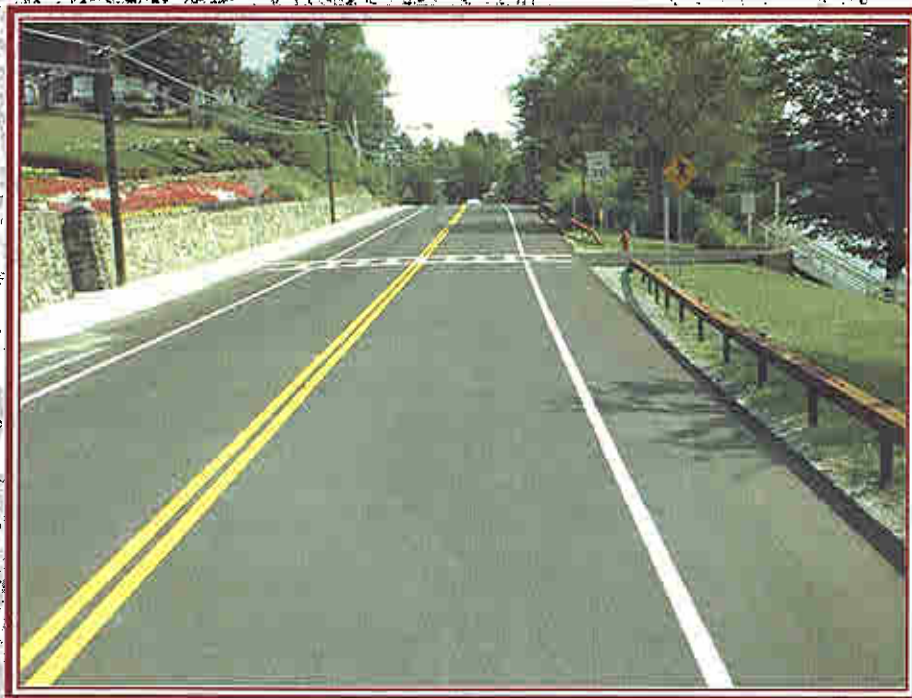


Pavement Condition of New York's Highways



2003

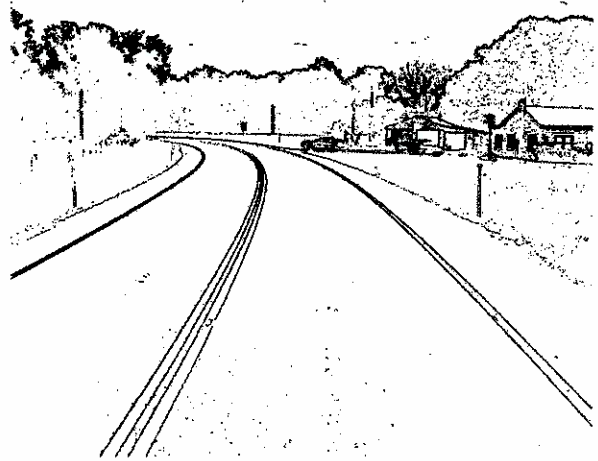


New York State Department of Transportation

Preface

The New York State Department of Transportation annually conducts a survey of State Highway pavement conditions which 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.

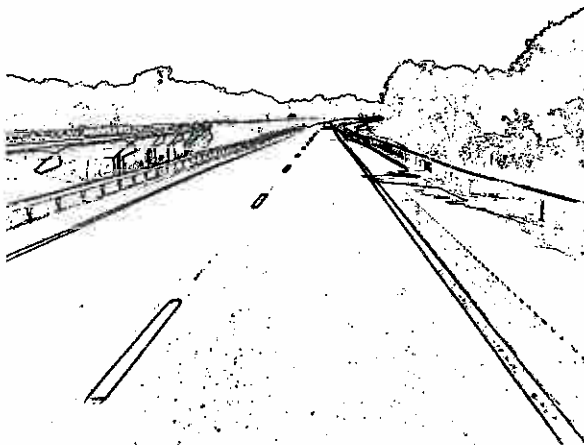
Included in this report are various tables and figures which describe network conditions over time, by Region and County, and by pavement type. Also included are summaries of network-level needs, in terms of mileage requiring a particular treatment strategy. It should be emphasized that the condition survey is

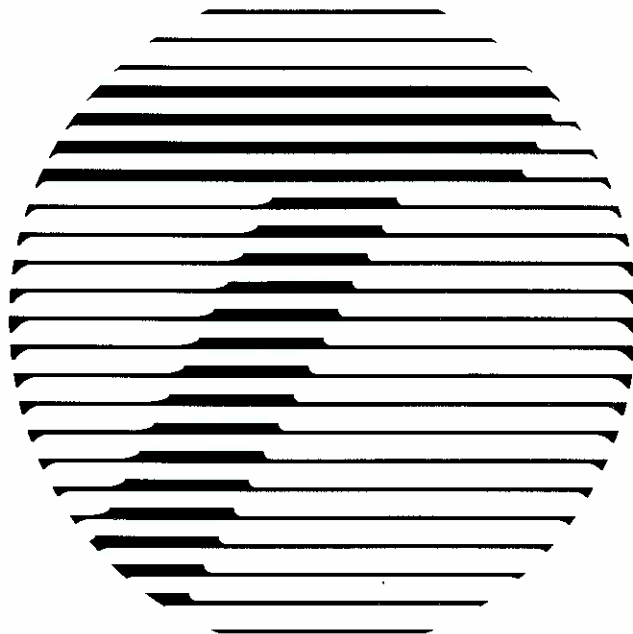


conducted in May and June and represents the condition of the system at that point in time. The impact of pavement improvement projects completed after the survey are therefore not reflected in the condition summaries.

