

# Pavement Condition of New York's Highways



2007



New York State Department of Transportation

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## Preface

The New York State Department of Transportation annually conducts a survey of State Highway pavement surface ratings that provides a consistent source of pavement data for New York's highway network. The survey results are a primary input to the Department's Pavement Management System as well as to the development of the pavement portion of the Department's Capital and Maintenance Programs.

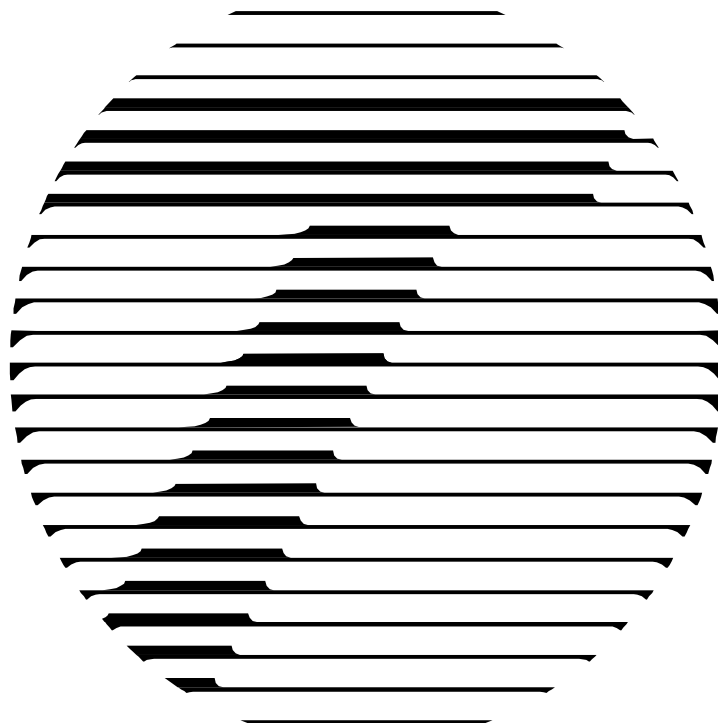
Included in this report are various tables and figures that describe network surface ratings over time, by region and county, and by pavement type. Also included is information about pavement ride quality. In addition, summaries of network-level needs, in terms of mileage requiring a particular treatment strategy, are provided.



It should be emphasized that the surface rating survey is conducted in May and June and represents the surface rating of the system at that point in time. Ride quality data is collected on a continuous basis through the spring, summer and fall. The impact of pavement improvement projects completed after the survey are therefore not reflected in the surface rating summaries and may not be included in the ride quality data depending on the timing of the data collection and the work done.

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## Executive Summary

### State System Surface Rating

After an upturn in the statewide average surface rating last year, a benefit of a strong early season paving program in Region 4, pavement surface ratings dropped in 2007 from 6.90 to 6.86.

Excellent dropped slightly from 10.5% to 9.7%, and Fair continued a general increasing trend by rising 0.6% to 33.2%. Poor pavement has been creeping upward from a low of 4.7% in 2004 to 5.4% in 2007, an increase of 0.4% over last year.

Pavements rated 7 fell for the fourth year in a row, to 42.4%. When this trend is coupled with the trend of increasing Fair pavement, it tends to indicate preventive maintenance candidates are not being treated in time and are deteriorating to levels that will require more expensive repairs.

The general relationship between surface ratings, condition category and type of treatment is shown below:

Rating	Category	Treatment
10-9	Excellent	Not Needed
8-7	Good	Crack Seal PM overlay
6	Fair	Rehab
5 and below	Poor	Major Repair Replacement

### Surface Rating by Region

Six regions improved in average rating by an average of 0.10 points, and five regions declined in average rating by an average of 0.20 points. Eight of eleven regions have an increase in Fair pavement. Region 7 made the largest improvement in overall surface ratings, increasing the average rating by 0.25 points to 6.98 and Regions 3 improved the next most by 0.15 points to 7.07, the second-highest average rating. Region 10 has the highest overall surface rating at 7.16 and Region 6 has the lowest at 6.49. Region 9 has the largest decline, dropping 0.40 points to 6.80.

Tioga County is included with Region 9 in this year's report. The reassignment has only a slight impact on the ratings for Regions 9 and 6. Without Tioga County, Region 9's average rating still declines 0.36 points to 6.84, and Poor pavement increases from 4.5% to 9.3% (9.5% with Tioga County). Region 6's average rating is 6.49 without Tioga County and 6.47 with Tioga.

### Ride Quality

Interstate ride quality is very good in Regions 1, 3 and 7, where 94% or better of the miles are rated smooth. Less than half the Interstate miles are rated smooth in Regions 2, 5, 8 and 10. Region 11 has only 5% of Interstate miles rated smooth.

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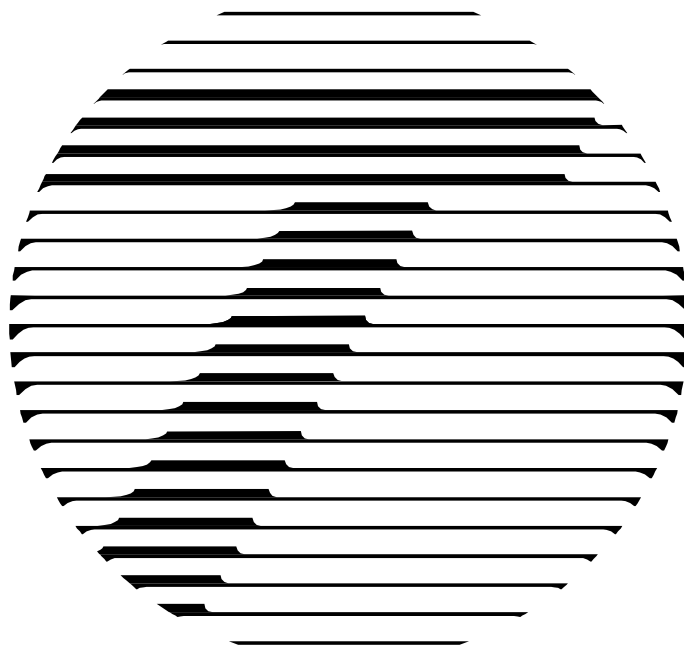
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An aerial photograph of a multi-lane highway, likely in New York, showing traffic moving away from the viewer. The highway is flanked by dense trees and foliage. The image is in grayscale, with the text overlaid in black.

# **Pavement Condition of New York's Highways**

## **2007**



# Pavement Condition of New York's Highways: 2007

## Introduction

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The New York State Department of Transportation annually conducts an assessment of the pavement surface rating of the New York State Highway network. The survey data is collected by regional rating teams who are trained in the use of carefully developed photographic scales of pavement surface ratings. Surface rating data is collected for the pavement surface and for specific distress symptoms called dominant distress. The survey is conducted during the late spring and early summer with the results supplied back to the regions later in the fall.

This report presents a summary of the 2007 survey results. Unless otherwise noted, the various tables and figures reflect data for the State Highway System only. These are facilities under the jurisdiction of the New York State Department of Transportation, including NYSDOT Parkways and State-owned service roads. Ramp mileage is not included.

*Please note that the data and analyses in this report **include** the reassignment of Tioga County from Region 6 to Region 9.*

## Pavement Surface Rating Process

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The pavement surface rating of New York's highways is determined by two measures: the *surface rating* and the *dominant distress indicator*. These measures and the associated rating process are described as follows:

### The Surface Rating Scale

The surface rating scale is a 1 to 10 point scale based on the prevalence of a surface - related pavement distress (e.g., cracking). The Pavement Surface

Rating Manual is the tool used to ensure consistency in obtaining the surface ratings. The manual includes photographs of each scale point and descriptions of the frequency and severity of distress associated with each scale point. Each photograph was selected by a panel of Department pavement experts based on the general treatments required by the pavement surface rating represented. There are three scales, one for each pavement structure type:

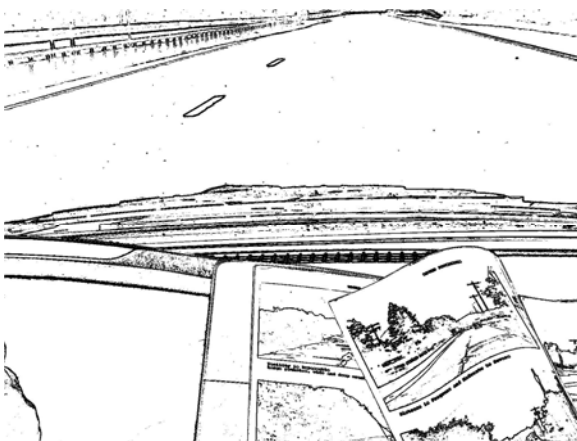
- *Rigid* (Portland Cement Concrete PCC)
- *Overlaid* (asphalt overlaid on PCC slabs), and
- *Flexible* (full-depth asphalt)

When in the field, the survey teams determine the surface rating by comparing the surface rating of the highway section surveyed to the photographic scale for the appropriate pavement type. The scale point that most closely represents the surface rating of the highway evaluated is the surface rating for that section.



### Dominant Distress Measures

A dominant distress is defined as a specific distress symptom, observable at posted speeds, which will trigger a treatment category different from the treatment category based on the surface rating alone. For example, if a Portland cement concrete pavement is rated with a surface rating of "7," the treatment category assigned on the basis of the surface rating alone is non-paving preventive maintenance. However, if this pavement were faulted (that is, step formations at the joints), a more costly corrective maintenance treatment is required. Therefore, faulting qualifies as a dominant distress for PCC pavement structures. Dominant distresses were determined for each pavement type by the panel of experts and are shown in the following table:



Dominant Distress by Pavement Type		
Pavement Type	Dominant Distress	Frequency Measure
Rigid	Faulting	presence only
	Spalling (Isolated)	occurs infrequently over section (less than 20%)
	Spalling (General)	occurs over most of the section (more than 20%)
Overlaid	Alligator Cracking (Isolated)	occurs infrequently over section (less than 20%)
	Alligator Cracking (General)	occurs over most of the section (more than 20%)
	Widening Dropoff	presence only
Flexible	Alligator Cracking (Isolated)	occurs infrequently over section (less than 20%)
	Alligator Cracking (General)	occurs over most of the section (more than 20%)

### ***Special note on Alligator Cracking***

Alligator Cracking as a dominant distress is a load-related, fatigue-type distress indicating a weakness in the pavement structure. Raters will identify Alligator Cracking as a Dominant Distress only if the cracking appears in the wheelpath of an Overlaid or Flexible Pavement.

### **Pavement Rating with E-Score**

E-Score (Electronic Documentation of Pavement Scores) captures field rating information directly in an electronic format. The system uses a tablet computer linked to a DMI (distance measuring instrument) and GPS for location referencing. Built into the software are real-time edit checks to improve data quality at the source. E-Score has been used statewide since 2004.

