

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 Small Group – less than 500,000 population urban areas

Urban Area	Delay per Traveler	Travel Time Index	Total Delay	1982 to 2005	
				Delay per Traveler	Total Delay
Colorado Springs, CO	H+	H+	H+	F+	F+
Charleston-North Charleston, SC	H+	H+	H+	F	F+
Bakersfield, CA	L	0	0	0	F+
Columbia, SC	0	L	H	0	F+
Cape Coral, FL	H+	H	H+	F	F+
Little Rock, AR	0	L	0	0	F
Spokane, WA	L-	L-	L-	S-	S-
Pensacola, FL-AL	H+	H	H+	F+	F+
Corpus Christi, TX	L-	L	L	S-	S-
Anchorage, AK	L-	L	L-	S-	S-
Eugene, OR	L	0	L	S-	S-
Beaumont, TX	L-	L	L-	S-	S-
Salem, OR	L	0	L	0	S-
Laredo, TX	L-	0	L-	S	S-
Brownsville, TX	L-	L	L-	S-	S-
Boulder, CO	0	0	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 Corpus Christi, TX

Inventory Measures	2005	2004	2003	2002	2001	2000
Urban Area Information						
Population (1000s)	325	325	320	320	320	315
Rank	78	78	78	78	77	76
Urban Area (square miles)	200	200	200	200	200	200
Popn Density (persons/sq mile)	1,625	1,625	1,600	1,600	1,600	1,575
Peak Travelers (1000s)	177	176	172	170	167	162
Freeway						
Daily Vehicle-Miles of Travel (1000s)	3,180	3,095	2,960	2,960	2,915	2,815
Lane Miles	305	300	300	300	295	290
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	2,595	2,640	2,530	2,500	2,440	2,460
Lane Miles	675	675	675	675	675	675
Public Transportation						
Annual Psgr-Miles of Travel (millions)	22	22	21	22	32	31
Annual Unlinked Psgr Trips (millions)	5	5	5	5	5	5
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)	2.23	1.83	1.45	1.32	1.46	1.47
System Performance						
Congested Travel (% of peak VMT)	16	16	15	15	15	14
Congested System (% of lane-miles)	24	24	24	24	24	24
Congested Time (number of "Rush Hours")	3.2	3.0	2.9	2.9	2.9	2.9
Annual Increase Needed To Maintain Constant Congestion Level:						
Lane-Miles	18	17	9	9	13	16
Transit Riders or Carpoolers (millions)	4	4	2	2	3	3
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	1,088	1,050	957	906	941	801
Rank	78	77	80	79	79	80
Fuel per Peak Traveler (gallons)	6	6	6	5	6	5
Rank	81	79	77	82	76	80
Annual Delay						
Total Delay (1000s of person-hours)	1,784	1,700	1,590	1,492	1,545	1,303
Rank	77	78	80	80	79	81
Delay per Peak Traveler (person-hrs)	10	10	9	9	9	8
Rank	80	80	82	81	80	82
Delay due to Incidents (percent)	59	58	58	57	58	56
Travel Time Index						
Rank	1.06	1.05	1.05	1.05	1.05	1.04
Rank	81	83	83	82	82	84
Congestion Cost						
Total Cost (\$ millions)	32	29	27	24	25	20
Rank	77	77	79	80	79	80
Cost per Peak Traveler (\$)	183	167	154	142	149	125
Rank	81	83	82	83	81	84

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 Corpus Christi, TX, Continued

Inventory Measures	1999	1998	1997	1996	1995	1994
Urban Area Information						
Population (1000s)	315	315	310	310	305	295
Rank	76	76	76	76	76	76
Urban Area (square miles)	200	200	195	195	195	190
Popn Density (persons/sq mile)	1,575	1,575	1,590	1,590	1,564	1,553
Peak Travelers (1000s)	160	158	153	150	145	139
Freeway						
Daily Vehicle-Miles of Travel (1000s)	2,785	2,750	2,745	2,540	2,395	2,390
Lane Miles	285	285	285	285	285	285
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	2,470	2,495	2,475	2,470	2,460	2,445
Lane Miles	675	655	650	640	635	630
Public Transportation						
Annual Psgr-Miles of Travel (millions)	30	30	29	28	28	24
Annual Unlinked Psgr Trips (millions)	5	5	6	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)	1.07	1.01	1.12	1.21	1.14	1.03
System Performance						
Congested Travel (% of peak VMT)	14	13	13	12	12	12
Congested System (% of lane-miles)	21	17	17	17	17	17
Congested Time (number of "Rush Hours")	2.9	2.9	2.9	2.8	2.7	2.7
Annual Increase Needed To Maintain Constant Congestion Level:						
Lane-Miles	16	16	22	19	19	25
Transit Riders or Carpoolers (millions)	3	3	4	4	3	5
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	851	734	707	660	608	586
Rank	78	79	78	79	79	80
Fuel per Peak Traveler (gallons)	5	5	5	4	4	4
Rank	80	82	82	81	79	79
Annual Delay						
Total Delay (1000s of person-hours)	1,346	1,142	1,102	1,060	967	933
Rank	80	80	79	79	80	80
Delay per Peak Traveler (person-hrs)	8	7	7	7	7	7
Rank	83	83	82	82	81	79
Delay due to Incidents (percent)	58	57	57	56	56	56
Travel Time Index						
Rank	84	84	84	84	84	84
Congestion Cost						
Total Cost (\$ millions)	20	17	16	15	13	12
Rank	80	80	79	79	80	80
Cost per Peak Traveler (\$)	125	105	104	99	91	88
Rank	83	83	83	82	83	81