For additional information on the contents of this report, please contact:

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Executive Summary

State System Condition

The results of the 2003 pavement condition survey show the percent of poor pavements on the State Highway System continued the long term trend of improvement. Poor pavement decreased for the tenth consecutive year to 5.0%, down from 5.6% last year. Overall, the current percent poor has improved dramatically from a high of 14.1% in 1993.

In the other categories, good and excellent pavement decreased from 67.8% to 65.9%, and fair pavement increased from 26.6% to 29.1%. The

overall average pavement condition rating decreased from 7.00 to 6.86.

Condition by Region

The 2003 survey shows Regions 2, 3, 10 and 11 have the fewest poor pavements, ranging from 1.2% to 3.4%. Regions 10, 8 and 5 remain in the best overall condition with average condition ratings of 7.14, 7.10 and 7.01 respectively. Regions 1, 7, 9 and 10 made the most improvement over last year in reducing poor pavements. Region 7 has the lowest overall condition at 6.45 followed by Region 6 at 6.67, Region 3 at 6.74 and Region 4 at 6.75.

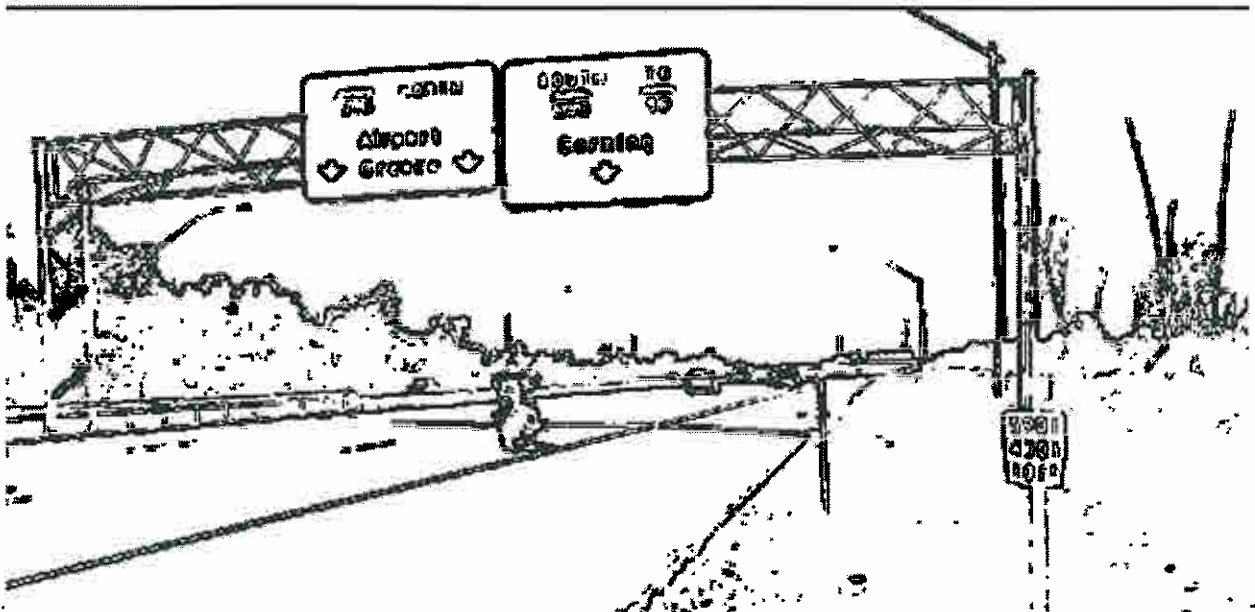
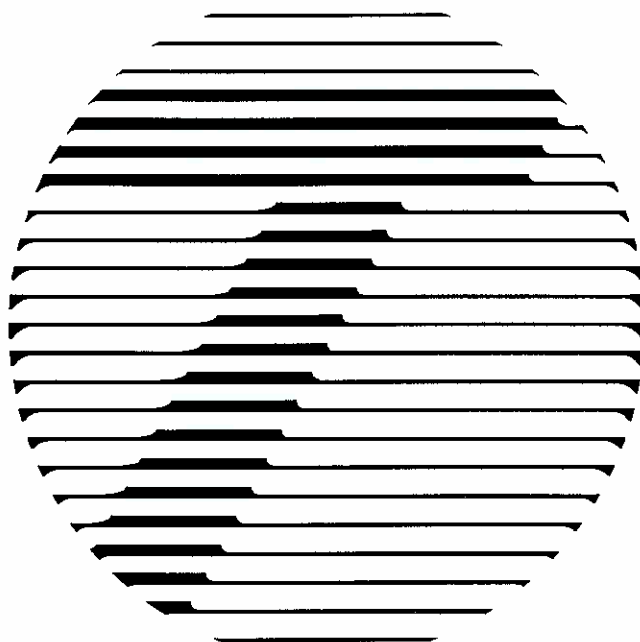


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Pavement Condition of New York's Highways

2003

Pavement Condition of New York's Highways: 2003

Introduction

The New York State Department of Transportation annually conducts an assessment of the pavement condition 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 conditions. Condition data is collected for both 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 during the early fall.