The screenshot displays the E-Score PCS software interface. At the top, it shows 'Region: 1', 'County: Albany', and 'Route: 871 11077'. Below this, 'Miles from Start' is 2.551. The 'Previous Landmark' is 'VILLAGE COLONIE SAND CREEK ROAD UNDER (1.54 mi) 87111082016' and the 'Next Landmark' is 'EXIT 4 ALBANY SHAKER ROAD UNDER (2.73 mi) 87111082020'. The 'Roadway Characteristics (Inventory)' section includes 'Median Type: 3', 'No. Roadways: 2', 'Median Width: 0', 'No. Lanes: 6', 'Pavement Width: 72', 'Shoulder Width: 10', 'Pavement Type: OVL', and 'Shoulder Type: 4'. The 'Pavement Condition' section shows a 'Score' of 7, 'Dominant Distress 1' as 'Ag', and 'Dominant Distress 2' as 'Ag'. A numeric keypad is visible with buttons for digits 0-9, 'U', 'W', 'F', 'START', 'STOP', 'FILL', and 'CLEAR'. The bottom status bar shows 'Start', 'E-Score PCS', and the time '10:24 AM'.

## **Pavement Surface Rating Survey Results**

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### **Extent of System**

*Table 1* presents the jurisdictional classification in lane miles for both State and non-State Highways that comprise the Touring Route System. The total mileage of the NYS Touring Route System is 41,260 lane miles, of which 38,183 lane miles are under State jurisdiction.

It should be noted that mileage under construction at the time of the survey, which can be several hundred miles, in the past has *not* been included in any of the surface rating summaries presented in this report. To help reduce the effect of this “unaccounted” mileage, beginning in 2006 the raters were instructed to rate segments actively under construction and expected to be completed before the end of the season as new pavement (rating of 10) rather than “under construction.” Only pavements under multi-year construction with uncertain completion dates should be rated as “under construction.”

### **State Highway System**

#### ***Surface rating Trends - Statewide***

*Table 2* and *Figure 1* illustrate the statewide trends in pavement surface rating for State-owned highways from 2003 through 2007. Statewide

pavement surface ratings have been generally declining since about 2002. Last year the statewide Average Surface Rating increased significantly due to a strong early season paving program in Region 4. The 2007 Average Surface Rating slipped to 6.86 from last year's 6.90, but the Average Rating is still above the 6.81 from two years ago.

Statewide, pavements rated Excellent dropped from 10.5% to 9.7%, and Fair continued a general increasing trend by rising 0.6% to 33.2%. Poor pavement has been creeping upward from a low of 4.7% in 2004 to 5.4% in 2007, an increase of 0.4% over last year.

Pavements rated 7 fell for the fourth year in a row, to 42.4%. When this trend is coupled with the trend of increasing Fair pavement, it tends to indicate preventive maintenance candidates are not being treated in time and are deteriorating to levels that will require more expensive repairs.

#### ***Surface Ratings Based on LM vs CLM***

This document historically has reported surface ratings based on lane miles rather than centerline miles because lane miles better reflect the magnitude of pavement in the system. Emphasis has shifted over the last several years to giving priority to the Interstates and

other high-volume roadways over lower-volume roads. As a result, the surface rating of high-volume versus low-volume highways has begun to diverge. This causes an upward weighting of the overall ratings because the higher-volume facilities have more lane miles per mile of road, thereby giving greater weight to the better ratings. *Figure 2* illustrates this observation. Until about 2003, there was not much difference in average rating based on lane miles or centerline miles. However, differences are greater over the last few years.

### **Surface Rating by Region**

*Table 3* presents the distribution of surface ratings by region for 2007, as well as the percentage and number of lane-miles in each surface rating category. The amount of Excellent pavement generally is related to the strength of the region's paving program over the last few years. Regions 7 and 3 have the most Excellent pavement, with 16.9% and 14.0%, respectively.

A large and growing number of pavements rated 7 generally indicates a need for more preventive maintenance paving. If left untreated, these pavements will begin to fall to the Fair surface rating. This trend has emerged in the statewide surface ratings. The number of 7's increased steadily from 1992 to 2002. Since 2002, 7's have

been steadily decreasing with a corresponding increase in the amount of Fair pavement. This is an undesirable situation; it is more cost effective to treat a pavement with a relatively inexpensive preventive maintenance treatment than a more costly rehab required for a Fair pavement.

Region 10 again this year has a high amount of pavement at 7 with 71.0%. While this is down slightly from last year, the Fair pavement in the region has been increasing steadily over the last 5 years.

Eight of eleven Regions experienced an increase in Fair pavement in 2007. This means that their paving preventive maintenance programs have not been able to keep up, and pavements are falling beyond the preventive maintenance window. This situation is most noticeable in Region 4, with a 6.4% increase in Fair, and Region 9, with a 9.6% increase. Even without the addition of Tioga County to Region 9, the region experienced a 7.3% increase in Fair pavement.

Region 7 continues steady progress at reducing Fair pavement, experiencing an 8.2% drop from last year. This year's Fair of 51.1% is an improvement of 23.1% from the high of 74.2% in 2004. Region 3 reduced Fair pavement by 5.6% to 32.7%, and Region 1 by 2.5% to 41.8%.

Table 4 presents the Average Surface Ratings and percent Poor pavement by region for the years 2003-2007. Overall, six regions improved and five regions declined. The improving regions increased by an average of 0.10, but declining regions decreased by an average of 0.20. Region 7 improved the most, raising the Average Surface Rating by 0.25 to 6.98. Region 10 has the highest overall average rating at 7.16, followed by Region 3 at 7.07 and Region 7.

Region 9 surface ratings declined the most, with the average rating

decreasing by 0.40 to 6.80 and Poor increasing 5.0% to 9.5%. Without the addition of Tioga County, the average rating still decreased 0.34 to 6.84 and Poor increased 4.8% to 9.3%.

Region 6 has the lowest Average Surface Rating at 6.49 followed by Region 1 at 6.67 and Region 4 at 6.68. Region 4 has the highest amount of Poor pavement at 10.7%, with Region 1 having 9.0% and Region 6 with 8.9%. Regions 11, 10 and 3 have the lowest amount of Poor pavement, with 0.3%, 0.7% and 1.0%, respectively.

