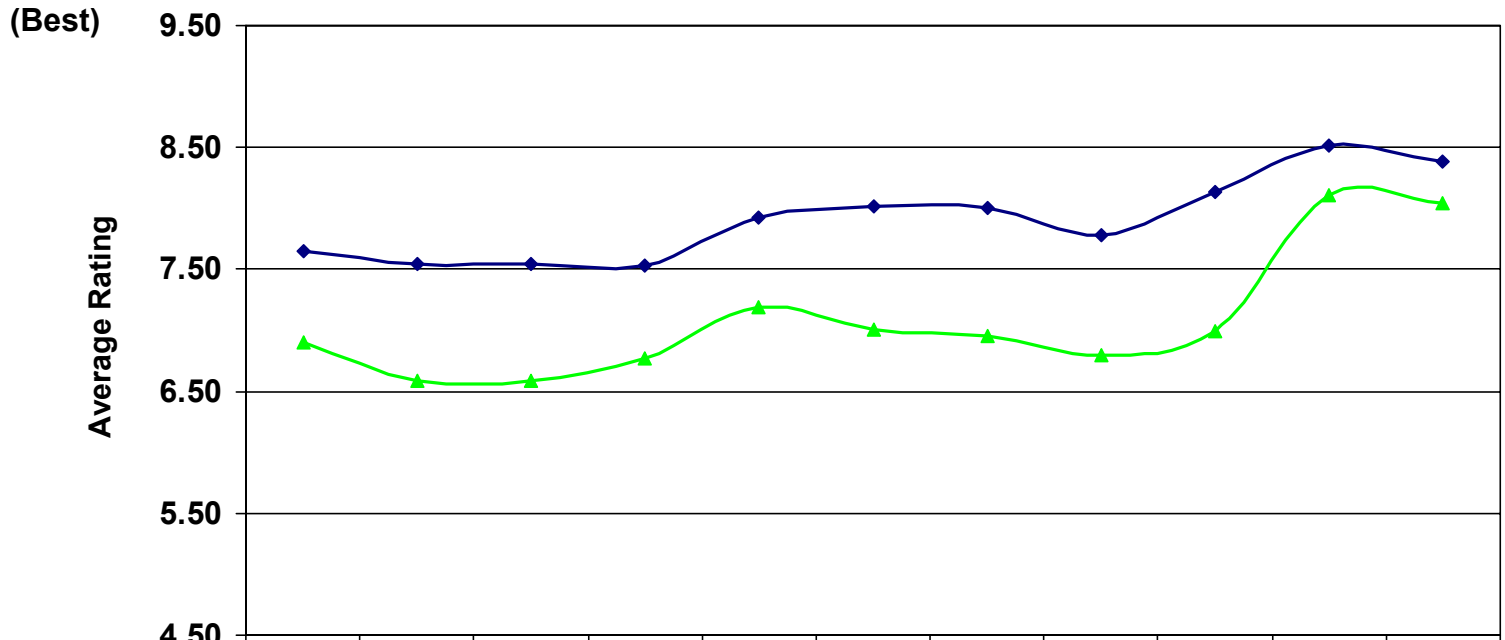
District 5 (All Systems)



	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Defect Rating	7.83	7.54	7.54	7.66	8.04	8.00	8.13	8.05	8.22	7.94	8.12
Ride Rating	6.73	6.75	6.75	6.65	6.88	7.05	7.54	7.06	6.86	7.06	7.11
Lane Miles Defected	224	212	212	213	194	188	195	197	202	202	194