This report presents a summary of the results of the 2003 survey effort. 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.

Pavement Condition Rating Process

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

The Surface Condition Rating Scale

The surface condition rating scale is a 1 to 10 point scale based on the prevalence of a surface-related pavement distress

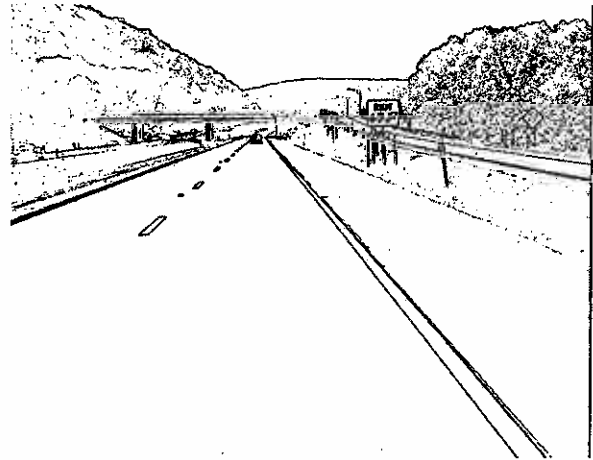
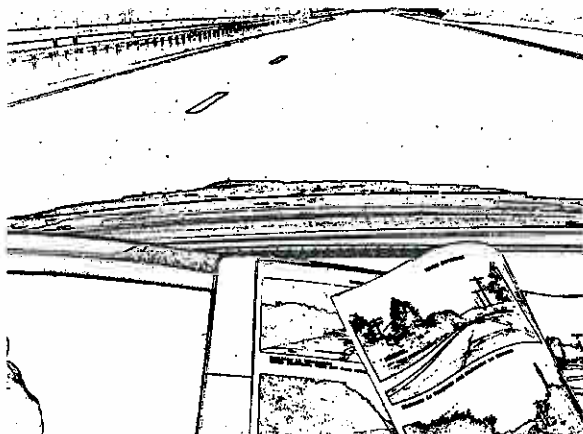
(e.g., cracking). The Pavement Condition Rating Manual is the tool used to ensure consistency in obtaining the surface condition ratings. The manual includes photographs of each scale point and descriptions of the frequency and severity of distress associated with each scale point. Each photograph was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

- *Rigid* (Portland Cement Concrete [PCC])
- *Overlaid* (asphalt overlaid on PCC slabs), and
- *Flexible* (full depth asphalt) pavement structures.

When in the field, the survey teams determine the surface condition rating by comparing the surface condition of the highway section surveyed to the photographic scale for the appropriate pavement type. The scale point which most closely represents the condition 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 score of "6", the treatment category assigned on the basis of the surface rating alone is corrective maintenance. However, if this pavement were faulted (i.e., step formations at joints), a treatment more costly than corrective maintenance 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 Condition Survey Results

Extent of System

Table 1 presents the jurisdictional classification in lane-miles for both State and non-State Highways which comprise the Touring Route System. About 20-30 lane miles are added to the Touring Route System each year, reaching

41,163 lane miles in 2003. It should be noted that mileage under construction at the time of the survey, which can be several hundred miles, are *not* included in any of the condition summaries presented in this report.

State Highway System

Condition Trends - Statewide

Table 2 and Figure 1 illustrate the statewide trends in pavement surface condition for State-owned highways from 1999 through 2003. Pavement conditions have been improving since 1994 as a result of a strong capital program working on the poor pavements and an aggressive preventive maintenance program keeping good pavements in good condition. Poor pavements continued to decline in 2003 for the tenth consecutive year, reaching an all-time low of 5.0%.

Pavements in the other condition categories changed as follows: Excellent pavements declined to 5.7% from 10.9% while good pavements increased to 60.2% from 56.9%. However, as a group, good and excellent pavements declined to 65.9% from 67.8% and fair pavement increased to 29.1% from 26.6% last year. The overall average pavement condition rating decreased to 6.86 from 7.00.

Surface Condition by Region

Table 3 presents the distribution of surface condition ratings by region for 2003, as well as the percentage and number of lane-miles in each condition category. The lowest percentage of poor pavement is found in Regions 10 (1.2%),

11 (2.8%) and 2 (2.9%). The data in *Table 3* also shows Regions 10 and 8 having the greatest percentage of good and excellent pavement at 89.6% and 79.2% respectively.

Table 4 presents the average condition ratings and percent poor pavement by region for the years 1998-2003. The data shows that only Region 10 showed a slight improvement in average condition this past year while the others lost ground on this measure.

Pavements in Regions 10, 8 and 5 remain in the best overall condition with average condition ratings of 7.14, 7.10 and 7.01. Region 7 has the lowest overall condition at 6.45 followed by Region 6 at 6.67, Region 4 at 6.74 and Region 3 at 6.75. Regions 3, 7 and 5 showed the largest decrease in average score, deteriorating by 0.29, 0.25 and 0.23 ratings points, respectively

With respect to the percent of poor pavement, most regions showed improvement. Regions 10, 1, 7 and 9 showed the greatest reductions in poor pavement (3.1%, 1.7%, 1.5% and 1.4% respectively), while Region 5 had the most pavements slip into the poor category (2.0%), followed by Region 6 (1.4%). Region 4 has the highest percent of poor pavement at 9.0%, followed by Region 1 at 7.8% and Regions 6 and 5 at 6.1% and 5.3% respectively.