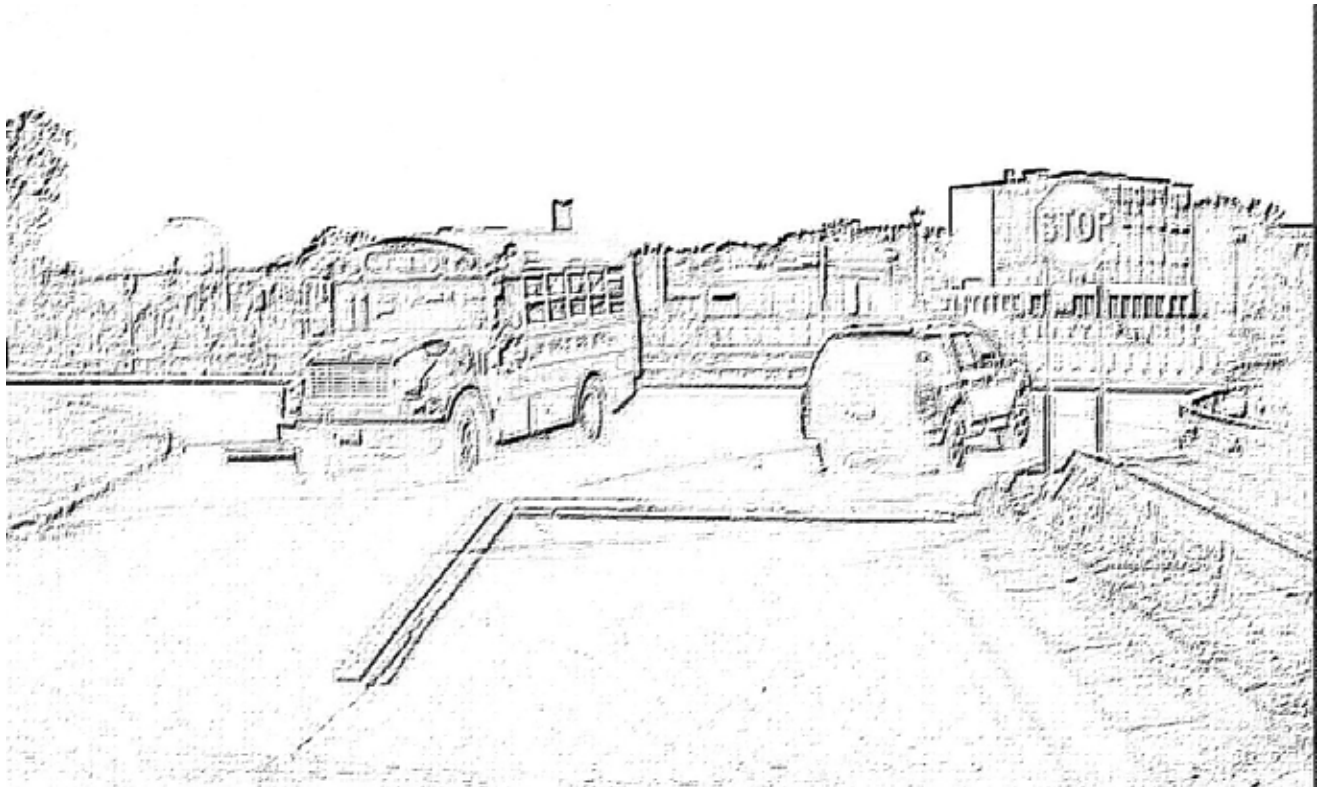


Table 1

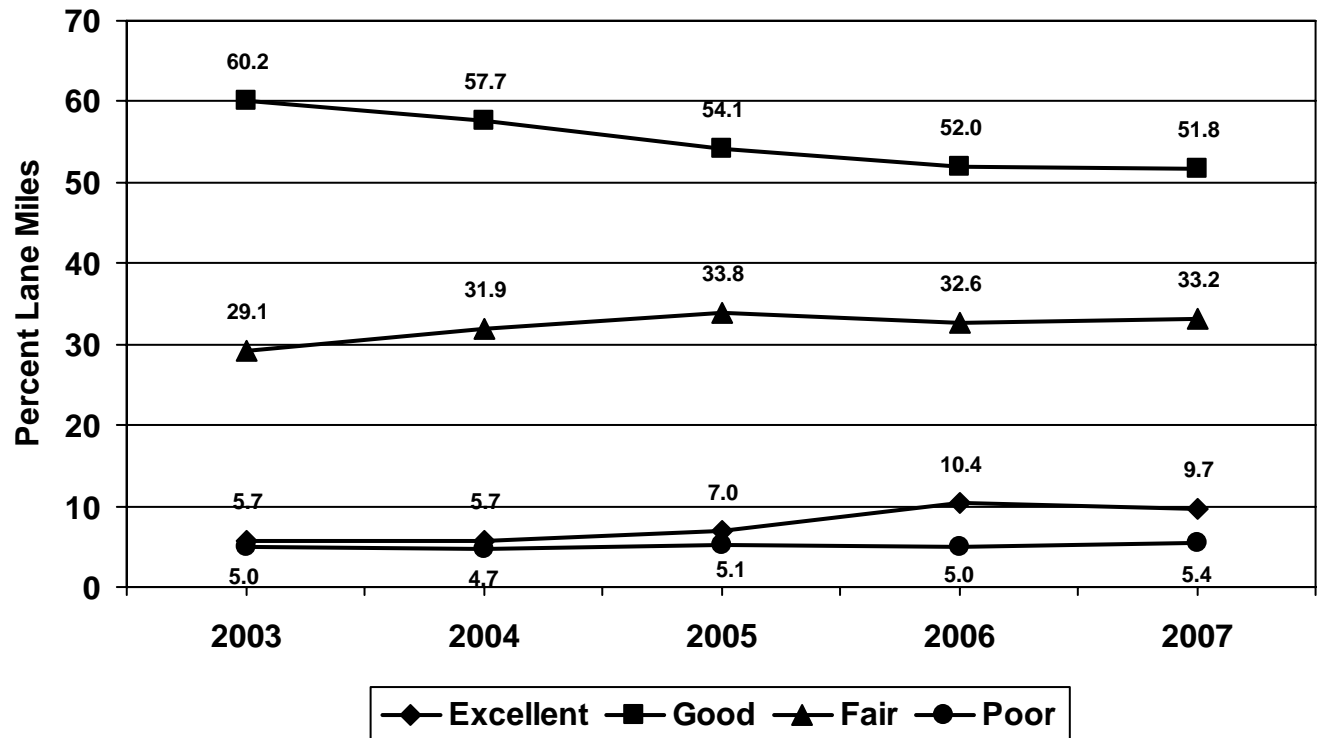
<b>Touring Route System 2007</b> <b>Total Lane Miles by Region and Jurisdiction</b>						
Region	Rated			Under Construction		Touring Route System 3
	State 1	Non-State 2	Total	State	Non-State	
1	4,791	230	5,021	4	0	5,025
2	3,023	59	3,081	13	0	3,095
3	3,589	177	3,766	0	0	3,766
4	4,039	357	4,396	33	2	4,431
5	3,698	479	4,177	81	0	4,258
6	2,192	26	2,218	29	0	2,247
7	3,494	117	3,611	22	3	3,636
8	5,390	425	5,815	0	0	5,815
9	4,202	180	4,382	25	0	4,407
10	2,731	212	2,943	2	0	2,945
11	825	811	1,636	0	0	1,636
<b>State</b>	<b>37,974</b>	<b>3,073</b>	<b>41,046</b>	<b>209</b>	<b>5</b>	<b>41,261</b>
Notes: 1. State Includes Interstates, State Highways, State-DOT Parkways and State-owned service roads, including other State-owned roads with "900" route designations. Unless noted otherwise, the tables and figures in this Report are based on this mileage and is identified as the "State Highway System." 2. Non-State Includes Non-DOT Parkways, local roads, institutional roads and authority mileage on the Touring Route System, but not the NYS Thruway. 3. Touring Route System does not include NYS Thruway mileage.						

Table 2

Surface Rating 2003 - 2007 State Highway System											
Rating Level		2003		2004		2005		2006		2007	
		Lane Miles	%	Lane Miles	%	Lane Miles	%	Lane Miles	%	Lane Miles	%
Excellent	10	623	1.7	743	2.0	731	1.9	1,354	3.6	679	1.8
	9	1,513	4.0	1,402	3.7	1,894	5.0	2,619	6.9	2,993	7.9
Subtotal		2,136	5.7	2,145	5.7	2,625	7.0	3,973	10.5	3,672	9.7
Good	8	4,649	12.4	3,996	10.7	3,483	9.3	3,140	8.3	3,551	9.4
	7	17,998	47.9	17,606	47.0	16,795	44.8	16,557	43.7	16,118	42.4
Subtotal		22,647	60.2	21,602	57.7	20,278	54.1	19,697	52.0	19,669	51.8
Fair	6	10,927	29.1	11,948	31.9	12,688	33.8	12,344	32.6	12,593	33.2
Subtotal		10,927	29.1	11,948	31.9	12,688	33.8	12,344	32.6	12,593	33.2
Poor	5	1,793	4.8	1,675	4.5	1,786	4.8	1,755	4.6	1,887	5.0
	4	87	0.2	95	0.3	129	0.3	127	0.3	152	0.4
	3	1	0.0	1	0.0	2	0.0	1	0.0	1	0.0
	2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Subtotal		1,881	5.0	1,771	4.7	1,917	5.1	1,883	5.0	2,040	5.4
Total		37,591	100.0	37,466	100.0	37,508	100.0	37,897	100.0	37,974	100.0
Avg Rating		6.86		6.82		6.81		6.90		6.86	



**Figure 1**  
**State Highway Surface Rating Trends**



**Figure 2**  
**Average Pavement Surface Rating**

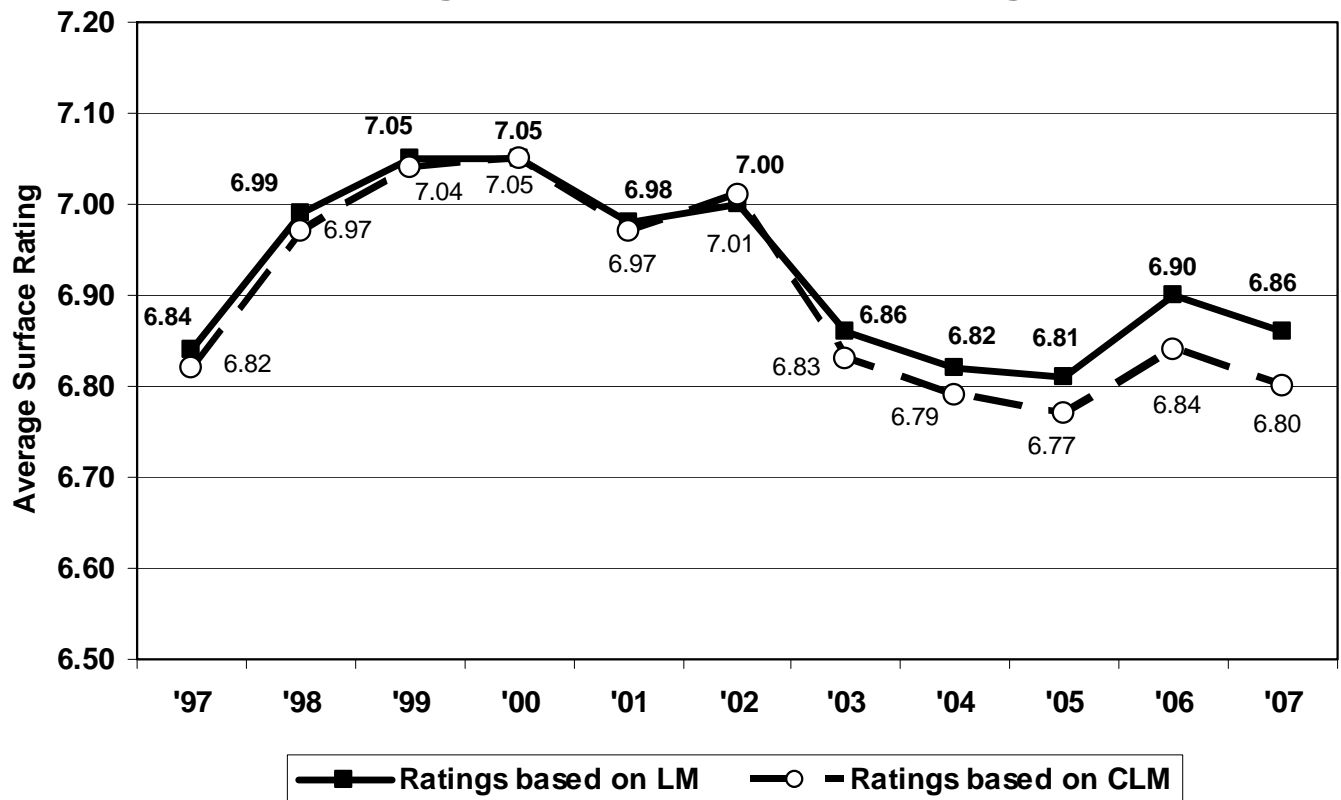


Table 3\*

**State Highway System  
2007 Surface Rating by Region in Lane Miles**

Region	Surface Ratings										Total
	1	2	3	4	5	6	7	8	9	10	
<b>1</b>	0	0	0	66	366	2,004	1,468	473	346	67	<b>4,791</b>
<b>2</b>	0	0	1	16	86	748	1,738	247	186	2	<b>3,023</b>
<b>3</b>	0	0	0	0	37	1,174	1,385	491	492	11	<b>3,589</b>
<b>4</b>	0	0	0	9	421	1,536	1,386	321	300	66	<b>4,039</b>
<b>5</b>	0	0	0	0	75	941	2,005	523	155	0	<b>3,698</b>
<b>6</b>	0	0	0	0	195	1,302	348	119	227	1	<b>2,192</b>
<b>7</b>	0	0	0	10	60	1,785	488	560	473	118	<b>3,494</b>
<b>8</b>	0	0	0	4	275	1,188	3,117	281	343	182	<b>5,390</b>
<b>9</b>	0	0	0	47	353	1,277	1,753	376	285	111	<b>4,202</b>
<b>10</b>	0	0	0	0	18	357	1,940	115	179	121	<b>2,731</b>
<b>11</b>	0	0	0	0	2	280	490	44	8	0	<b>825</b>
<b>State</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>152</b>	<b>1,887</b>	<b>12,593</b>	<b>16,118</b>	<b>3,551</b>	<b>2,993</b>	<b>679</b>	<b>37,974</b>