Historical Information

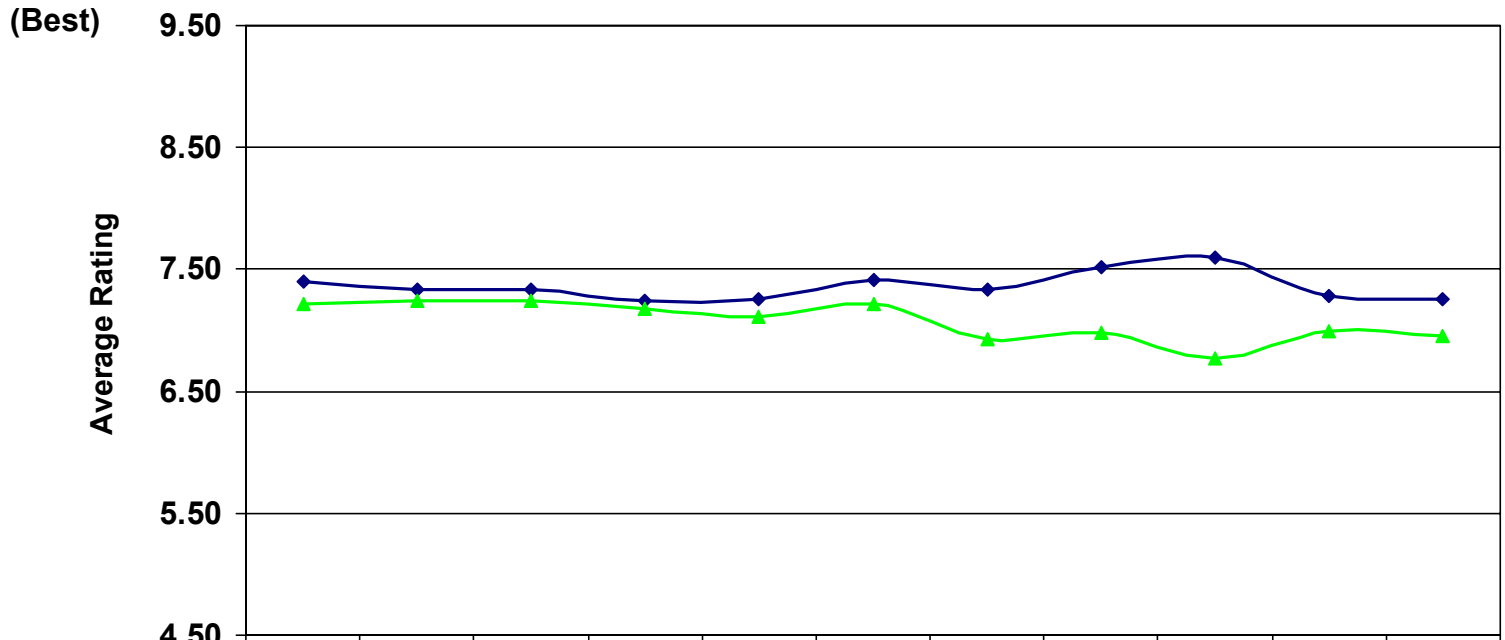
District 6 (All Systems)



	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Defect Rating	7.65	7.54	7.54	7.53	7.93	8.02	8.01	7.78	8.13	8.51	8.38
Ride Rating	6.90	6.59	6.59	6.77	7.19	7.01	6.95	6.80	7.00	8.11	8.04
Lane Miles Defected	142	142	142	143	140	136	135	155	146	131	129

Historical Information

District 7 (All Systems)



	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Defect Rating	7.40	7.33	7.33	7.24	7.26	7.41	7.34	7.52	7.60	7.28	7.26
Ride Rating	7.22	7.24	7.24	7.18	7.11	7.22	6.93	6.98	6.77	6.99	6.95
Lane Miles Defected	343	342	342	363	363	296	326	281	280	246	223