Table 1

Touring Route System 2003						
Total Lane-Miles by Region and Jurisdiction						
Region	Rated			Under Construction		Touring Route System
	State 1	Non-State 2	Total	State	Non-State	
1	4,756	222	4,978	49	3	5,030
2	2,997	50	3,047	8	0	3,055
3	3,554	172	3,726	27	4	3,757
4	3,999	355	4,354	77	2	4,433
5	3,753	470	4,223	22	2	4,247
6	2,594	32	2,626	0	2	2,628
7	3,473	98	3,571	44	14	3,629
8	5,247	448	5,695	92	2	5,789
9	3,854	148	4,002	44	0	4,046
10	2,551	207	2,758	163	2	2,923
11	813	790	1,603	13	10	1,626
State	37,591	2,992	40,583	539	41	41,163
Notes: 1. "State" Includes Interstates, State Highways, State-DOT Parkways, and State-owned service roads. 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 Condition, 1999 - 2003 State Highway System										
Condition Level	1999		2000		2001		2002		2003	
	Lane Miles	%	Lane Miles	%	Lane Miles	%	Lane Miles	%	Lane Miles	%
Excellent	10									
	9									
	951	2.6	846	2.2	508	1.3	1,108	3.0	623	1.7
	4,075	11.0	3,834	10.3	3,030	8.1	2,940	7.9	1,513	4.0
Subtotal	5,026	13.6	4,680	12.5	3,538	9.4	4,048	10.9	2,136	5.7
Good	8									
	7									
	6,127	16.5	5,755	15.4	6,188	16.5	4,952	13.3	4,649	12.4
	13,706	37.0	15,640	41.9	15,747	42.0	16,174	43.6	17,998	47.9
Subtotal	19,833	53.5	21,395	57.3	21,935	58.5	21,126	56.9	22,647	60.2
Fair	6									
	9,233	24.9	8,720	23.3	9,711	25.9	9,888	26.6	10,927	29.1
Subtotal	9,233	24.9	8,720	23.3	9,711	25.9	9,888	26.6	10,927	29.1
Poor	5									
	4									
	3									
	2									
	1									
	2,810	7.6	2,424	6.5	2,220	5.9	1,990	5.4	1,793	4.8
	163	0.4	143	0.4	100	0.3	86	0.2	87	0.2
	1	0.0	2	0.0	1	0.0	0	0.0	1	0.0
	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Subtotal	2,974	8.0	2,569	6.9	2,321	6.2	2,076	5.6	1,881	5.0
Total	37,066	100.0	37,364	100.0	37,505	100.0	37,138	100.0	37,591	100.0
Avg Score	7.05		7.05		6.98		7.00		6.86	