Percentage						Lane Miles					
Region	Poor 1-5	Fair 6	Good 7-8	Excellent 9-10	Average Rating	Region	Poor 1-5	Fair 6	Good 7-8	Excellent 9-10	Total
<b>1</b>	9.0%	41.8%	40.5%	8.6%	<b>6.67</b>	<b>1</b>	431	2,004	1,941	414	<b>4,791</b>
<b>2</b>	3.4%	24.7%	65.7%	6.2%	<b>6.89</b>	<b>2</b>	103	748	1,985	188	<b>3,023</b>
<b>3</b>	1.0%	32.7%	52.3%	14.0%	<b>7.07</b>	<b>3</b>	37	1,174	1,876	502	<b>3,589</b>
<b>4</b>	10.7%	38.0%	42.3%	9.0%	<b>6.68</b>	<b>4</b>	431	1,536	1,707	365	<b>4,039</b>
<b>5</b>	2.0%	25.4%	68.3%	4.2%	<b>6.93</b>	<b>5</b>	75	941	2,527	155	<b>3,698</b>
<b>6</b>	8.9%	59.4%	21.3%	10.4%	<b>6.49</b>	<b>6</b>	195	1,302	467	228	<b>2,192</b>
<b>7</b>	2.0%	51.1%	30.0%	16.9%	<b>6.98</b>	<b>7</b>	69	1,785	1,048	591	<b>3,494</b>
<b>8</b>	5.2%	22.0%	63.0%	9.7%	<b>6.96</b>	<b>8</b>	279	1,188	3,399	525	<b>5,390</b>
<b>9</b>	9.5%	30.4%	50.7%	9.4%	<b>6.80</b>	<b>9</b>	399	1,277	2,129	396	<b>4,202</b>
<b>10</b>	0.7%	13.1%	75.3%	11.0%	<b>7.16</b>	<b>10</b>	18	357	2,056	300	<b>2,731</b>
<b>11</b>	0.3%	34.0%	64.8%	1.0%	<b>6.73</b>	<b>11</b>	2	280	534	8	<b>825</b>
<b>State</b>	<b>5.4%</b>	<b>33.2%</b>	<b>51.8%</b>	<b>9.7%</b>	<b>6.86</b>	<b>State</b>	<b>2,040</b>	<b>12,593</b>	<b>19,669</b>	<b>3,672</b>	<b>37,974</b>

\* Tioga Co. assigned to Region 9 in Table 3 above and all other tables and charts; Tioga Co. assigned to Region 6 shown below:

6	9.2%	59.1%	21.8%	9.9%	6.47	6	234	1,494	551	250	2,529
9	9.3%	28.1%	52.9%	9.7%	6.84	9	360	1,086	2,045	373	3,864

**Table 4**

<b>State Highway System Regional Trends 2003-2007</b>					
<b>Average Surface Ratings</b>					
<b>Region</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
<b>1</b>	6.81	6.58	6.53	6.62	<b>6.67</b>
<b>2</b>	6.89	6.87	6.81	6.95	<b>6.89</b>
<b>3</b>	6.74	6.81	6.90	6.92	<b>7.07</b>
<b>4</b>	6.75	6.78	6.55	6.99	<b>6.68</b>
<b>5</b>	7.01	7.14	7.14	7.12	<b>6.93</b>
<b>6</b>	6.67	6.76	6.76	6.45	<b>6.49</b>
<b>7</b>	6.45	6.26	6.50	6.73	<b>6.98</b>
<b>8</b>	7.10	6.95	6.89	6.90	<b>6.96</b>
<b>9</b>	6.97	7.08	7.13	7.20	<b>6.80</b>
<b>10</b>	7.14	7.01	6.93	7.14	<b>7.16</b>
<b>11</b>	6.86	6.89	6.83	6.78	<b>6.73</b>
<b>Total</b>	6.86	6.82	6.81	6.90	<b>6.86</b>
<b>Percent Below 6, Poor Pavement</b>					
<b>Region</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
<b>1</b>	7.8%	10.0%	8.6%	8.7%	<b>9.0%</b>
<b>2</b>	2.9%	3.1%	3.4%	3.1%	<b>3.4%</b>
<b>3</b>	3.4%	2.5%	2.4%	2.3%	<b>1.0%</b>
<b>4</b>	9.0%	9.3%	14.9%	9.5%	<b>10.7%</b>
<b>5</b>	5.3%	2.9%	2.8%	1.4%	<b>2.0%</b>
<b>6</b>	6.1%	5.5%	4.8%	9.8%	<b>8.9%</b>
<b>7</b>	4.4%	4.8%	3.3%	2.9%	<b>2.0%</b>
<b>8</b>	3.9%	4.0%	3.9%	5.5%	<b>5.2%</b>
<b>9</b>	4.4%	2.8%	2.4%	4.5%	<b>9.5%</b>
<b>10</b>	1.2%	0.6%	3.3%	1.1%	<b>0.7%</b>
<b>11</b>	2.8%	0.0%	0.3%	0.3%	<b>0.3%</b>
<b>Total</b>	5.0%	4.7%	5.1%	5.0%	<b>5.4%</b>

## Surface Rating by County

*Tables 5A and 5B* rank the counties in the State by Average Surface Rating and percent Poor for 2007. Onondaga and Lewis counties have the highest average ratings (7.22 and 7.21), followed by Otsego (7.19) and Jefferson (7.18). Four of the five boroughs in Region 11 plus Seneca, Tompkins and Clinton counties report no Poor pavement. There are 16 counties with 1% or less Poor pavement (one more than last year) compared to 12 counties with 10% or more (one more than last year). Ontario (17.8%), Rensselaer (17.2%) and Delaware (15.9%) have the highest percentage of Poor pavement. Steuben, Yates and Tioga Counties have the lowest Average Surface Rating at 6.32, 6.33 and 6.35, respectively.

## Surface Rating by Pavement Type

*Table 6* provides a statewide summary of surface rating by pavement type and rating category. The State System is comprised of 6.5% rigid (PCC) pavements, 61.1% overlaid (composite) pavements and 32.4% flexible (asphalt) pavements. The average rating of PCC pavement is 6.88, Flexible pavements is 6.80 and Overlaid pavements 6.89.

## National Highway System

Established in 1995, the *National Highway System* (NHS) is an interconnected system of principal arterial routes serving major population centers, interstate and interregional travel, international border crossings, ports, and other intermodal facilities and national defense needs. The NYS Thruway Authority mileage is part of the NHS.

*Table 7* through *Table 9* present the number of lane miles by pavement surface rating category for the National Highway System (NHS) by region and jurisdiction. *Table 7*, which includes the NYS Thruway Authority mileage, shows that approximately 75.8% of the entire NHS has Good to Excellent surface ratings, with only 3.6% at the Poor rating.

Comparing the data for State Highways in *Table 8* to the rating data for all State Highways in *Tables 2 and 3* shows that statewide the NHS generally has better ratings than all State Highways: 73.2% of the NHS is rated Good or Excellent, compared to 61.5% of all State Highways, and 4.3% Poor on the NHS versus 5.4% on all State Highways. Most regions have better ratings on the NHS than for all State Highways except that Regions 4, 5, 6 and 8 have slightly more Poor pavement, and Region 10 has slightly more Fair.

Table 5A

State Highway System 2007 County Rankings by Average Surface Rating and Percent Poor							
Region	County	Name	Lane Miles	Average Rating	State Rank	% Poor (< 6 )	State Rank
1	1	Albany	820	6.83	32	12.6%	57
1	2	Essex	781	6.45	55	10.6%	54
1	3	Greene	414	6.81	34	5.4%	38
1	4	Rensselaer	620	6.36	59	17.2%	61
1	5	Saratoga	730	7.04	14	3.9%	31
1	6	Schenectady	403	6.73	43	1.8%	22
1	7	Warren	562	6.48	54	4.6%	34
1	8	Washington	461	6.68	46	11.9%	56
1			4,791	6.67	10	9.0%	9
2	1	Fulton	287	6.56	52	4.8%	36
2	2	Hamilton	361	6.74	42	5.1%	37
2	3	Herkimer	523	6.91	25	5.9%	39
2	4	Madison	368	7.00	19	1.5%	19
2	5	Montgomery	390	6.74	41	4.7%	35
2	6	Oneida	1,095	7.02	17	1.5%	18
2			3,023	6.89	6	3.4%	6
3	1	Cayuga	573	6.90	27	3.5%	28
3	2	Cortland	466	7.02	16	0.2%	8
3	3	Onondaga	1,188	7.22	1	0.9%	16
3	4	Oswego	684	7.10	11	0.8%	15
3	5	Seneca	329	7.10	10	0.0%	1
3	6	Tompkins	349	6.81	33	0.0%	4
3			3,589	7.07	2	1.0%	3
4	1	Genesee	413	6.87	30	4.6%	33
4	2	Livingston	617	6.37	58	10.2%	53
4	3	Monroe	1,400	6.71	45	12.6%	58
4	4	Ontario	499	6.53	53	17.8%	62
4	5	Orleans	317	6.97	21	9.5%	50
4	6	Wyoming	418	6.74	40	3.8%	30
4	7	Wayne	376	6.76	38	10.2%	52
4			4,039	6.68	9	10.7%	11
5	1	Cattaraugus	729	6.67	47	7.3%	43
5	2	Chautauqua	812	6.63	50	1.6%	21
5	3	Erie	1,556	7.16	5	0.4%	9
5	4	Niagara	601	7.07	12	0.5%	11
5			3,698	6.93	5	2.0%	5

Table 5B

State Highway System 2007 County Rankings by Average Rating and Percent Poor							
Region	County	Name	Lane Miles	Average Rating	State Rank	Poor (< 6)	State Rank
6	1	Allegany	529	6.66	48	13.7%	59
6	2	Chemung	320	6.85	31	2.6%	25
6	3	Schuyler	217	6.42	57	10.1%	51
6	4	Steuben	908	6.32	62	8.7%	47
6	6	Yates	218	6.33	61	6.1%	40
6			2,192	6.49	11	8.9%	8
7	1	Clinton	645	7.04	13	0.0%	2
7	2	Franklin	534	6.89	28	4.3%	32
7	3	Jefferson	934	7.18	4	0.5%	10
7	4	Lewis	313	7.21	2	0.6%	12
7	5	St. Lawrence	1,067	6.74	39	3.7%	29
7			3,494	6.98	3	2.0%	4
8	1	Columbia	609	6.77	37	9.4%	49
8	2	Dutchess	948	6.90	26	2.9%	26
8	3	Orange	1,026	6.95	22	3.1%	27
8	4	Putnam	349	7.15	8	7.6%	44
8	5	Rockland	273	7.00	20	2.5%	24
8	6	Ulster	634	6.92	24	2.3%	23
8	7	Westchester	1,552	7.03	15	7.3%	42
8			5,390	6.96	4	5.2%	7
9	1	Broome	882	7.01	18	7.9%	46
9	2	Chenango	556	6.72	44	7.8%	45
9	3	Delaware	771	6.45	56	15.9%	60
9	4	Otsego	676	7.19	3	9.2%	48
9	5	Schoharie	465	7.13	9	6.6%	41
9	6	Sullivan	515	6.87	29	1.6%	20
9	7	Tioga	337	6.35	60	11.6%	55
9			4,202	6.80	7	9.5%	10
10	3	Nassau	1,068	7.16	6	0.6%	13
10	7	Suffolk	1,662	7.16	7	0.7%	14
10			2,731	7.16	1	0.7%	2
11	1	Bronx	203	6.79	36	1.1%	17
11	2	Kings	138	6.61	51	0.0%	7
11	4	New York	79	6.80	35	0.0%	5
11	5	Queens	297	6.65	49	0.0%	6
11	6	Richmond	107	6.93	23	0.0%	3
11			825	6.73	8	0.3%	1
State			37,974	6.86	---	5.4%	---

