

Performance Measure Summary

There are several inventory and performance measures listed in the pages of this Urban Area Report for the years from 1982 to 2005. There is no single performance measure that experts agree “says it all.” The best comparison of congestion levels and trends is done between regions of similar size, over several years, and with a few measures of congestion aspects. Examining a few measures over many years reduces the chance that data variations or the estimating procedures may have caused a “spike” in any single year. A few key points should be recognized by users of the Urban Mobility Report data.

Use the Trends – The multi-year performance measures are better indicators, in most cases, than any single year. (*5 years is 5 times better than 1 year*).

Use several measures – Each performance measure illustrates a different element of congestion. (*The view is more interesting from the top of a few measures*).

Compare to similar regions – Congestion analyses that compare areas with similar characteristics (for example population, growth rate, road and public transportation system design) are usually more insightful than comparisons of different regions. (*Los Angeles is not Peoria*).

Compare ranking changes and performance measure values – In some performance measures a small change in the value may cause a significant change in rank from one year to the next. This is the case when there are several regions with nearly the same value. (*15 hours is only 1 hour more than 14 hours*).

Consider the scope of improvement options – Any improvement project in a corridor within most of the regions will only have a modest effect on the regional congestion level. (*To have an effect on areawide congestion, there must be significant change in the system or service*).

Comparison of Several Key Mobility Performance Measures Medium Group – 500,000 to 1 million population urban areas

Urban Area	Delay per Traveler	Travel Time Index	Total Delay	1982 to 2005	
				Delay per Traveler	Total Delay
Jacksonville, FL	H+	H+	H+	F	F+
Nashville-Davidson, TN	H+	0	H+	0	F+
Salt Lake City, UT	0	H	H	0	F+
Raleigh-Durham, NC	H+	H	H+	F+	F+
Richmond, VA	L-	L-	0	S-	S
Louisville, KY-IN	H+	H+	H+	F+	F+
Hartford, CT	L-	L-	L	S	S-
Bridgeport-Stamford, CT-NY	H	H+	H+	F	F+
Charlotte, NC-SC	H+	H+	H+	F+	F+
Austin, TX	H+	H+	H+	F+	F+
Oklahoma City, OK	L-	L-	L	S	S-
Tulsa, OK	L-	L-	L	S-	S-
Tucson, AZ	H+	H+	H+	0	F+
Dayton, OH	L-	L-	L-	S-	S-
Honolulu, HI	L	H+	L	S-	S-
Birmingham, AL	H+	0	H	F+	F+
El Paso, TX-NM	L	0	L	F	S-
Rochester, NY	L-	L-	L-	S-	S-
Springfield, MA-CT	L-	L-	L-	S-	S-
Omaha, NE-IA	L	0	L	0	S-
Sarasota-Bradenton, FL	L	H	L	S-	S-
Allentown-Bethlehem, PA-NJ	L-	L	L-	S-	S-
Akron, OH	L-	L-	L-	S-	S-
Fresno, CA	L-	L	L-	S-	S-
Grand Rapids, MI	L	L-	L-	0	S-
Oxnard-Ventura, CA	H+	H+	0	F+	F+
Albuquerque, NM	H+	0	0	F	S
New Haven, CT	L-	L-	L-	S-	S-
Albany-Schenectady, NY	L-	L-	L-	S-	S-
Toledo, OH-MI	L-	L-	L-	S-	S-

0 – Average congestion levels or average congestion growth

H Higher congestion; H+ Much higher congestion; F Faster congestion growth; F+ Much faster growth

L Lower congestion; L- Much lower congestion; S Slower congestion growth; S- Much slower growth

Performance Measures and Definition of Terms

Travel Time Index – A measure of congestion that focuses on each trip and each mile of travel. The ratio of travel time in the peak period to travel time in free-flow. A value of 1.30 indicates a 20-minute free-flow trip takes 26 minutes in the peak.

Peak Travelers – Number of travelers (using any travel mode) who begin a trip during the morning or evening peak travel periods (6 to 9 a.m. and 4 to 7 p.m.).

Annual Delay per Traveler – A yearly sum of all the per-trip delays. This measure illustrates the effect of the per-mile congestion as well as the length of each trip. The extra time required to travel in the peak period is divided by the number of travelers who begin a trip during the peak period (6 to 9 a.m. and 4 to 7 p.m.).

Total Delay – The overall size of the congestion problem. Measured by the total travel time above that needed to complete a trip at free-flow speeds. The ranking of total delay usually follows the population ranking (larger regions usually have more delay).