Figure 1
State Highway Condition Trends

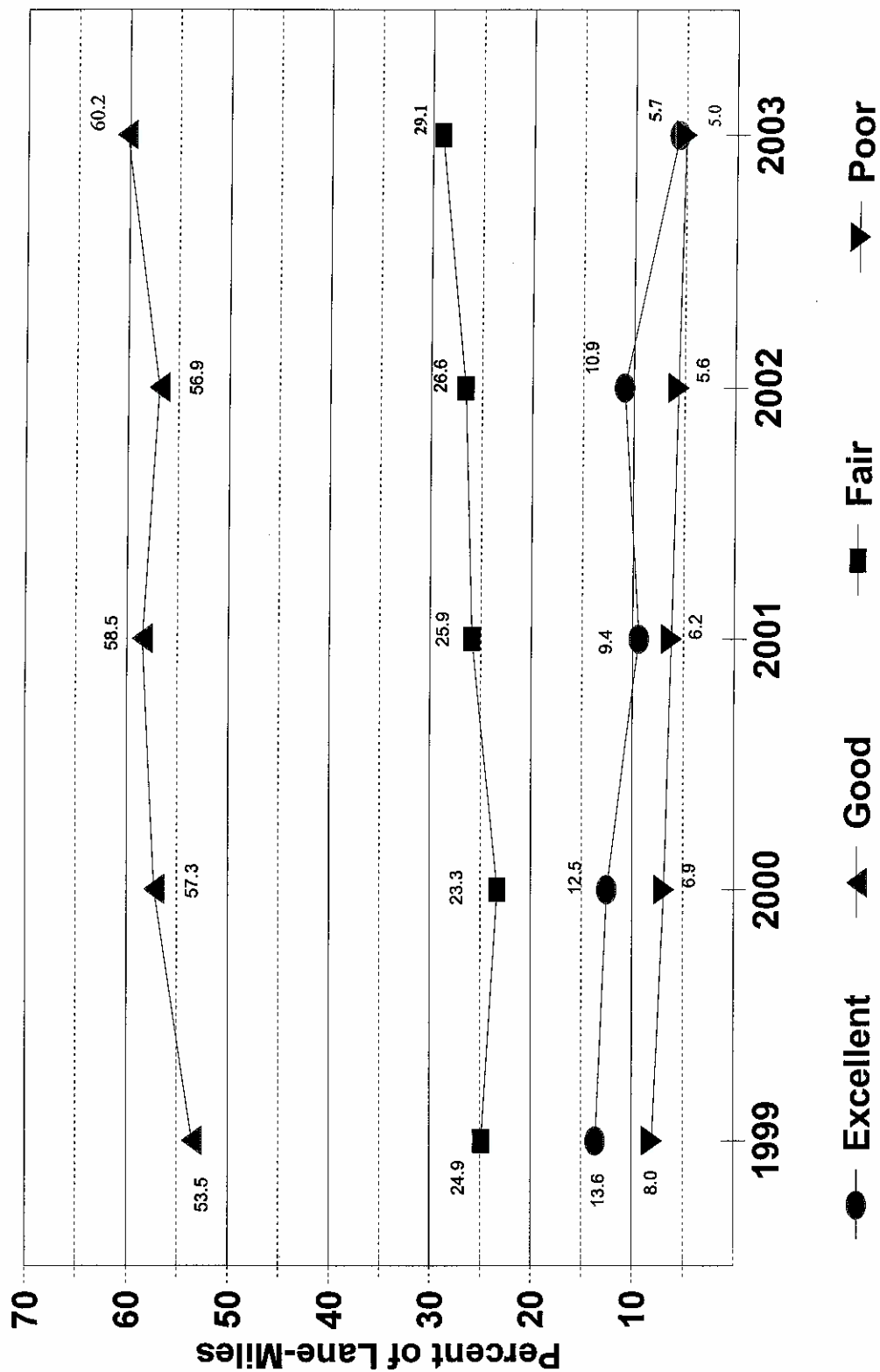


Table 3

State Highway System
2003 Surface Condition by Region in Lane-Miles

Surface Condition Ratings											
Region	1	2	3	4	5	6	7	8	9	10	Total
1	0	0	0	14	358	1,208	2,393	572	163	48	4,756
2	0	0	0	10	78	689	1,775	361	79	5	2,997
3	0	0	0	4	118	1,531	1,207	563	87	44	3,554
4	0	0	0	9	352	1,283	1,588	555	158	54	3,999
5	0	0	1	4	194	859	1,661	806	189	39	3,753
6	0	0	0	1	158	952	1,181	211	82	9	2,594
7	0	0	0	19	134	2,165	810	178	84	83	3,473
8	0	0	0	26	180	886	3,070	548	298	239	5,247
9	0	0	0	0	168	920	1,971	509	243	43	3,854
10	0	0	0	0	30	234	1,867	250	111	59	2,551
11	0	0	0	0	23	200	475	96	19	0	813
State	0	0	1	87	1,793	10,927	17,998	4,649	1,513	623	37,591

Percentage					Lane Miles						
Region	Poor 1-5	Fair 6	Good 7-8	Excellent 9-10	Avg Cond	Region	Poor 1-5	Fair 6	Good 7-8	Excellent 9-10	Total
1	7.8%	25.4%	62.3%	4.5%	6.81	1	372	1,208	2965	211	4,756
2	2.9%	23.0%	71.3%	2.8%	6.89	2	88	689	2136	84	2,997
3	3.4%	43.1%	49.8%	3.7%	6.74	3	122	1,531	1770	131	3,554
4	9.0%	32.1%	53.6%	5.3%	6.75	4	361	1,283	2143	212	3,999
5	5.3%	22.9%	65.7%	6.1%	7.01	5	199	859	2467	228	3,753
6	6.1%	36.7%	53.7%	3.5%	6.67	6	159	952	1392	91	2,594
7	4.4%	62.3%	28.5%	4.8%	6.45	7	153	2,165	988	167	3,473
8	3.9%	16.9%	69.0%	10.2%	7.10	8	206	886	3618	537	5,247
9	4.4%	23.9%	64.3%	7.4%	6.97	9	168	920	2480	286	3,854
10	1.2%	9.2%	83.0%	6.6%	7.14	10	30	234	2117	170	2,551
11	2.8%	24.6%	70.2%	2.4%	6.86	11	23	200	571	19	813
State	5.0%	29.1%	60.2%	5.7%	6.86	State	1,881	10,927	22,647	2,136	37,591

Table 4

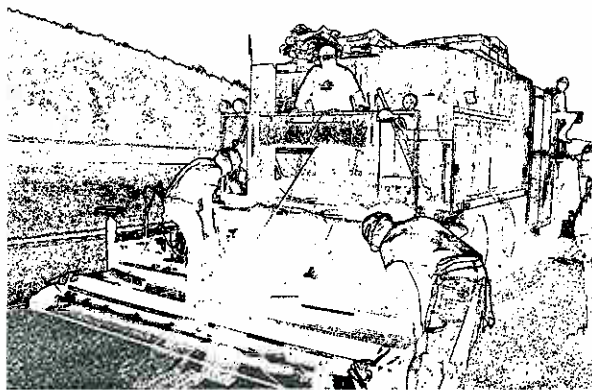
State Highway System Regional Trends 1999-2003					
Average Condition Ratings					
Region	1999	2000	2001	2002	2003
1	6.92	6.87	6.95	6.94	6.81
2	7.22	7.08	6.95	6.98	6.89
3	7.34	7.27	7.02	7.03	6.74
4	7.06	6.95	6.84	6.91	6.75
5	7.02	7.16	7.10	7.24	7.01
6	6.76	6.91	6.94	6.84	6.67
7	6.70	6.78	6.63	6.70	6.45
8	7.30	7.43	7.20	7.13	7.10
9	6.85	6.81	6.83	7.06	6.97
10	7.35	7.22	7.33	7.12	7.14
11	6.65	6.79	7.08	7.03	6.86
Total	7.05	7.05	6.98	7.00	6.86
Percent Below 6, Poor Pavement					
Region	1999	2000	2001	2003	2003
1	11.8%	11.1%	9.2%	9.5%	7.8%
2	4.1%	4.2%	3.3%	3.1%	2.9%
3	2.7%	1.4%	5.1%	4.2%	3.4%
4	12.5%	11.6%	12.5%	9.7%	9.0%
5	7.4%	7.3%	4.9%	3.3%	5.3%
6	9.1%	7.2%	4.6%	4.7%	6.1%
7	13.0%	9.4%	7.2%	5.9%	4.4%
8	2.8%	2.8%	3.6%	4.0%	3.9%
9	11.0%	7.9%	7.2%	5.8%	4.4%
10	5.5%	5.6%	2.9%	4.3%	1.2%
11	7.7%	4.8%	2.8%	2.3%	2.8%
Total	8.0%	6.9%	6.2%	5.6%	5.0%