Table 6

State Highway System 2007 Percent Lane Miles by Pavement Type <sup>1</sup> and Rating Category											
Category	Poor		Fair		Good		Excellent		Total		Avg Rating
	Lane Miles	%	Lane Miles	%	Lane Miles	%	Lane Miles	%	Lane Miles	%	
<b>Rigid</b>	310	12.6%	533	21.7%	1,309	53.3%	305	12.4%	2,457	6.5%	6.88
<b>Overlay</b>	1,138	4.9%	7,241	31.2%	12,601	54.3%	2,240	9.6%	23,220	61.1%	6.89
<b>Flexible</b>	591	4.8%	4,819	39.2%	5,759	46.8%	1,128	9.2%	12,297	32.4%	6.80
<b>State</b>	<b>2,040</b>	<b>5.4%</b>	<b>12,593</b>	<b>33.2%</b>	<b>19,669</b>	<b>51.8%</b>	<b>3,672</b>	<b>9.7%</b>	<b>37,974</b>	<b>100.0%</b>	<b>6.86</b>

<sup>1</sup> Work related to the implementation of the Department's RIS relational database project involved data cleansing. Some corrections to pavement type codes were made in the database, resulting in adjustments to the number of lane miles in each pavement category.

Table 7

2007 New York State National Highway System <sup>2</sup>									
Region	Poor		Fair		Good		Excellent		Total Lane Miles
	Lane Miles	%	Lane Miles	%	Lane Miles	%	Lane Miles	%	
<b>1</b>	30	1.8%	394	23.6%	949	56.8%	298	17.8%	1,671
<b>2</b>	0	0.0%	67	6.9%	813	84.1%	87	9.0%	967
<b>3</b>	5	0.3%	241	16.3%	1,071	72.7%	156	10.6%	1,472
<b>4</b>	170	10.8%	379	24.1%	855	54.5%	165	10.5%	1,568
<b>5</b>	39	2.3%	338	19.5%	1,144	66.2%	209	12.1%	1,729
<b>6</b>	54	12.0%	196	43.6%	46	10.2%	154	34.2%	450
<b>7</b>	0	0.0%	380	35.8%	467	44.0%	214	20.2%	1,061
<b>8</b>	165	5.4%	506	16.7%	1,932	63.8%	425	14.0%	3,027
<b>9</b>	119	7.5%	340	21.3%	899	56.5%	234	14.7%	1,592
<b>10</b>	9	0.5%	288	14.2%	1,543	76.2%	184	9.1%	2,025
<b>11</b>	2	0.3%	236	31.1%	513	67.5%	8	1.1%	759
<b>Total</b>	<b>593</b>	<b>3.6%</b>	<b>3,363</b>	<b>20.6%</b>	<b>10,231</b>	<b>62.7%</b>	<b>2,134</b>	<b>13.1%</b>	<b>16,322</b>

<sup>2</sup> This table contains NYS Thruway Authority mileage. The LHI mileage is not included in this table. FHWA now requires reporting of IRI only for the HPMS and therefore the LHI was not surveyed.

Table 8

2007 National Highway System: State Highways Only									
Region	Poor		Fair		Good		Excellent		Total Lane Miles
	Lane Miles	%	Lane Miles	%	Lane Miles	%	Lane Miles	%	
1	30	2.2%	387	28.4%	722	53.1%	221	16.3%	1,361
2	0	0.0%	57	10.1%	479	85.5%	25	4.4%	561
3	5	0.4%	198	15.7%	901	71.5%	156	12.4%	1,260
4	170	13.5%	340	27.1%	607	48.3%	141	11.2%	1,258
5	39	3.1%	290	23.2%	867	69.7%	50	4.0%	1,245
6	54	12.0%	196	43.6%	46	10.2%	154	34.2%	450
7	0	0.0%	380	35.8%	467	44.0%	214	20.2%	1,061
8	164	6.9%	424	17.9%	1,485	62.6%	300	12.7%	2,373
9	119	7.5%	340	21.3%	899	56.5%	234	14.7%	1,592
10	9	0.5%	288	14.2%	1,543	76.2%	184	9.1%	2,025
11	2	0.3%	236	32.0%	491	66.6%	8	1.1%	738
<b>Total</b>	<b>592</b>	<b>4.3%</b>	<b>3,137</b>	<b>22.5%</b>	<b>8,509</b>	<b>61.1%</b>	<b>1,688</b>	<b>12.1%</b>	<b>13,925</b>

Table 9

2007 National Highway System: NYS Thruway Authority									
Region	Poor		Fair		Good		Excellent		Total Lane Miles
	Lane Miles	%	Lane Miles	%	Lane Miles	%	Lane Miles	%	
1	0	0.0%	7	2.1%	227	73.2%	77	24.7%	310
2	0	0.0%	10	2.5%	333	82.1%	63	15.4%	406
3	0	0.0%	42	20.0%	170	80.0%	0	0.0%	212
4	0	0.0%	38	12.3%	248	80.0%	24	7.7%	310
5	0	0.0%	48	9.9%	277	57.2%	159	32.9%	484
6	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
7	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
8	1	0.2%	82	12.6%	447	68.3%	124	19.0%	654
9	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
10	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0
11	0	0.0%	0	0.0%	21	100.0%	0	0.0%	21
<b>Total</b>	<b>1</b>	<b>0.1%</b>	<b>227</b>	<b>9.5%</b>	<b>1,722</b>	<b>71.9%</b>	<b>446</b>	<b>18.6%</b>	<b>2,397</b>



## Pavement Ride Quality

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### Background

A pavement ride quality measurement known as the International Roughness Index (IRI) originally was developed by the World Bank during the 1970's to assess road conditions in developing countries for allocating road improvement funding. Several more recent studies have shown that rough roads increase vehicle operating and maintenance costs, increase fuel consumption and actually increase the deterioration rate of the pavement.



Because of the importance of road smoothness to the traveling public and the economic impact of rough roads, IRI has been adopted by many countries, the FHWA and most states as a standard measure of the ride quality of a pavement. The units for IRI are inches per mile (or meters per kilometer); the higher the value, the greater the roughness. The IRI value is obtained by accurately measuring the profile of a road surface and calculating how a vehicle will respond to that profile at highway

speeds. Certain types, or wavelengths, of roughness are mathematically filtered out of the profile, just as the suspension of a car will dampen certain types of roughness as it travels over the road. The roughness reflected in the IRI value is basically the roughness a person would feel while riding in a typical car at 50 miles per hour.

The application of IRI adds another dimension to assessing road condition. It is possible for roads with little distress, and therefore relatively good surface ratings, to have rough rides. It is equally possible to have roads with significant distress and depending on the type of distress, to have relatively smooth riding surfaces. These distinctions can be used to further prioritize the application of available funding to achieve the greatest combined positive impact on the highway system for the traveling public.

The Department began collecting IRI data with in-house resources in 2003. Most of the Interstates have been collected annually since then, and other highways have been collected every 2-3 years. The data reported this year in the following charts and tables are for Interstates only. This is because the Department's data management system was under construction and was not ready to produce data in time for this report. Ride quality data is available for the state highway system by contacting the Pavement Management Unit.

## Pavement Ride Quality

IRI values can be grouped into categories to summarize the level of ride quality:

IRI Range	Category
$\leq 60$ in/mi	Very Smooth
$60 < \text{IRI} \leq 120$	Smooth
$120 < \text{IRI} \leq 170$	Fair
$170 < \text{IRI} \leq 220$	Rough
$> 220$ in/mi	Very Rough

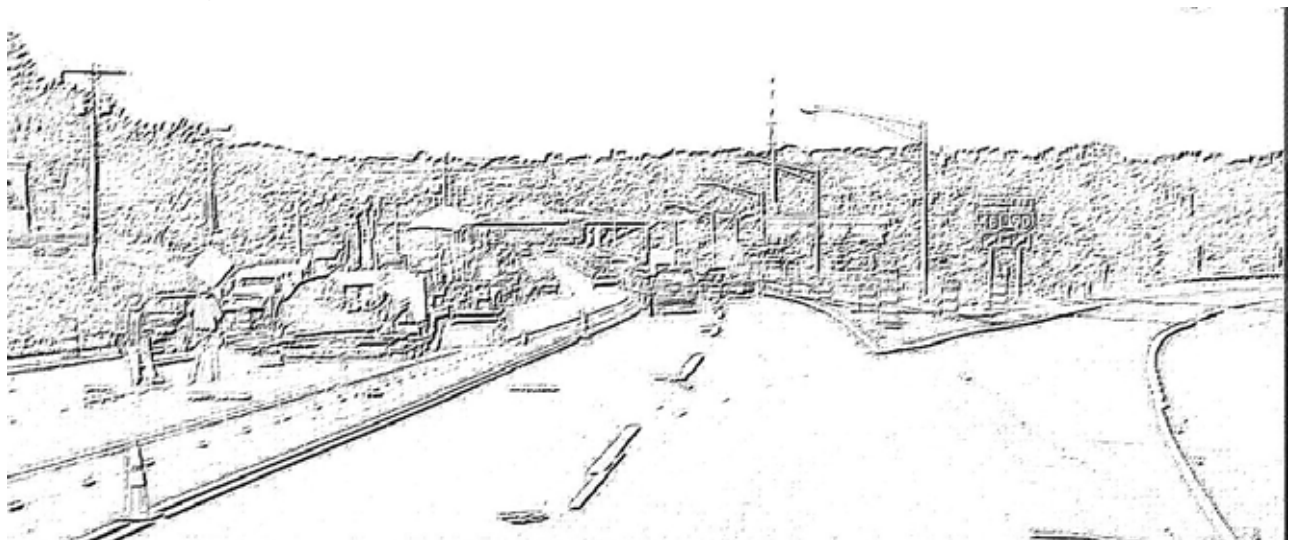
Figure 3 shows the Average Ride Quality (IRI) vs the Average Surface Rating for the Interstates by region. It is desirable on this chart to have a high Surface Rating (narrow cross-hatched bar) and a low IRI (wide solid bar). This would indicate low surface distress and good ride quality.

Regions 1, 3 and 7 have the best Interstate pavement surface ratings with good ride quality and high Average Surface Ratings.