Free-Flow Speeds (60 mph on freeways and 35 mph on arterials) – These values are used as the national comparison thresholds. Other speed values may be appropriate for urban areas or sub-regions.

Excess Fuel Consumed – Increased fuel consumption due to travel in congested conditions rather than free-flow conditions.

Public Transportation – Regular route service from all public transportation providers in an urban area.

Operations Treatments – Freeway incident management, freeway ramp metering, arterial street signal coordination and arterial street access management.

Congestion Cost – Value of travel delay for 2005 (estimated at \$14.60 per hour of person travel and \$77.10 per hour of truck time) and excess fuel consumption (estimated using state average cost per gallon).

Annual Increase Needed to Maintain Constant Congestion Level – Number of lane-miles that must be added to the road system each year – or – the number of new transit riders or carpoolers that must be added to keep congestion levels the same as the previous year.

Urban Area – The developed area (population density more than 1,000 persons per square mile) within a metropolitan region. The urban area boundaries change frequently (every year for most growing areas). The annual change in miles traveled, therefore, includes both new travel due to growth and travel that previously occurred in areas designated as rural.

Number of Rush Hours – Time when system might have congestion

Key Mobility Performance Measure Labels

Note: Designation of an urban area congestion problem as “Much higher”, “Much faster growth”, etc. is determined using a general indicator of the accuracy of the congestion estimates. For regions with the same indicator label, there may be no difference in congestion levels. Different values are used for the indicators in regions over 1 million population and below 1 million population.

Measures	Differences Within These Values May Not Indicate a Difference in Congestion Level	
	Above 1M Population	Below 1M Population
2005 Values Delay per Traveler - Travel Time Index - Total Delay -	5 Hours 5 Index Points 5 Hours x Average Population	3 Hours 3 Index Points 3 Hours x Average Population
1982 to 2005 Trends Delay per Traveler - Total Delay -	5 Hours 5 Hours x Average Population	3 Hours 3 Hours x Average Population

The Mobility Data for Omaha, NE-IA

Inventory Measures	2005	2004	2003	2002	2001	2000
Urban Area Information						
Population (1000s)	640	640	635	635	630	620
Rank	59	59	59	59	58	58
Urban Area (square miles)	245	245	245	245	245	240
Popn Density (persons/sq mile)	2,612	2,612	2,592	2,592	2,571	2,583
Peak Travelers (1000s)	348	346	341	337	330	321
Freeway						
Daily Vehicle-Miles of Travel (1000s)	3,590	3,530	3,600	3,635	3,420	3,300
Lane Miles	300	300	300	300	300	300
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	6,705	6,795	6,740	6,690	6,675	6,625
Lane Miles	1,280	1,275	1,275	1,275	1,275	1,270
Public Transportation						
Annual Psgr-Miles of Travel (millions)	16	17	17	16	15	16
Annual Unlinked Psgr Trips (millions)	5	5	4	4	4	4
Cost Components						
Value of Time (\$/hour)	14.60	14.10	13.75	13.45	13.25	12.85
Commercial Cost (\$/hour)	77.10	74.60	72.65	71.05	69.95	68.00
Fuel Cost (\$/gallon)	2.32	1.92	1.53	1.40	1.44	1.60
System Performance						
Congested Travel (% of peak VMT)	44	44	44	44	41	38
Congested System (% of lane-miles)	39	39	39	39	39	37
Congested Time (number of "Rush Hours")	5.4	5.4	5.4	5.4	5.2	5.0
Annual Increase Needed To Maintain Constant Congestion Level:						
Lane-Miles	11	23	32	46	39	46
Transit Riders or Carpoolers (millions)	3	5	7	10	9	10
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	5,344	5,358	5,320	5,290	4,854	4,395
Rank	56	55	55	52	55	57
Fuel per Peak Traveler (gallons)	15	16	16	16	15	14
Rank	50	47	47	45	46	49
Annual Delay						
Total Delay (1000s of person-hours)	8,784	8,882	8,787	8,695	8,148	7,515
Rank	56	54	53	52	54	55
Delay per Peak Traveler (person-hrs)	25	26	26	26	25	23
Rank	48	47	47	44	46	50
Delay due to Incidents (percent)	56	56	56	56	56	55
Travel Time Index						
Rank	1.16	1.16	1.16	1.16	1.15	1.14
Rank	46	45	44	43	44	49
Congestion Cost						
Total Cost (\$ millions)	154	148	140	136	125	112
Rank	57	54	54	52	54	58
Cost per Peak Traveler (\$)	442	428	412	402	379	351
Rank	50	48	47	47	50	51

Note: System Performance statistics for 2000 through 2005 data reflect the effects of operational treatments.