SECTION V

HISTORICAL

INFORMATION

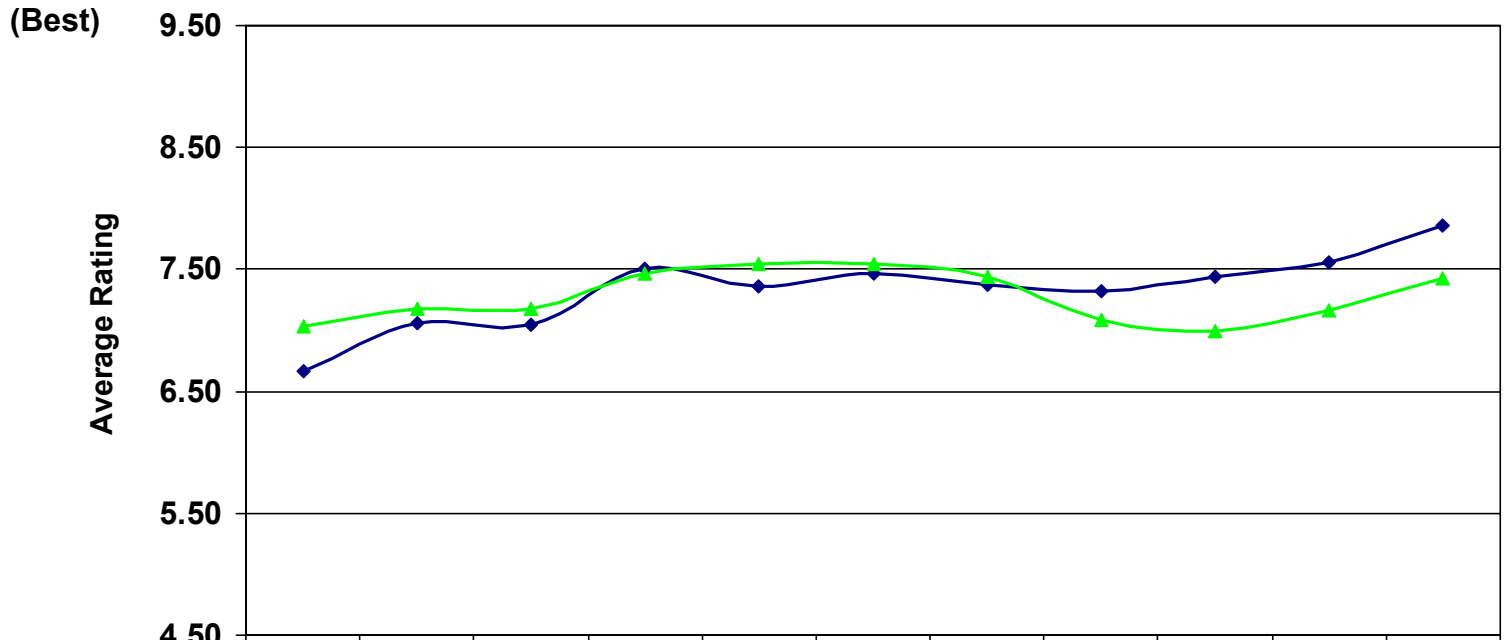
BY

SYSTEM

(ALL DISTRICTS COMBINED)