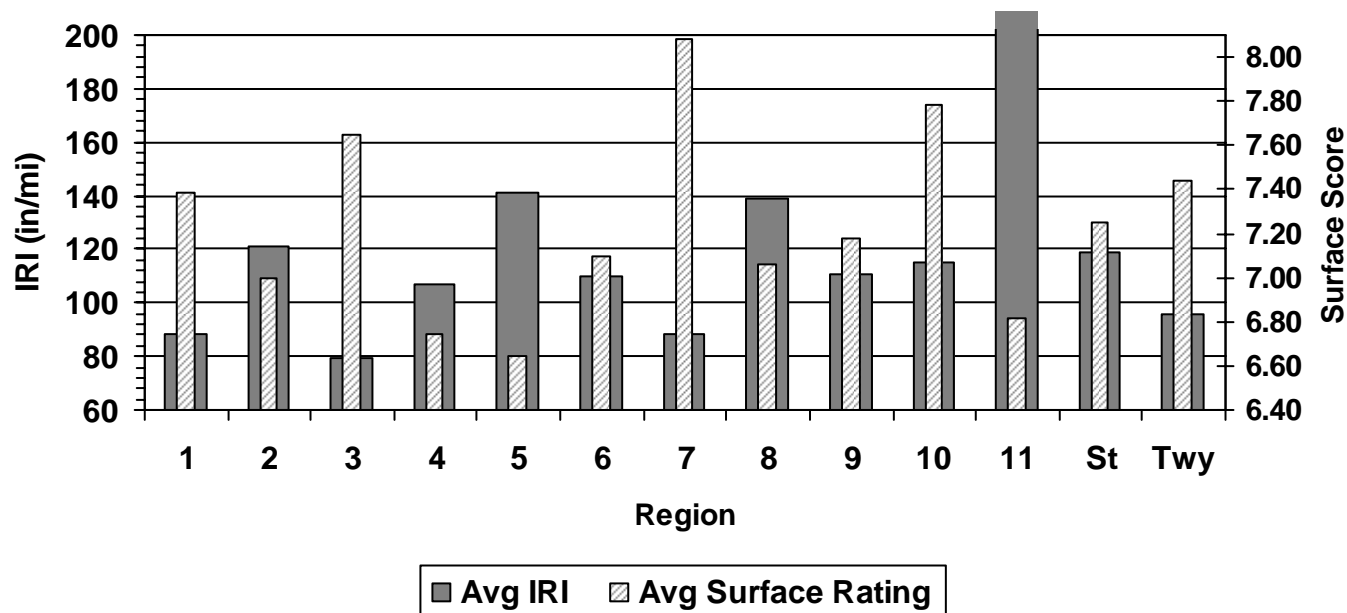
Figure 4 presents the distribution of ride quality for each region's Interstates. As can be seen, Regions 1, 3 and 7 have mostly smooth-riding Interstates. Regions 5, 8 and 10 have about 60% of their Interstates that ride fair or rough, and more than 95% of the Interstates in Region 11 are fair or rough. (Region 2 has a very limited number of miles of Interstate, so their fair to rough conditions are not extensive).

Table 10 contains detailed ride quality data for the Interstates in each region and county. Table 11 provides similar information for the Thruway.

A few more years of data are needed before any meaningful trends in ride quality can be identified.



**Figure 3**  
**Interstates**  
**Average Ride Quality (IRI)**  
**vs Average Surface Rating**  
 (2006 IRI data, 2007 Surface Rating data)



**Figure 4**  
**Ride Quality (IRI) - Interstates**  
(2006 HPMS data)

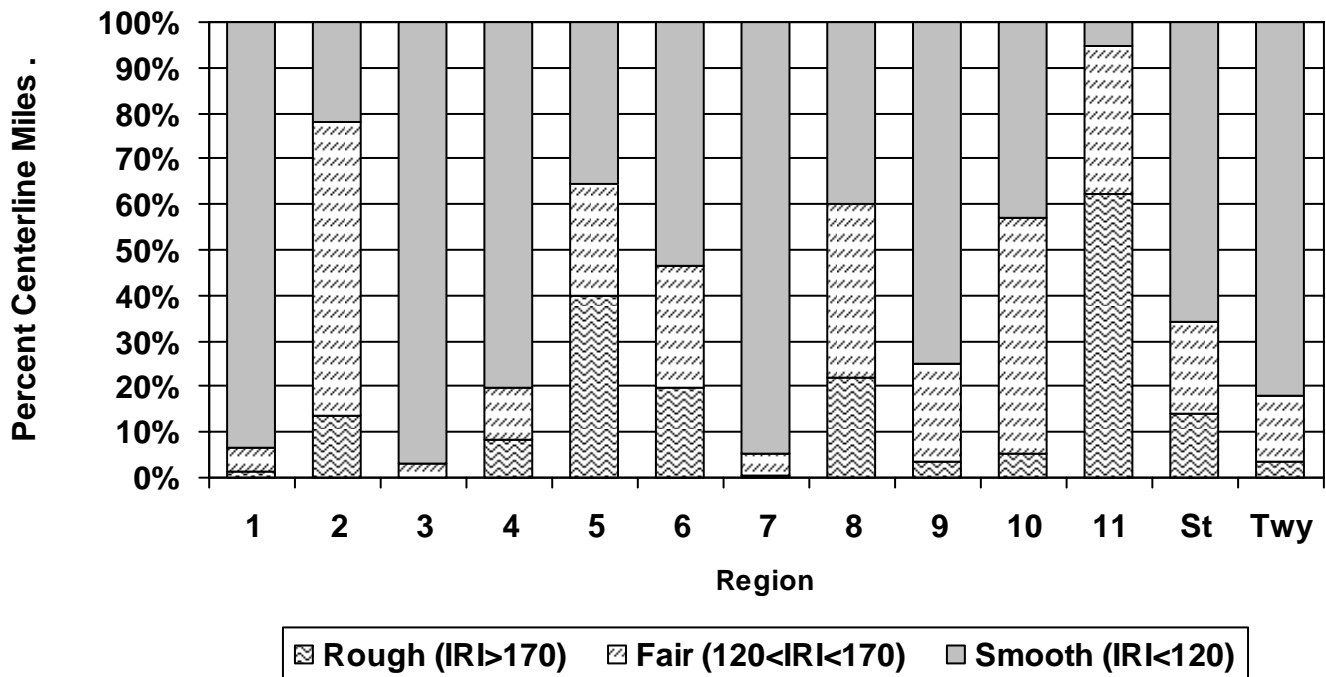


Table 10A

2006 IRI by Category and County – Interstates							
County	Percent Collected	V. Smooth IRI<60	Percent Based on CLM			V. Rough IRI>220	AVG IRI (in/mi)
			Smooth 60<IRI<120	Fair 120<IRI<170	Rough 170<IRI<220		
Region 1							
ALB	100.0%	23.5%	63.0%	9.2%	4.3%	0.0%	87
ESX	100.0%	3.1%	96.9%	0.0%	0.0%	0.0%	81
GRN	-	-	-	-	-	-	-
REN	100.0%	0.7%	77.1%	19.4%	2.9%	0.0%	105
SAR	100.0%	41.0%	59.0%	0.0%	0.0%	0.0%	67
SCH	100.0%	1.0%	77.6%	18.4%	2.2%	0.8%	114
WAR	100.0%	20.5%	79.5%	0.0%	0.0%	0.0%	72
WSH	-	-	-	-	-	-	-
Total	100.0%	17.5%	76.1%	5.2%	1.2%	0.1%	88
Region 2							
FUL	-	-	-	-	-	-	-
HAM	-	-	-	-	-	-	-
HRK	-	-	-	-	-	-	-
MAD	-	-	-	-	-	-	-
MTG	-	-	-	-	-	-	-
OND	100.0%	0.0%	22.1%	64.4%	13.6%	0.0%	121
Total	100.0%	0.0%	22.1%	64.4%	13.6%	0.0%	121
Region 3							
CAY	-	-	-	-	-	-	-
COR	100.0%	36.5%	63.5%	0.0%	0.0%	0.0%	63
ONO	100.0%	2.8%	91.6%	5.2%	0.4%	0.0%	86
OSW	99.8%	12.4%	87.6%	0.0%	0.0%	0.0%	63
SEN	-	-	-	-	-	-	-
TOM	-	-	-	-	-	-	-
Total	100.0%	12.1%	84.8%	2.9%	0.2%	0.0%	79
Region 4							
GEN	100.0%	0.0%	86.2%	0.0%	0.0%	13.8%	123
LIV	99.4%	0.0%	74.6%	8.3%	17.0%	0.0%	107
MNR	99.2%	3.3%	78.8%	13.4%	2.6%	1.8%	107
ONT	100.0%	0.0%	100.0%	0.0%	0.0%	0.0%	87
ORL	-	-	-	-	-	-	-
WYN	-	-	-	-	-	-	-
WYO	-	-	-	-	-	-	-
Total	99.7%	2.2%	78.1%	11.3%	7.1%	1.4%	107
Region 5							
CAT	100.0%	0.0%	22.1%	27.7%	39.2%	11.0%	181
CHA	100.0%	0.0%	23.7%	29.2%	47.1%	0.0%	131
ERI	100.0%	0.0%	23.7%	29.2%	47.1%	0.0%	116
NIA	100.0%	0.0%	80.3%	14.0%	5.6%	0.0%	122
Total	100.0%	0.3%	35.3%	24.6%	35.1%	4.7%	141