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 Corpus Christi, TX, Continued

Inventory Measures	1993	1992	1991	1990	1989	1988
Urban Area Information						
Population (1000s)	290	285	285	280	275	275
Rank	76	76	76	76	76	76
Urban Area (square miles)	185	180	180	175	175	175
Popn Density (persons/sq mile)	1,568	1,583	1,583	1,600	1,571	1,571
Peak Travelers (1000s)	134	130	128	124	121	120
Freeway						
Daily Vehicle-Miles of Travel (1000s)	2,400	2,240	2,100	1,980	1,830	1,750
Lane Miles	285	260	240	220	190	185
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	2,410	2,405	2,415	2,410	2,400	2,395
Lane Miles	630	630	630	630	630	630
Public Transportation						
Annual Psgr-Miles of Travel (millions)	25	18	20	14	16	15
Annual Unlinked Psgr Trips (millions)	5	5	5	4	3	3
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)	1.10	1.09	1.12	1.04	1.07	0.99
System Performance						
Congested Travel (% of peak VMT)	12	12	12	12	10	10
Congested System (% of lane-miles)	17	17	17	17	13	13
Congested Time (number of "Rush Hours")	2.7	2.7	2.8	2.8	2.9	2.9
Annual Increase Needed To Maintain Constant Congestion Level:						
Lane-Miles	28	27	25	26	22	34
Transit Riders or Carpoolers (millions)	5	5	4	5	4	6
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	588	594	563	512	438	423
Rank	79	78	77	77	77	76
Fuel per Peak Traveler (gallons)	4	5	4	4	4	4
Rank	76	76	74	72	74	70
Annual Delay						
Total Delay (1000s of person-hours)	922	937	890	832	734	716
Rank	80	78	78	77	77	75
Delay per Peak Traveler (person-hrs)	7	7	7	7	6	6
Rank	79	77	76	73	74	71
Delay due to Incidents (percent)	56	56	56	55	54	54
Travel Time Index						
Rank	81	78	78	77	78	78
Congestion Cost						
Total Cost (\$ millions)	12	12	11	10	8	8
Rank	80	78	77	78	77	76
Cost per Peak Traveler (\$)	89	91	86	80	68	63
Rank	79	78	76	73	74	71

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The Mobility Data for Corpus Christi, TX, Continued

Inventory Measures	1987	1986	1985	1984	1983	1982
Urban Area Information						
Population (1000s)	275	270	260	250	250	250
Rank	76	75	75	75	75	75
Urban Area (square miles)	175	175	170	170	170	170
Popn Density (persons/sq mile)	1,571	1,543	1,529	1,471	1,471	1,471
Peak Travelers (1000s)	119	116	111	106	105	104
Freeway						
Daily Vehicle-Miles of Travel (1000s)	1,620	1,560	1,425	1,360	1,080	1,010
Lane Miles	185	185	180	180	180	180
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	2,385	2,370	2,350	2,330	2,310	2,300
Lane Miles	625	625	625	625	625	625
Public Transportation						
Annual Psgr-Miles of Travel (millions)	14	9	7	6	6	6
Annual Unlinked Psgr Trips (millions)	3	2	2	2	2	2
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)	0.99	0.97	1.27	1.28	1.31	1.37
System Performance						
Congested Travel (% of peak VMT)	10	10	9	9	8	8
Congested System (% of lane-miles)	13	13	13	13	13	13
Congested Time (number of "Rush Hours")	2.8	2.7	2.7	2.6	2.4	2.4
Annual Increase Needed To Maintain Constant Congestion Level:						
Lane-Miles	31	--	--	--	--	--
Transit Riders or Carpoolers (millions)	5	--	--	--	--	--
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	425	397	373	346	310	303
Rank	75	74	73	73	72	71
Fuel per Peak Traveler (gallons)	4	3	3	3	3	3
Rank	70	69	67	66	64	64
Annual Delay						
Total Delay (1000s of person-hours)	747	690	673	612	553	544
Rank	74	74	72	73	72	71
Delay per Peak Traveler (person-hrs)	6	6	6	6	5	5
Rank	69	69	66	64	63	59
Delay due to Incidents (percent)	53	53	53	53	53	53
Travel Time Index						
Rank	73	72	69	69	67	66
Congestion Cost						
Total Cost (\$ millions)	8	7	7	6	5	5
Rank	74	75	72	73	72	72
Cost per Peak Traveler (\$)	64	59	59	55	49	47
Rank	69	69	66	64	63	59