Historical Information

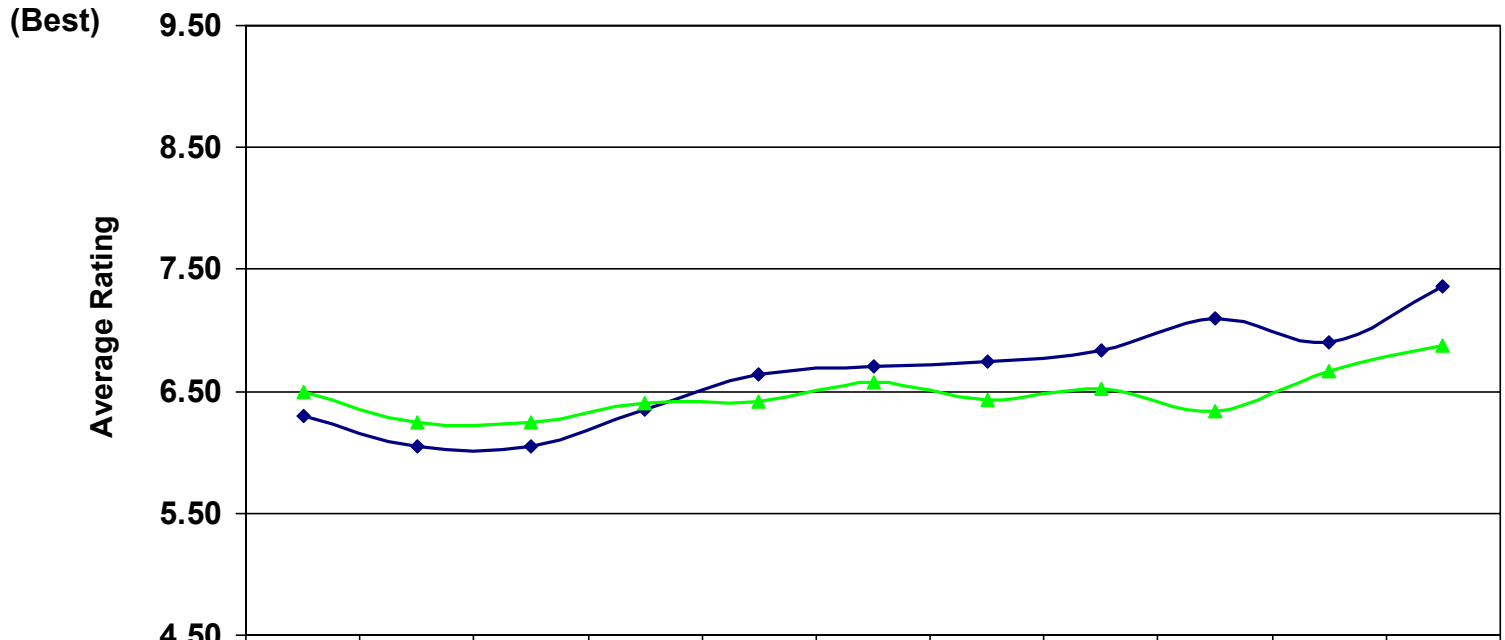
All Systems (All Districts)



	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Defect Rating	6.67	7.06	7.05	7.51	7.36	7.47	7.38	7.32	7.44	7.56	7.86
Ride Rating	7.03	7.18	7.18	7.46	7.55	7.54	7.44	7.08	7.00	7.17	7.43
Lane Miles Defected	1984	1632	1632	1657	1572	1434	1442	1416	1373	1205	896