Table 10B

2006 IRI by Category and County – Interstates							
County	Percent Collected	Percent Based on CLM					AVG IRI (in/mi)
		V. Smooth IRI<60	Smooth 60<IRI<120	Fair 120<IRI<170	Rough 170<IRI<220	V. Rough IRI>220	
Region 6							
ALG	99.3%	21.5%	48.0%	0.0%	16.7%	13.8%	118
CMG	100.0%	0.5%	65.1%	1.6%	32.8%	0.0%	92
SHY	-	-	-	-	-	-	-
STU	100.0%	1.9%	39.6%	48.5%	9.4%	0.7%	116
YAT	-	-	-	-	-	-	-
Total	99.8%	6.5%	46.8%	26.8%	15.9%	3.9%	110
Region 7							
CLN	100.0%	38.2%	61.8%	0.0%	0.0%	0.0%	72
FRK	-	-	-	-	-	-	-
JEF	100.0%	9.9%	80.8%	8.3%	0.0%	1.0%	100
LEW	-	-	-	-	-	-	-
STL	-	-	-	-	-	-	-
Total	100.0%	21.8%	72.8%	4.8%	0.0%	0.6%	88
Region 8							
COL	-	-	-	-	-	-	-
DUT	-	-	-	-	-	-	-
ORG	100.0%	0.1%	82.6%	15.9%	1.0%	0.4%	111
PUT	100.0%	0.0%	0.0%	12.0%	88.0%	0.0%	180
ROC	100.0%	0.0%	0.0%	0.0%	100.0%	0.0%	215
ULS	100.0%	0.0%	0.0%	0.0%	100.0%	0.0%	200
WST	87.8%	0.0%	34.5%	47.7%	10.0%	7.8%	149
Total	98.6%	0.0%	40.0%	38.0%	16.3%	5.7%	139
Region 9							
BRM	100.0%	0.0%	80.9%	15.0%	0.1%	4.0%	105
CHN	100.0%	0.0%	76.2%	23.8%	0.0%	0.0%	84
DEL	100.0%	0.0%	72.7%	16.7%	10.6%	0.0%	140
OTS	100.0%	0.0%	2.4%	94.0%	1.8%	1.9%	165
SCO	100.0%	0.0%	100.0%	0.0%	0.0%	0.0%	90
SUL	100.0%	0.0%	93.5%	6.3%	0.2%	0.0%	102
TIO	100.0%	1.8%	97.5%	0.8%	0.0%	0.0%	78
Total	100.0%	0.2%	74.8%	21.5%	2.0%	1.6%	111
Region 10							
NAS	100.0%	0.0%	91.4%	8.6%	0.0%	0.0%	98
SUF	100.0%	0.0%	25.5%	67.1%	7.4%	0.0%	122
Total	100.0%	0.0%	43.2%	51.4%	5.4%	0.0%	115
Region 11							
BNX	100.0%	0.0%	14.6%	39.3%	22.8%	23.4%	186
KGS	100.0%	0.0%	5.0%	6.6%	16.6%	71.9%	236
QNS	100.0%	0.0%	0.0%	17.5%	31.5%	51.1%	304
RCH	100.0%	0.0%	0.0%	37.9%	33.2%	28.9%	202
NY	100.0%	0.0%	0.0%	44.3%	39.7%	16.0%	203
Total	100.0%	0.0%	5.1%	32.8%	28.0%	34.1%	209
State	99.8%	6.1%	59.6%	20.4%	9.3%	4.6%	119

Interstates include the divided portion of Route 17. Thruway owned/maintained Interstates are not included. Data is from 2006 HPMS submittal.

**Table 11**

2006 IRI by Category and Division – Thruway							
Division	Percent Collected	Percent Based on CLM					AVG IRI (in/mi)
		V.Smooth IRI<60	Smooth 60<IRI<120	Fair 120<IRI<170	Rough 170<IRI<220	V.Rough IRI>220	
Mainline							
NY I-87	97.6%	0.0%	76.9%	17.4%	3.0%	0.0%	101
ALB I-87	100.0%	20.4%	69.2%	9.9%	0.5%	0.0%	81
ALB I-90	96.4%	0.0%	100.0%	0.0%	0.0%	0.0%	80
SYR I-90	100.0%	3.8%	91.5%	4.7%	0.0%	0.0%	84
BUF I-90	100.0%	4.0%	80.6%	14.3%	1.0%	0.0%	95
All Mainline	99.2%	4.7%	84.4%	10.0%	0.9%	0.0%	90
Other Divisions							
MIDD I-84	100.0%	0.0%	94.9%	3.4%	1.4%	0.3%	100
EF I-84	95.7%	0.0%	27.6%	58.2%	11.5%	2.7%	135
All I-84	98.0%	0.0%	64.2%	28.4%	6.0%	1.4%	116
BRKS	75.0%	0.0%	59.1%	40.9%	0.0%	0.0%	109
CWE I-287	100.0%	0.0%	24.6%	54.0%	9.6%	11.9%	154
NIAG I-190	97.5%	1.6%	67.2%	27.1%	4.1%	0.0%	102
NE I-95	100.0%	29.7%	17.0%	6.0%	27.0%	20.3%	142
GSP	100.0%	0.0%	85.8%	14.2%	0.0%	0.0%	110
All Twy							
All Twy	97.7%	4.6%	77.3%	14.4%	2.6%	1.1%	96

## Network-Level Pavement Needs

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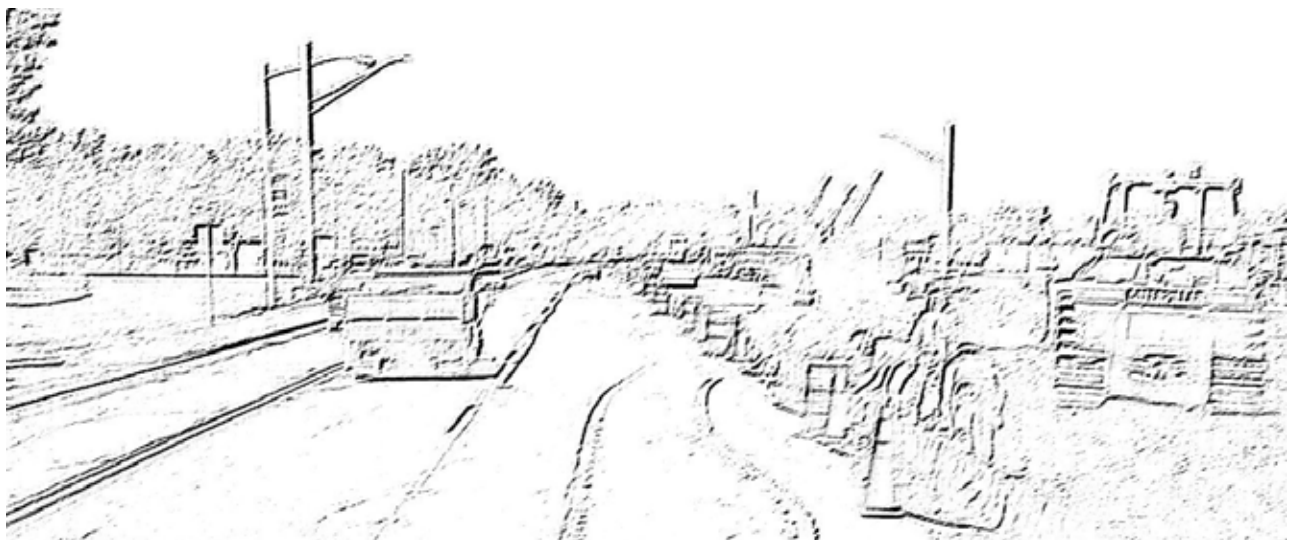
### Treatment Categories

Pavement treatment strategies currently available can be classified into six general categories:

1. *Do Nothing*
2. *Preventive Maintenance Non-paving*- joint and crack sealing and filling, minor spall repair.
3. *Preventive Maintenance Treatments*- single-course (1-½") overlays, microsurfacing, surface treatments and other thin overlays intended to seal the pavement surface.
4. *Corrective Maintenance* - applies to HMA and PCC pavements and includes for PCC: resealing joints, spall repair, grinding and isolated full-depth segment replacement; and for HMA: mill and fill, cold or hot in-place recycling with single course overlay.
5. *Rehabilitation* - multi-course overlays with or without milling or recycling, crack and seat, rubblizing, joint replacement and isolated full depth segment replacement.
6. *Reconstruction* – full-depth asphalt or concrete replacement.

A simple algorithm is used to assign pavements with specific combinations of surface rating and dominant distress to one of the six treatment categories described above. This analysis is used to provide a network-level estimate of pavement needs. It should be noted that specific project-level decisions may assign another treatment based on additional detailed information.

The algorithm used to estimate network-level pavement needs is summarized in Table 12.





**Table 12: Algorithm for Estimating Network-Level Pavement Needs**

Rating	PCC				Asphalt			Overlay				
	Fault	Spall Genl	Spall Iso	None	Allig Genl	Allig Iso	None	Allig Genl	Allig Iso	Allig Iso & Wide Drop	Wide Drop	None
1-4	6				6			6				
5	5				5			5				
6					4	4	3	4	4	4	4	3
7	4	4	2	2	3	3	3	3	3	3	2	2
8	N/A			2	N/A		2	N/A				2
9-10	N/A			1	N/A		1	N/A				1

1 - Do Nothing

2 - Preventive Maintenance Non-Paving

3 - Preventive Maintenance Treatments

4 - Corrective Maintenance

5 - Rehabilitation

6 - Reconstruction

## Pavement Needs

As shown in Table 13, an estimated 9.7% of the State Highway system falls in the Do Nothing category. This indicates that more than 90% of the State Highway System is in need of some type of maintenance or rehabilitation action. About 21% of pavements are candidates

for crack sealing, 32.9% are in need of preventive maintenance paving, 29.7% need corrective maintenance, 6.4% need rehabilitation, and only about 0.4%, representing 153 lane miles, need to be reconstructed. These needs have not changed much from last year.

Table 13

State Highway System 2007 Lane Miles by Treatment Category													
Region	Total Lane Miles	Do Nothing		Preventive Maintenance (Non-Paving)		Preventive Maintenance (Paving)		Corrective Maintenance		Rehabilitation		Reconstruction	
		Lane Miles	%	Lane Miles	%	Lane Miles	%	Lane Miles	%	Lane Miles	%	Lane Miles	%
1	4,791	414	8.6%	808	16.9%	1,233	25.7%	1,855	38.7%	415	8.7%	66	1.5%
2	3,023	188	6.2%	631	20.9%	1,358	44.9%	736	24.3%	93	3.1%	17	0.6%
3	3,589	502	14.0%	779	21.7%	1,160	32.3%	1,111	31.0%	37	1.0%	0	0.0%
4	4,039	365	9.0%	598	14.8%	1,134	28.1%	1,507	37.3%	426	10.5%	9	0.2%
5	3,698	155	4.2%	884	23.9%	1,601	43.3%	857	23.2%	201	5.4%	0	0.0%
6	2,192	228	10.4%	149	6.8%	331	15.1%	1,172	53.5%	312	14.2%	0	0.0%
7	3,494	591	16.9%	675	19.3%	742	21.2%	1,415	40.5%	61	1.7%	10	0.3%
8	5,390	525	9.7%	1,505	27.9%	2,012	37.3%	1,023	19.0%	321	6.0%	4	0.1%
9	4,202	396	9.4%	961	22.9%	1,395	33.2%	1,008	24.1%	395	9.4%	47	1.1%
10	2,731	300	11.0%	416	15.2%	1,345	49.2%	609	22.3%	61	2.2%	0	0.0%
11	825	8	1.0%	534	64.7%	184	22.3%	0	0.0%	99	12.0%	0	0.0%
State	37,974	3,672	9.7%	7,940	20.9%	12,495	32.9%	11,293	29.7%	2,421	6.4%	153	0.4%

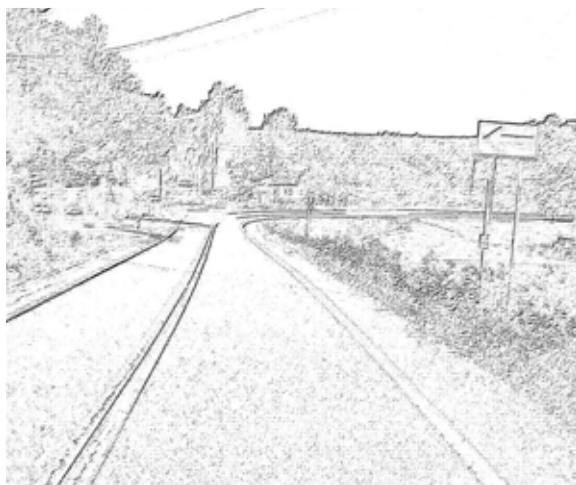
## Survey Quality Assurance Procedures

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### Annual Training Session

The success of the pavement management program depends on the ability to collect accurate, consistent and reliable data on pavement surface ratings. The core of the Pavement Surface Rating Quality Assurance effort is the Annual Highway Surface Rating Survey Training Session conducted each spring at the NYSDOT Main Office in Albany. Through classroom and field exercises, the regional rating teams learn to distinguish the surface ratings and dominant distress features.