Note: Zeroes in the table reflect values less than 0.5.

The Mobility Data for Omaha, NE-IA, Continued

Inventory Measures	1999	1998	1997	1996	1995	1994
Urban Area Information						
Population (1000s)	605	590	575	565	555	545
Rank	59	59	59	59	58	58
Urban Area (square miles)	235	230	225	225	220	215
Popn Density (persons/sq mile)	2,574	2,565	2,556	2,511	2,523	2,535
Peak Travelers (1000s)	309	298	286	278	270	262
Freeway						
Daily Vehicle-Miles of Travel (1000s)	3,280	3,135	2,955	2,860	2,715	2,690
Lane Miles	300	300	290	280	280	280
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	6,310	6,220	6,005	6,070	5,895	5,810
Lane Miles	1,260	1,255	1,250	1,245	1,230	1,225
Public Transportation						
Annual Psgr-Miles of Travel (millions)	19	20	20	20	19	20
Annual Unlinked Psgr Trips (millions)	5	6	5	5	5	5
Cost Components						
Value of Time (\$/hour)	12.40	12.15	12.00	11.70	11.40	11.05
Commercial Cost (\$/hour)	65.80	64.35	63.40	61.95	60.20	58.50
Fuel Cost (\$/gallon)	1.12	1.10	1.20	1.30	1.16	1.14
System Performance						
Congested Travel (% of peak VMT)	35	34	30	32	30	30
Congested System (% of lane-miles)	36	36	36	32	32	32
Congested Time (number of "Rush Hours")	4.8	4.4	4.2	4.2	3.8	3.8
Annual Increase Needed To Maintain Constant Congestion Level:						
Lane-Miles	38	43	38	65	56	63
Transit Riders or Carpoolers (millions)	8	9	8	13	11	12
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	4,160	3,850	3,281	3,429	3,064	2,958
Rank	58	59	60	58	58	57
Fuel per Peak Traveler (gallons)	13	13	11	12	11	11
Rank	56	55	59	53	54	52
Annual Delay						
Total Delay (1000s of person-hours)	7,198	6,680	5,693	5,793	5,186	5,018
Rank	57	57	60	57	58	56
Delay per Peak Traveler (person-hrs)	23	22	20	21	19	19
Rank	51	52	57	52	53	52
Delay due to Incidents (percent)	55	55	55	55	54	54
Travel Time Index						
Rank	50	49	54	50	53	49
Congestion Cost						
Total Cost (\$ millions)	102	93	79	79	68	64
Rank	59	59	61	58	58	57
Cost per Peak Traveler (\$)	331	312	274	284	253	246
Rank	56	54	59	55	54	52

Note: System Performance statistics for 2000 through 2005 data reflect the effects of operational treatments.

Note: Zeroes in the table reflect values less than 0.5.

The Mobility Data for Omaha, NE-IA, Continued

Inventory Measures	1993	1992	1991	1990	1989	1988
Urban Area Information						
Population (1000s)	540	535	535	530	525	520
Rank	58	58	57	56	54	55
Urban Area (square miles)	215	210	210	210	205	205
Popn Density (persons/sq mile)	2,512	2,548	2,548	2,524	2,561	2,537
Peak Travelers (1000s)	256	250	247	242	237	233
Freeway						
Daily Vehicle-Miles of Travel (1000s)	2,455	2,370	2,095	2,040	2,050	1,965
Lane Miles	255	245	235	230	225	225
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	5,685	5,565	5,155	5,135	4,890	4,875
Lane Miles	1,220	1,210	1,175	1,155	1,140	1,140
Public Transportation						
Annual Psgr-Miles of Travel (millions)	20	24	23	26	25	28
Annual Unlinked Psgr Trips (millions)	5	6	6	7	7	7
Cost Components						
Value of Time (\$/hour)	10.75	10.50	10.25	10.00	9.25	8.80
Commercial Cost (\$/hour)	57.05	55.40	53.80	51.60	48.95	46.70
Fuel Cost (\$/gallon)	1.15	1.17	1.14	1.13	1.17	1.08
System Performance						
Congested Travel (% of peak VMT)	28	28	25	25	23	22
Congested System (% of lane-miles)	33	33	28	28	28	28
Congested Time (number of "Rush Hours")	3.8	3.8	3.0	3.2	3.0	3.0
Annual Increase Needed To Maintain Constant Congestion Level:						
Lane-Miles	52	50	23	50	256	56
Transit Riders or Carpoolers (millions)	10	10	4	9	45	10
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	2,625	2,629	2,056	2,047	1,761	1,651
Rank	59	54	58	55	58	57
Fuel per Peak Traveler (gallons)	10	11	8	8	7	7
Rank	52	47	51	51	53	52
Annual Delay						
Total Delay (1000s of person-hours)	4,405	4,388	3,471	3,456	2,943	2,784
Rank	57	54	58	56	58	56
Delay per Peak Traveler (person-hrs)	17	18	14	14	12	12
Rank	52	49	52	51	52	50
Delay due to Incidents (percent)	55	55	55	55	55	54
Travel Time Index						
Rank	50	47	51	50	51	47
Congestion Cost						
Total Cost (\$ millions)	55	54	42	41	32	29
Rank	60	55	58	57	58	56
Cost per Peak Traveler (\$)	216	216	169	168	136	124
Rank	55	50	53	51	52	52