Historical Information

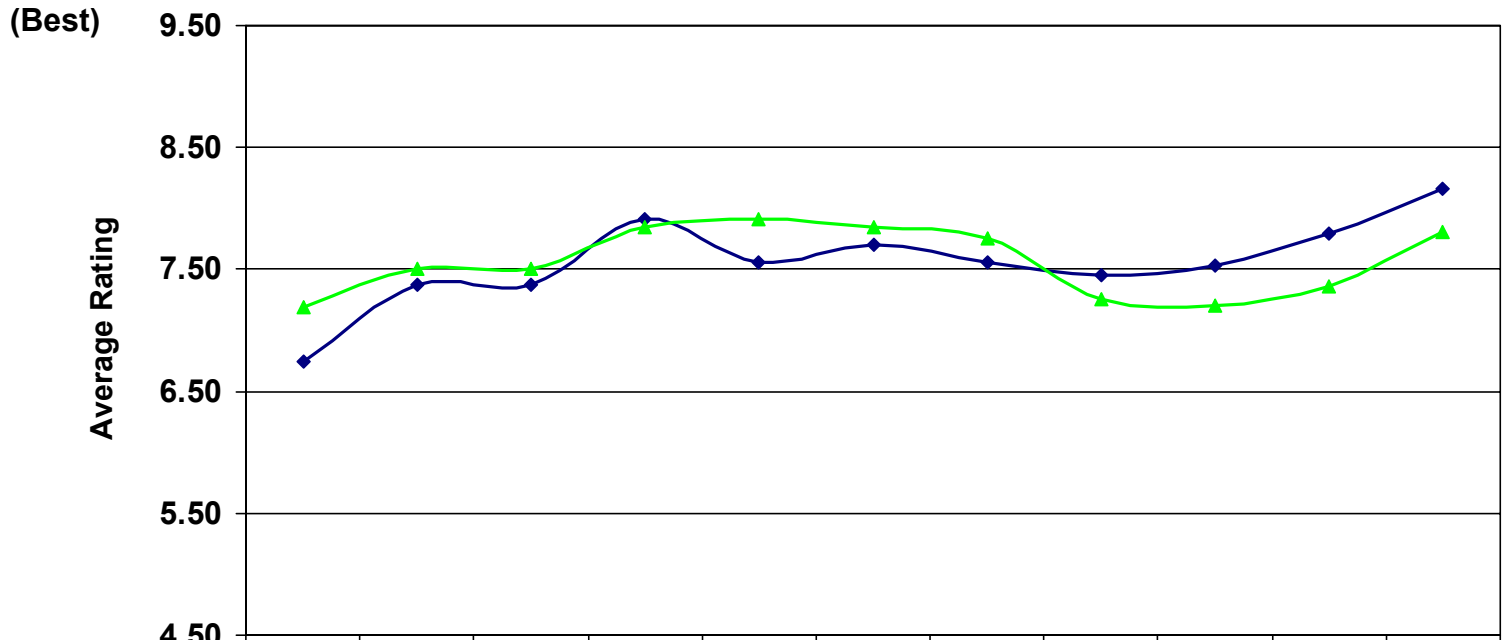
Primary System (All Districts)



	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Defect Rating	6.30	6.05	6.05	6.35	6.64	6.71	6.75	6.84	7.10	6.90	7.36
Ride Rating	6.49	6.25	6.25	6.40	6.42	6.57	6.43	6.52	6.34	6.66	6.87
Lane Miles Defected	424	409	409	424	375	344	346	350	344	344	352