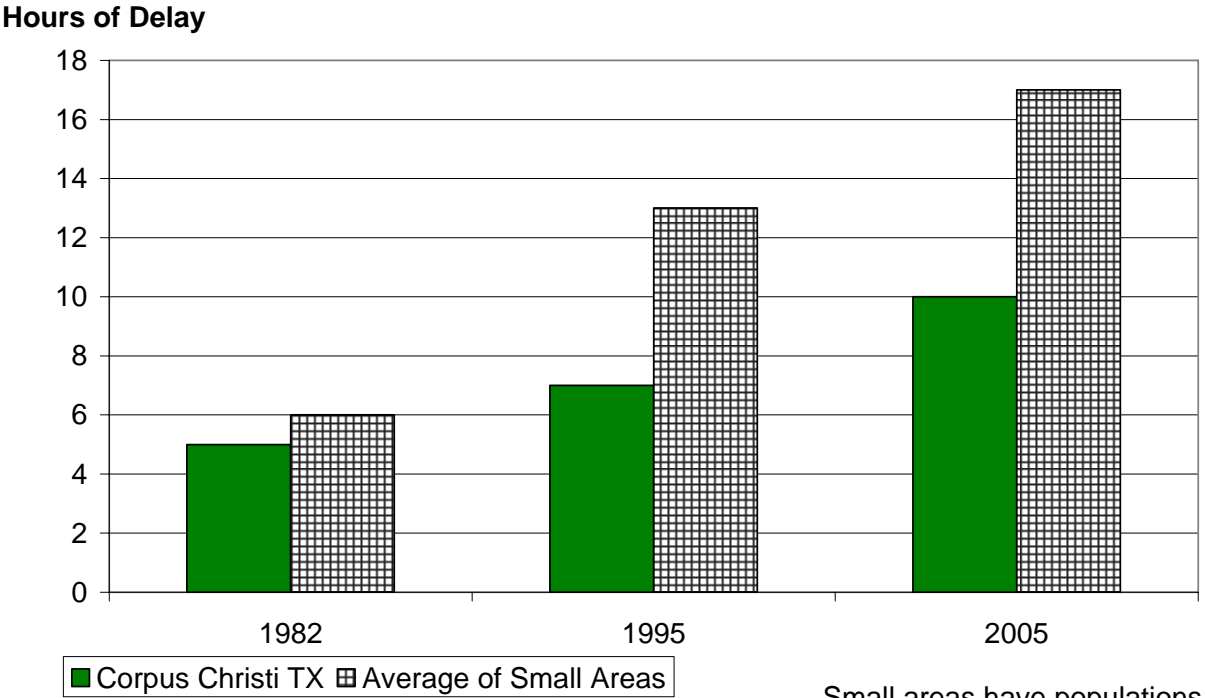
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Benefits From Public Transportation Service and Operations Strategies for Corpus Christi, TX