Note: System Performance statistics for 2000 through 2005 data reflect the effects of operational treatments.

Note: Zeroes in the table reflect values less than 0.5.

The Mobility Data for Omaha, NE-IA, Continued

Inventory Measures	1987	1986	1985	1984	1983	1982
Urban Area Information						
Population (1000s)	520	515	510	510	505	500
Rank	54	54	54	54	54	53
Urban Area (square miles)	205	200	200	200	200	195
Popn Density (persons/sq mile)	2,537	2,575	2,550	2,550	2,525	2,564
Peak Travelers (1000s)	231	228	224	222	218	214
Freeway						
Daily Vehicle-Miles of Travel (1000s)	1,940	1,895	1,735	1,705	1,585	1,520
Lane Miles	220	220	220	215	215	215
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	4,755	4,790	4,255	1,235	4,015	3,810
Lane Miles	1,130	1,105	1,090	1,075	1,075	1,050
Public Transportation						
Annual Psgr-Miles of Travel (millions)	30	33	32	38	38	38
Annual Unlinked Psgr Trips (millions)	7	8	9	10	10	10
Cost Components						
Value of Time (\$/hour)	8.50	8.20	8.00	7.75	7.45	7.20
Commercial Cost (\$/hour)	44.85	43.30	42.50	41.05	39.35	38.10
Fuel Cost (\$/gallon)	1.08	1.06	1.38	1.40	1.43	1.50
System Performance						
Congested Travel (% of peak VMT)	20	21	16	10	13	12
Congested System (% of lane-miles)	28	28	23	23	18	14
Congested Time (number of "Rush Hours")	3.0	3.0	2.8	2.2	2.7	2.6
Annual Increase Needed To Maintain Constant Congestion Level:						
Lane-Miles	63	--	--	--	--	--
Transit Riders or Carpoolers (millions)	11	--	--	--	--	--
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	1,507	1,531	1,005	271	766	697
Rank	59	53	62	78	61	61
Fuel per Peak Traveler (gallons)	7	7	4	1	4	3
Rank	50	49	57	83	60	58
Annual Delay						
Total Delay (1000s of person-hours)	2,537	2,602	1,683	416	1,285	1,163
Rank	57	53	61	79	61	62
Delay per Peak Traveler (person-hrs)	11	11	8	2	6	5
Rank	53	50	58	85	59	58
Delay due to Incidents (percent)	55	54	54	56	54	54
Travel Time Index						
Rank	48	46	52	71	55	53
Congestion Cost						
Total Cost (\$ millions)	26	25	16	4	12	10
Rank	57	53	61	79	62	62
Cost per Peak Traveler (\$)	111	112	73	18	54	49
Rank	55	50	59	85	61	58

Note: System Performance statistics for 2000 through 2005 data reflect the effects of operational treatments.