Surface Condition by County

Tables 5A and 5B rank the counties in the State by average surface condition and percent poor for 2003. Rockland County has the highest average condition rating (7.29), followed by Ulster (7.20) and Westchester (7.17). New York, Richmond, Kings, Queens and Otsego counties all report no poor pavement. Other counties with very low percent poor pavements are Suffolk (0.3%), Rockland (0.6%), Niagara (0.7%), Seneca (1.2%) and Clinton (1.3%). Franklin County has the lowest average surface condition at 6.18, with Lewis at 6.36 and Cortland at 6.40. Washington County has the largest percentage of pavements rated poor at 16.5%, followed by Wyoming (13.1%) and Rensselaer (13.0%).

Surface Condition by Pavement Type

Table 6 provides a statewide summary of condition by pavement type and rating category. The State System is comprised of 7.1% rigid (PCC) pavements, 55.4% overlaid (composite) pavements, and



37.5% flexible (asphalt) pavements. Of the three, rigid pavements are in the lowest condition with 13.3% poor and an average surface condition rating of 6.58, which is an improvement from the 2002 Condition Survey of 13.9% and 6.49, respectively.

National Highway System

Established by ISTEA in 1991, 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 condition category for the National Highway System (NHS) by region and jurisdiction. Table 7, which includes the NYS Thruway Authority mileage, shows that approximately 74.4% of the entire NHS is in good to excellent condition, with only 6.0% in poor condition. Comparing the data for State Highways in Table 8 to the condition data for all State Highways in Table 2 shows that statewide conditions on the NHS are slightly below the conditions for all State Highways. The strategy of the 21st Century Goal for Pavements is the NHS be given priority over other pavements.

Table 5A

State Highway System 2003 County Rankings by Average Condition and Percent Poor							
Region	County	County Name	Lane Miles	Average Condition	Statewide Rank	Percent Poor (< 6)	Statewide Rank
1	1	Albany	815	6.95	20	8.7%	53
1	2	Essex	786	6.62	53	6.1%	45
1	3	Greene	415	6.73	43	8.3%	51
1	4	Rensselaer	619	6.67	49	13.0%	60
1	5	Saratoga	729	7.09	10	3.2%	27
1	6	Schenectady	379	7.08	12	2.4%	18
1	7	Warren	561	6.82	36	5.6%	41
1	8	Washington	450	6.42	59	16.5%	62
1			4,755	6.81		7.8%	
2	1	Fulton	287	6.84	31	1.6%	13
2	2	Hamilton	360	6.93	23	2.6%	20
2	3	Herkimer	523	6.77	41	5.7%	42
2	4	Madison	382	6.78	38	2.8%	23
2	5	Montgomery	386	7.04	16	4.9%	36
2	6	Oneida	1,060	6.92	26	1.4%	11
2			2,997	6.89		2.9%	
3	1	Cayuga	573	6.82	34	3.0%	24
3	2	Cortland	466	6.40	60	2.7%	22
3	3	Onondaga	1,164	6.68	48	5.3%	38
3	4	Oswego	673	6.93	25	3.1%	26
3	5	Seneca	329	7.00	18	1.2%	9
3	6	Tompkins	349	6.69	46	1.5%	12
3			3,554	6.74		3.4%	
4	1	Genesee	415	6.72	45	10.1%	54
4	2	Livingston	613	6.81	37	3.4%	28
4	3	Monroe	1,385	6.76	42	12.7%	59
4	4	Ontario	492	6.65	51	5.4%	39
4	5	Orleans	305	6.83	33	3.6%	30
4	6	Wyoming	420	6.67	50	13.1%	61
4	7	Wayne	369	6.87	28	8.0%	49
4			3,998	6.75		9.0%	
5	1	Cattaraugus	793	6.72	44	11.5%	57
5	2	Chautauqua	810	7.03	17	5.3%	37
5	3	Erie	1,547	7.09	11	3.9%	31
5	4	Niagara	602	7.16	4	0.7%	8
5			3,753	7.01		5.3%	