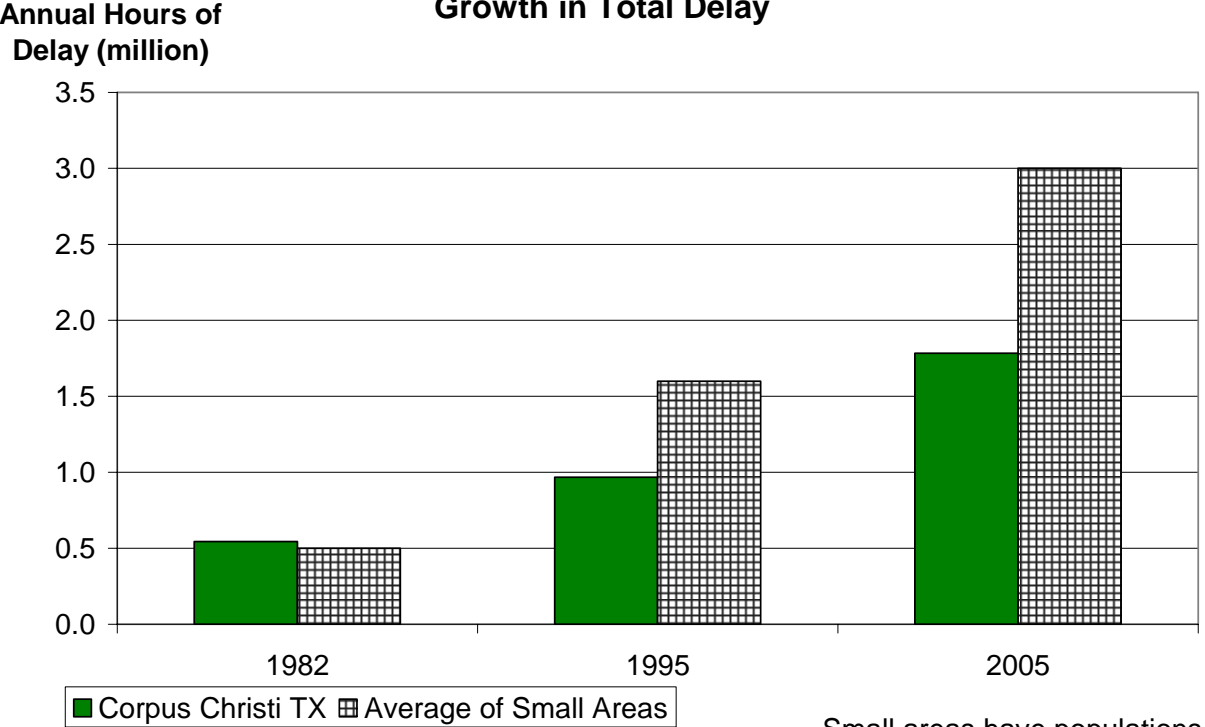
Operations Strategies	2005	2004	2003	2002	2001	2000
Freeway Ramp Metering						
Percent of Roadway Miles	--	--	--	--	--	--
Annual Delay Reduction (1000 hours)	--	--	--	--	--	--
Freeway Incident Management						
Cameras						
Percent of Roadway Miles	--	--	--	--	--	--
Service Patrols						
Percent of Roadway Miles	--	--	--	--	--	--
Annual Delay Reduction (1000 hours)	--	--	--	--	--	--
Arterial Signal Coordination						
Percent of Roadway Miles	77	61	53	53	53	53
Annual Delay Reduction (1000 hours)	11	7	5	4	3	7
Arterial Access Management						
Percent of Roadway Miles	10	10	10	10	10	10
Annual Delay Reduction (1000 hours)	7	7	2	2	4	1
HOV Lanes						
Daily Passenger-miles of Travel (1000s)	--	--	--	--	--	--
HOV User Delay Savings	--	--	--	--	--	--
Total Effect of Operations Treatments						
Annual Delay Reduction (1000 hours)	17	14	7	6	7	8
Annual Delay Saved per Peak Traveler (hours)	0	0	0	0	0	0
Annual Congestion Cost Savings (\$million)	0.3	0.2	0.1	0.1	0.1	0.1
Travel Time Index with Strategies	1.056	1.055	1.052	1.049	1.052	1.045
Travel Time Index (Base)	1.057	1.055	1.052	1.050	1.053	1.045
Public Transportation Service						
Existing Service						
Annual Passenger-miles of Travel (million)	22	22	21	22	32	31
Unlinked Passenger Trips (million)	5	5	5	5	5	5
Travel Time Index (combined road and transit)	1.056	1.054	1.051	1.049	1.051	1.044
Condition if Public Transportation Service were Discontinued						
Travel Time Index	1.059	1.057	1.053	1.051	1.054	1.047
Annual Delay Increase (1000 hours)	107	106	59	61	97	73
Annual Delay Increase per Peak Traveler (hours)	1	1	0	0	1	0
Annual Congestion Cost Increase (\$million)	1.9	1.8	1.0	1.0	1.5	1.1

Growth in Delay per Peak Traveler



Small areas have populations under 0.5 million

Growth in Total Delay



Small areas have populations under 0.5 million