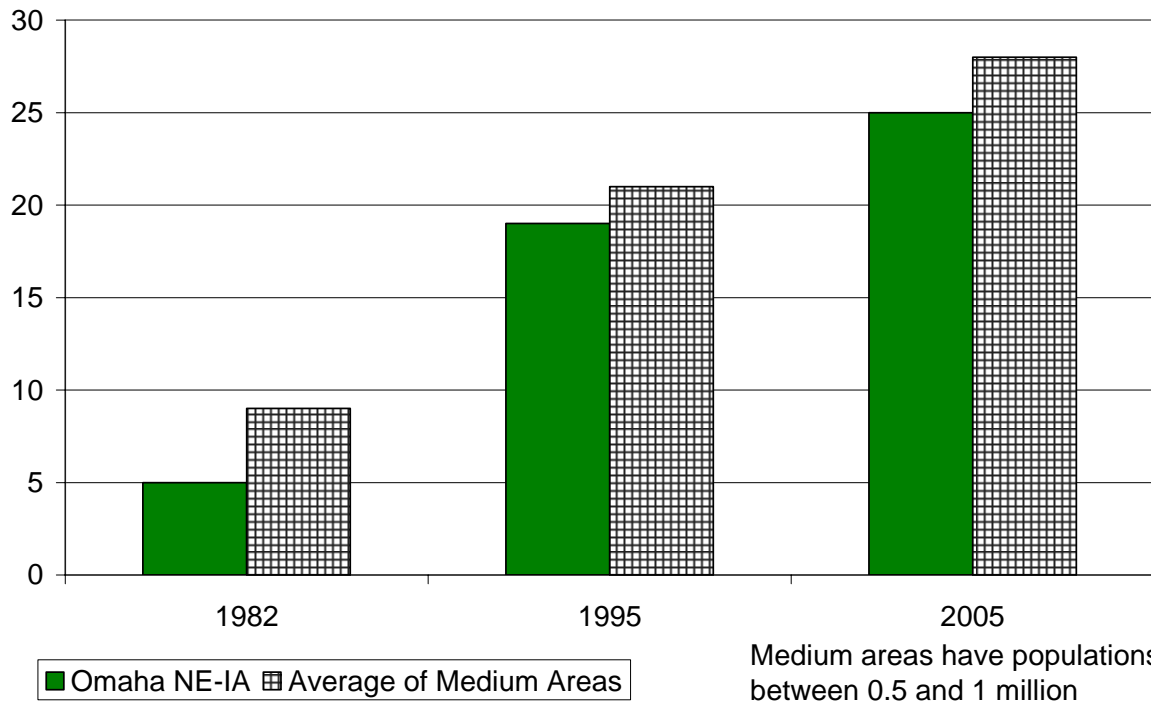
Note: Zeroes in the table reflect values less than 0.5.

Benefits From Public Transportation Service and Operations Strategies for Omaha, NE-IA

Operations Strategies	2005	2004	2003	2002	2001	2000
Freeway Ramp Metering						
Percent of Roadway Miles	--	--	--	--	--	--
Annual Delay Reduction (1000 hours)	--	--	--	--	--	--
Freeway Incident Management						
Cameras						
Percent of Roadway Miles	--	--	--	--	--	--
Service Patrols						
Percent of Roadway Miles	100	100	100	100	100	100
Annual Delay Reduction (1000 hours)	243	224	218	211	173	122
Arterial Signal Coordination						
Percent of Roadway Miles	66	65	64	59	55	48
Annual Delay Reduction (1000 hours)	124	150	144	119	64	69
Arterial Access Management						
Percent of Roadway Miles	39	36	36	36	36	33
Annual Delay Reduction (1000 hours)	307	305	276	278	286	282
HOV Lanes						
Daily Passenger-miles of Travel (1000s)	--	--	--	--	--	--
HOV User Delay Savings	--	--	--	--	--	--
Total Effect of Operations Treatments						
Annual Delay Reduction (1000 hours)	674	679	638	608	523	473
Annual Delay Saved per Peak Traveler (hours)	2	2	2	2	2	1
Annual Congestion Cost Savings (\$million)	11.8	11.3	10.3	9.6	8.1	7.1
Travel Time Index with Strategies	1.162	1.161	1.160	1.159	1.149	1.137
Travel Time Index (Base)	1.172	1.172	1.170	1.169	1.157	1.144
Public Transportation Service						
Existing Service						
Annual Passenger-miles of Travel (million)	16	17	17	16	15	16
Unlinked Passenger Trips (million)	5	5	4	4	4	4
Travel Time Index (combined road and transit)	1.159	1.158	1.157	1.157	1.147	1.135
Condition if Public Transportation Service were Discontinued						
Travel Time Index	1.174	1.174	1.171	1.170	1.157	1.146
Annual Delay Increase (1000 hours)	188	191	120	102	69	167
Annual Delay Increase per Peak Traveler (hours)	1	1	0	0	0	1
Annual Congestion Cost Increase (\$million)	3.3	3.2	1.9	1.6	1.1	2.5

Growth in Delay per Peak Traveler

Hours of Delay



Annual Hours of Delay (million)

Growth in Total Delay