Table 5B

State Highway System 2003 County Rankings by Average Condition and Percent Poor							
Region	County	County Name	Lane Miles	Average Condition	Statewide Rank	Percent Poor (< 6)	Statewide Rank
6	1	Allegany	536	6.47	57	12.5%	58
6	2	Chemung	334	6.94	22	7.2%	47
6	3	Schuyler	217	6.88	27	5.5%	40
6	4	Steuben	921	6.63	52	4.4%	35
6	5	Tioga	369	6.78	39	3.4%	29
6	6	Yates	218	6.49	56	1.7%	14
6			2,594	6.67		6.2%	
7	1	Clinton	651	6.56	54	1.3%	10
7	2	Franklin	525	6.18	62	11.0%	55
7	3	Jefferson	942	6.47	58	1.7%	15
7	4	Lewis	298	6.36	61	8.4%	52
7	5	St. Lawrence	1,056	6.53	55	4.3%	34
7			3,473	6.45		4.4%	
8	1	Columbia	580	6.82	35	6.6%	46
8	2	Dutchess	947	7.10	8	4.3%	33
8	3	Orange	1,003	7.11	7	2.3%	17
8	4	Putnam	348	6.95	21	7.3%	48
8	5	Rockland	267	7.29	1	0.6%	7
8	6	Ulster	628	7.20	2	2.7%	21
8	7	Westchester	1,473	7.17	3	4.0%	32
8			5,247	7.10		3.9%	
9	1	Broome	858	7.08	13	6.1%	44
9	2	Chenango	556	6.93	24	8.3%	50
9	3	Delaware	787	7.00	19	5.9%	43
9	4	Otsego	671	6.83	32	0.0%	3
9	5	Schoharie	465	7.04	15	3.1%	25
9	6	Sullivan	518	6.87	29	2.0%	16
9			3,854	6.97		4.4%	
10	3	Nassau	986	7.11	6	2.6%	19
10	7	Suffolk	1,566	7.16	5	0.3%	6
10			2,551	7.12		4.3%	
11	1	Bronx	199	7.10	9	11.5%	56
11	2	Kings	138	6.78	40	0.0%	4
11	4	New York	75	7.06	14	0.0%	1
11	5	Queens	293	6.69	47	0.0%	5
11	6	Richmond	107	6.85	30	0.0%	2
11			813	6.86		2.8%	
State			37,591	6.86	---	5.7%	---

Table 6

**State Highway System
2003 Percent Lane-Miles by
Pavement Type and Rating Category**

Category	Poor		Fair		Good		Excellent		Total		Avg Cond
	Lane Miles	%	Lane Miles	%	Lane Miles	%	Lane Miles	%	Lane Miles	%	
Rigid	356	13.3%	766	28.6%	1,452	54.2%	104	3.9%	2,678	7.1%	6.58
Overlay	943	4.5%	5,682	27.3%	12,971	62.3%	1,235	5.9%	20,831	55.4%	6.89
Flexible	582	4.1%	4,480	31.8%	8,223	58.4%	797	5.7%	14,082	37.5%	6.86
State	1,881	5.0%	10,928	29.1%	22,646	60.2%	2,136	5.7%	37,591	100.0%	6.86

Table 7

2003 New York State National Highway System*

Region	Poor		Fair		Good		Excellent		Total Lane Miles
	Lane Miles	%	Lane Miles	%	Lane Miles	%	Lane Miles	%	
1	54	3.2%	231	14.0%	1,302	78.8%	67	4.0%	1,653
2	62	6.4%	159	16.3%	710	73.0%	41	4.3%	973
3	52	3.5%	476	31.9%	958	64.2%	6	0.4%	1,493
4	146	9.4%	297	19.0%	990	63.4%	128	8.2%	1,561
5	143	7.9%	433	23.7%	1,157	63.4%	92	5.0%	1,826
6	66	7.9%	206	24.5%	541	64.4%	27	3.2%	840
7	79	7.4%	454	42.9%	472	44.6%	53	5.1%	1,058
8	275	9.3%	430	14.6%	2,039	69.1%	206	7.0%	2,949
9	51	3.4%	292	19.6%	1,042	69.8%	108	7.2%	1,493
10	44	2.3%	113	5.9%	1,668	87.1%	90	4.7%	1,916
11	23	2.9%	159	20.0%	592	74.7%	19	2.4%	792
Total	995	6.0%	3,250	19.6%	11,471	69.3%	837	5.1%	16,553

* 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 in 2003.

Table 8

2003 National Highway System: State Highways Only									
Region	Poor		Fair		Good		Excellent		Total Lane Miles
	Lane Miles	%	Lane Miles	%	Lane Miles	%	Lane Miles	%	
1	36	2.7%	229	17.1%	1,012	75.8%	59	4.4%	1,336
2	6	1.1%	159	28.8%	365	66.2%	21	3.9%	551
3	52	4.0%	460	36.0%	762	59.5%	6	0.5%	1,280
4	146	11.7%	297	23.8%	753	60.4%	51	4.1%	1,247
5	128	9.6%	385	28.7%	778	58.0%	50	3.7%	1,341
6	66	7.9%	206	24.5%	541	64.4%	27	3.2%	840
7	79	7.4%	454	42.9%	472	44.6%	53	5.1%	1,058
8	253	11.0%	408	17.8%	1,499	65.3%	135	5.9%	2,295
9	51	3.4%	292	19.6%	1,042	69.8%	108	7.2%	1,493
10	44	2.3%	113	5.9%	1,668	87.1%	90	4.7%	1,915
11	23	3.0%	159	20.6%	571	74.0%	19	2.4%	772
Total	884	6.2%	3,162	22.4%	9,463	67.0%	619	4.4%	14,128