Historical Information

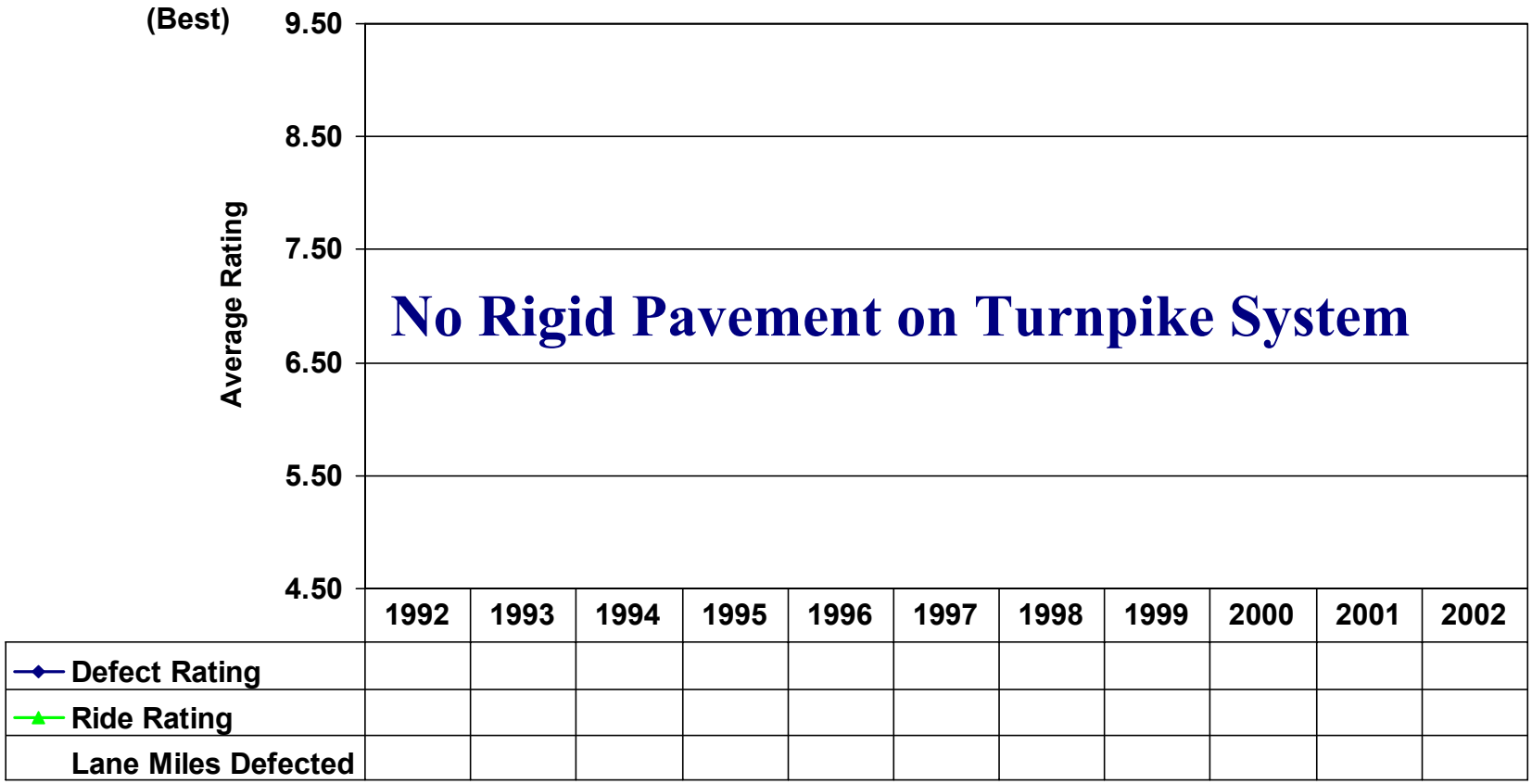
Interstate System (All Districts)



	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Defect Rating	6.75	7.38	7.37	7.91	7.56	7.70	7.56	7.45	7.53	7.79	8.16
Ride Rating	7.19	7.50	7.50	7.85	7.91	7.84	7.75	7.26	7.20	7.36	7.81
Lane Miles Defected	1541	1203	1203	1226	1167	1069	1065	1035	998	830	519