The purpose of the classroom practice rating is to develop a consensus among the regional raters in their use of the surface rating scales to determine appropriate surface ratings and to help the raters gain confidence in their pavement surface rating abilities.



Following the in-house practice rating, the regional teams rate several miles of pavements in the field. The field rating exercise is designed specifically to test the raters' ability to use the surface rating manual and to develop appropriate rating practices to ensure pavements are evaluated in a consistent and accurate manner.

### Shadow Rating Activity

To assess and monitor the quality of ratings in the survey, several thousand miles of pavement statewide are re-rated by an expert rating team from the main office. The ratings from the main office shadow rating team are compared to the ratings assigned by each regional team. Various statistical measurements are applied to evaluate the consistency and accuracy in rating provided by the regional teams. Approximately 2,087 sections, totaling 4,267 lane miles or 11.2% of the system, were shadow rated in 2007 by the main office team.

### Statistical Measures & Analysis

Several statistical measures are employed to analyze the accuracy and consistency of the survey ratings. These are:

- The Percent of Ratings Within +/- 1 Scale Point
- The Average Rating Error
- The Absolute Rating Difference

### ***The Percent of Ratings Within +/- 1 Scale Point***

One measure used to assess the accuracy of the surface ratings is the percent of sections rated within one point by the two rating teams. Rating differences and their magnitude provide an indication of the level of consistency among the raters statewide.

### ***The Average Rating Error***

The average rating error is computed using the formula shown below. To compute the average rating error the differences in ratings provided by the region and shadow teams are summed for all sections surveyed and divided by the total number of sections rated. These figures provide an average estimate of the degree to which a region “over” or “under” rates relative to the main office shadow team. The average rating error statistic provides a measure of the direction of rating bias.

Average Rating Error =

$$\frac{1}{n_j} \sum_{i=1}^{n_j} (r_i - s_i)$$

$r_i$  = region ratings  
 $s_i$  = shadow ratings  
 $n_j$  = number of sections evaluated in Region J

### ***The Absolute Rating Difference***

The absolute rating difference statistic identifies where rating differences exist and the magnitude of rating error. It is computed by summing the absolute value of the rating difference between region and shadow ratings and dividing this value by the total number of sections surveyed. The average rating error per section provides the direction of rating bias, while the absolute rating difference provides the magnitude of the rating error.

*Table 14* presents the results of the 2007 shadow rating effort. Overall, the results show continued rating consistency with 96.9% of the rating judgments by the shadow rating team within one point of the region’s surface ratings. Over the last five years, this value has ranged from a low of 96.3% to a high of 97.9%, and averaged 97.1%. Differences of greater than one point have remained relatively consistent over the past few years. The absolute rating error statewide of 0.30 also is consistent with previous year’s results.

*Figure 5* presents the average rating error by region and statewide. The average rating error per section statewide is 0.07, which indicates that

on average the region ratings are slightly higher than the shadow ratings. This year's results show good consistency of the region ratings among each other. These errors are actually quite small, as errors of 0.4 to 0.6 have been observed in prior years.

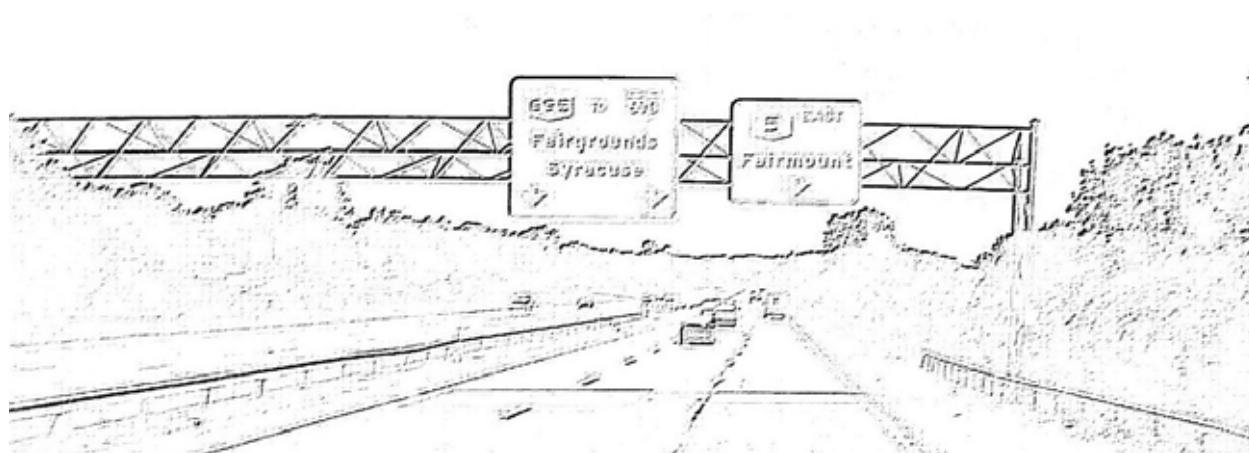
### ***One Point Increases in Rating***

An additional quality assurance measure that began in 2006 and continues this year is a detailed review of rating trends where the current year rating for a segment is one point higher than the previous year. Since there is essentially no treatment that increases the rating by only one point, the occurrences are attributed to rater variability. Segments with ratings increasing by one point when the lower rating was reported for at least the previous two years and no work was done (according to the year of last work field) were reverted to the lower rating. *Figure 6* summarizes the one point increases by region.

Ratings were changed only when it was clear that the rating trend for the segment in question did not support the increased rating. Regions 4, 5, 6, 8, 9 and 11 had many of the one point increases adjusted, and Regions 1, 2, 3, 7 and 10 are relatively unchanged.

Adjusting the ratings when appropriate increases the reliability and consistency of the survey results. Data in this report is based on the adjusted ratings.

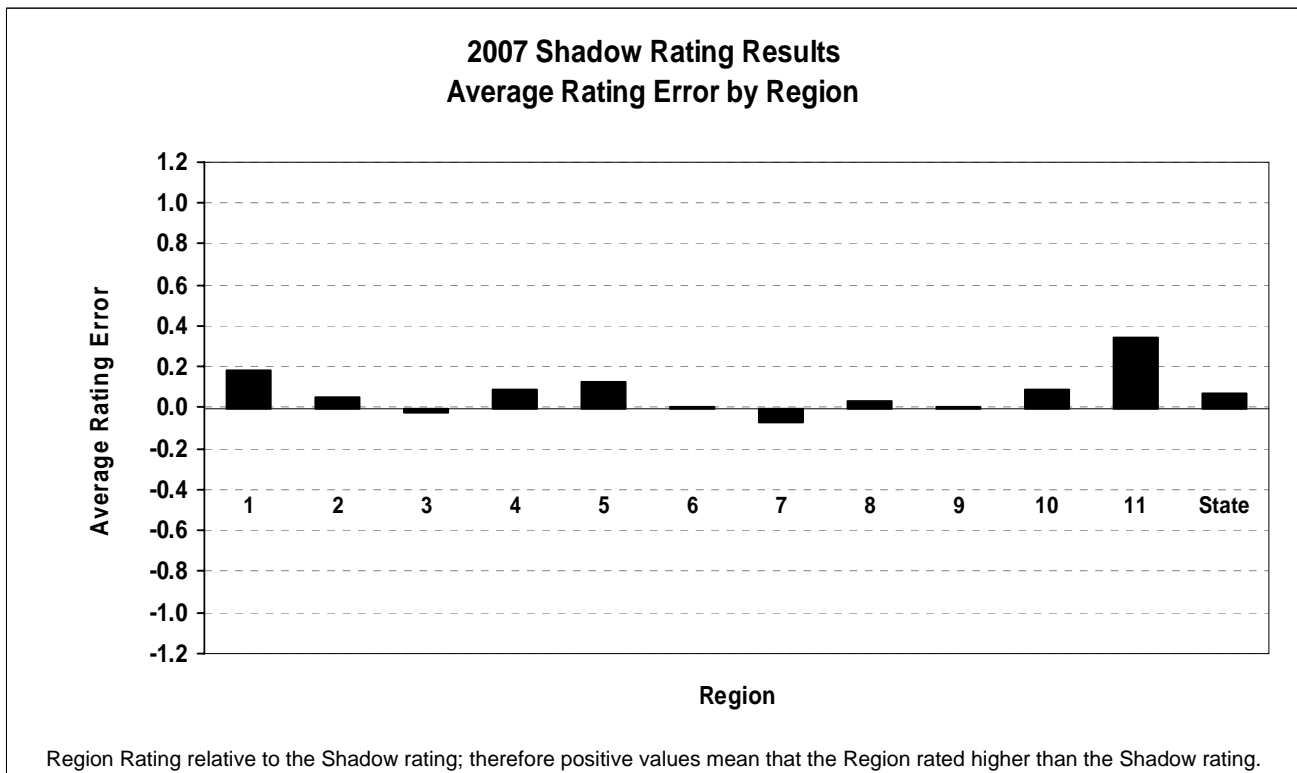
The shadow rating results show that the 2007 rating process has produced reliable, accurate and consistent pavement surface ratings. These findings demonstrate the benefits of carefully designed quality assurance procedures utilizing intensive training and monitoring of rating procedures, and they show the 2007 NYSDOT pavement surface ratings are sufficiently accurate for network-level summaries and analysis.



**Table 14**

<b>2007 Shadow Rating Results</b>			
<b>Region</b>	<b>Percent +/- 1 Point</b>	<b>Average Rating Error</b>	<b>Absolute Rating Error</b>
1	98.2%	0.18	0.30
2	98.4%	0.05	0.25
3	97.7%	-0.02	0.25
4	98.3%	0.09	0.32
5	97.4%	0.13	0.40
6	99.0%	0.00	0.24
7	98.1%	-0.07	0.20
8	96.6%	0.03	0.30
9	91.7%	0.00	0.47
10	97.1%	0.09	0.22
11	86.1%	0.35	0.35
State	96.9%	0.07	0.30

**Figure 5**



**Figure 6**