Table 9

2003 National Highway System: NYS Thruway Authority									
Region	Poor		Fair		Good		Excellent		Total Lane Miles
	Lane Miles	%	Lane Miles	%	Lane Miles	%	Lane Miles	%	
1	18	5.7%	2	0.6%	290	91.2%	8	2.5%	318
2	56	13.3%	0	0.0%	345	82.0%	20	4.7%	421
3	0	0.0%	16	7.5%	196	92.5%	0	0.0%	212
4	0	0.0%		0.0%	237	75.6%	77	24.4%	314
5	15	3.1%	48	9.9%	379	78.4%	42	8.6%	484
6	0		0		0		0		0
7	0		0		0		0		0
8	22	3.4%	22	3.4%	540	82.4%	71	10.8%	655
9	0		0		0		0		0
10	0		0		0		0		0
11	0	0.0%		0.0%	21	100.0%	0	0.0%	21
Total	111	4.6%	88	3.6%	2,008	82.8%	218	9.0%	2,425

The Local Highway portion of the NHS was not surveyed this year because reporting of the surface conditions of the Local Highways for HPMS is no longer required by FHWA. Instead of reporting surface condition, HPMS requires only the reporting of IRI (International Roughness Index) on the NHS.

Pavement Roughness

A road roughness measurement known as the International Roughness Index (IRI) was originally developed by the World Bank during the 1970's to assess road conditions in developing countries for the purpose of 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 condition ratings, to have rough rides. It is equally possible to have roads with significant distress and depending on the type of distress, 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 benefit of the traveling public.

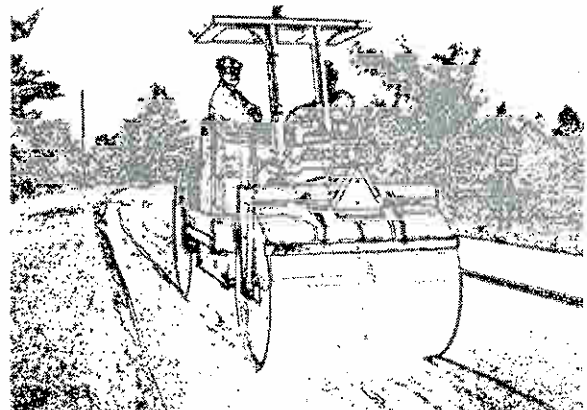


Table 10 presents the number and percent of State-owned Interstate and Principal Arterial Lane-miles by Roughness Category and Region. Because this information is collected every-other year, the values shown are from 2001, the latest year available.

Overall, 85.5 percent of these pavements are considered smooth and 14.5 percent are considered rough. Regions 3, 6 and 7 have the highest percentage of Interstate and Principal Arterial lane-miles of very smooth pavements. Region 11 has the highest percentage of lane-miles of very rough pavements.

Network-Level Pavement Needs

Treatment Categories

One of the objectives of the pavement condition survey process is to classify each highway section surveyed into one of five general treatment categories. The five general treatment categories are:

1. *Do Nothing*
2. *Preventive Maintenance (Non-paving)* - includes strategies such as joint or crack sealing/filling.
3. *Preventive Maintenance (Paving)* - includes single-course (1-½") overlays.
4. *Corrective Maintenance* - applies to PCC pavements only and includes treatments such as resealing joints, patching slabs, and grinding.

5. *Rehabilitation/Major Rehabilitation* - includes treatments intended to extend the service life of a roadway surface 15 years or more.

Pavement Needs

According to the 2003 pavement scores, an estimate of the percent of lanes miles in the Do Nothing category is about 6%, implying that almost 94% of the pavements on the State Highway System are candidates for some type of maintenance or rehabilitation. About 12% of pavements are candidates for crack sealing, approximately 35% are in the Rehab/Major Rehab category, and 48% of the State Highways are in need of preventive maintenance paving.

Table 10

2001 Lane Miles of Interstates and Principal Arterials * by Roughness Category (in/mi) and Region						
Region	Very Smooth 0 - 60	Smooth 61 - 120	Fair 121 - 170	Rough 171 - 220	Very Rough > 220	Total
1	236	1,029	225	120	82	1,692
2	44	550	77	29	16	716
3	290	873	87	17	28	1,294
4	121	920	139	102	55	1,336
5	35	1,128	479	211	113	1,965
6	146	428	83	85	3	745
7	174	807	47	18	15	1,061
8	6	1,707	585	256	241	2,795
9	50	857	299	36	23	1,265
10	4	713	748	265	127	1,856
11	0	89	271	215	200	775
Total	1,104	9,100	3,040	1,353	902	15,500

2001 Percent of Lane Miles of Interstates and Principal Arterials by Roughness Category (in/mi) and Region						
Region	Very Smooth 0 - 60	Smooth 61 - 120	Fair 121 - 170	Rough 171 - 220	Very Rough > 220	Total
1	13.9%	60.8%	13.3%	7.1%	4.8%	100.0%
2	6.1%	76.8%	10.7%	4.1%	2.2%	100.0%
3	22.4%	67.5%	6.7%	1.3%	2.2%	100.0%
4	9.0%	68.9%	10.4%	7.6%	4.1%	100.0%
5	1.8%	57.4%	24.4%	10.7%	5.7%	100.0%
6	19.6%	57.5%	11.1%	11.4%	0.4%	100.0%
7	16.4%	76.1%	4.4%	1.7%	1.4%	100.0%
8	0.2%	61.1%	20.9%	9.2%	8.6%	100.0%
9	4.0%	67.7%	23.7%	2.8%	1.8%	100.0%
10	0.2%	38.4%	40.3%	14.3%	6.8%	100.0%
11	0.0%	11.5%	35.0%	27.8%	25.7%	100.0%
Total	7.1%	58.7%	19.6%	8.7%	5.8%	100.0%