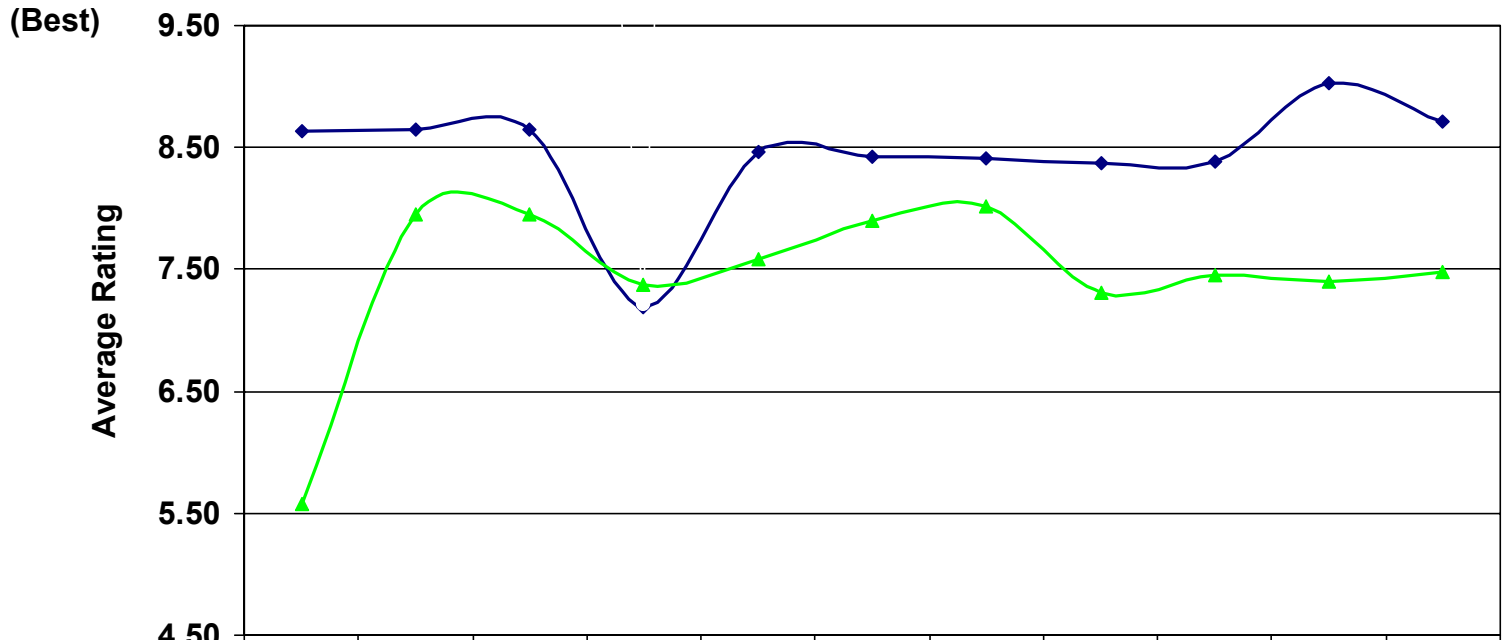
Historical Information

Turnpike System (All Districts)



Historical Information

Toll System (All Districts)



	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Defect Rating	8.63	8.65	8.65	7.19	8.46	8.43	8.41	8.37	8.38	9.03	8.71
Ride Rating	5.57	7.95	7.95	7.38	7.58	7.90	8.02	7.31	7.45	7.40	7.48
Lane Miles Defected	20	20	20	7	31	21	31	31	31	31	25

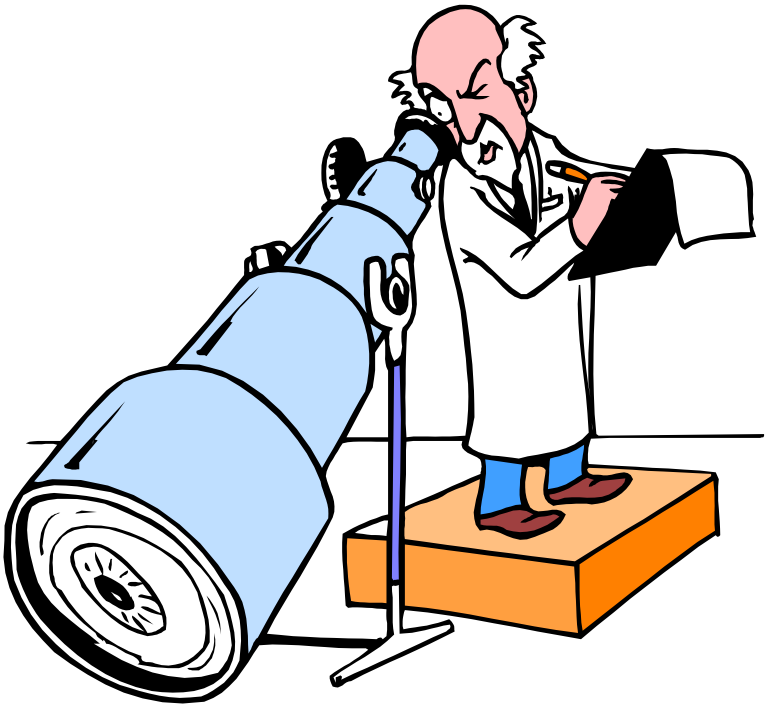
SECTION VI

DEFECT AND RIDE

RATING COMPARISON

BETWEEN

2002 AND 2001



SECTION VI

Defect and Ride Ratings Comparison

Rating Comparison Criteria

The following pavement types have been omitted because they exhibit known changes to the pavement surface as indicated below:

Type 0 - Pavement sections not State-maintained, duplicated under another county section number, or added under the flexible pavement condition survey.

Type 1 - Flexible Pavements

Type 2 - Pavement improvement without new construction, such as intersection improvements, bridge approach, crack sealing or grinding.

Type 5 - New Construction

Type 6 - No Ride taken for this section (normally because of length constraint)

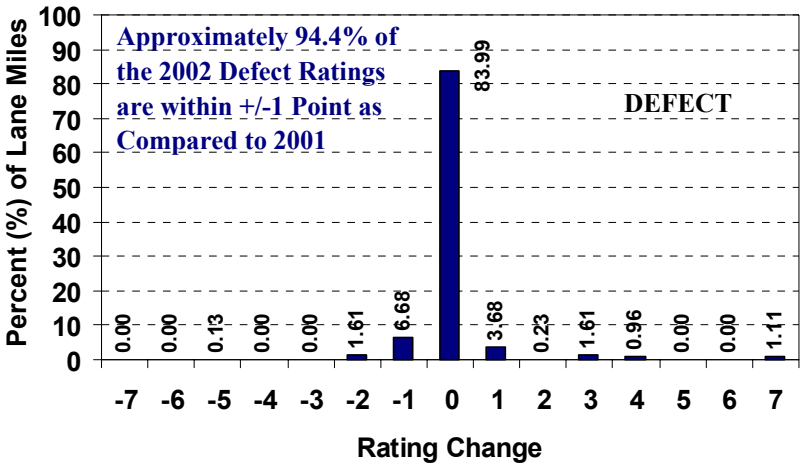
Type 7 - Rehabilitated Pavement

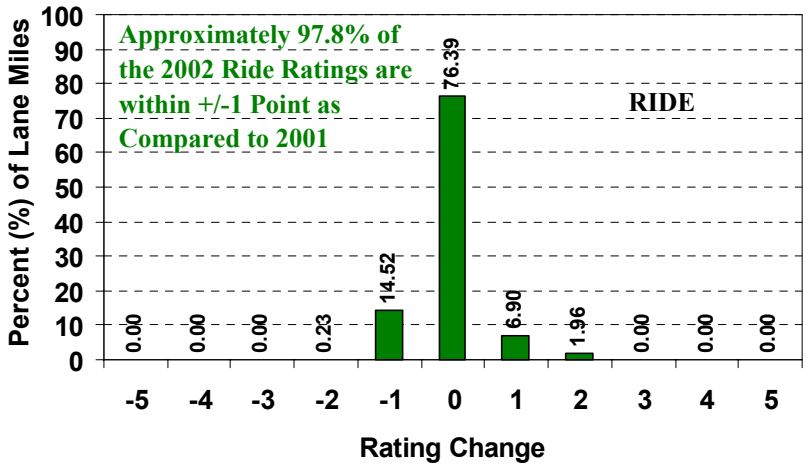
Type 8 - Under Construction

Type 9 - Structures or exceptions that are State-maintained

Defect and Ride Changes

2002 as Compared to 2001





NEGATIVE VALUES INDICATE DETERIORATION IN THE PAVEMENT AND/OR VARIABILITY IN THE DATA COLLECTION PROCESS

POSITIVE VALUES INDICATE VARIABILITY IN THE DATA COLLECTION PROCESS