100 Most Congested Roadways in Texas

2019 Summary Report

EXECUTIVE SUMMARY

In response to increased roadway congestion throughout the state, in 2009 the Texas Legislature mandated that the Texas Department of Transportation annually produce a ranked list of the most congested roadways in the state. This list measures congestion by the number of extra hours of travel time (also called 'delay') experienced by travelers on each section of road analyzed. Because of the significant delay values in the most congested corridors, and the slow nature of solution implementation to address a congested roadway, the overall list changes little from year to year.

Exhibit 1: 2019 Top 10 Most Congested Roads in Texas

2019	County	Road segment	From	To	2018
1	Harris	W Loop Fwy / IH 610	Katy Fwy / IH10 / US90	Southwest Fwy / US 59 / IH 69	1
2	Travis	IH 35	US 290 N / SS 69	Ben White Blvd / SH 71	3
3	Harris	Southwest Fwy / IH 69 / US 59	W Loop Fwy / IH 610	South Fwy / SH 288	2
4	Harris	Eastex Fwy / IH 69 / US 59	SH 288	IH 10	5
5	Dallas	Woodall Rodgers Fwy / SS 366	US 75	N Beckley Ave	4
6	Harris	Gulf Fwy / IH 45	IH 10 / US 90	S Loop E Fwy / IH 610	11
7	Dallas	US 75	LBJ Fwy / IH 635	Woodall Rodgers Fwy / SS 366	9
8	Dallas	Stemmons Fwy / IH 35E / US 77	John W Carpenter / SH 183	Tom Landry Fwy / IH 30	8
9	Harris	Katy Fwy / IH 10 / US 90	N Eldridge Pkwy	Sam Houston Tollway W / SL 8	7
10	Travis	IH 35	Ben White Blvd / SH 71	Slaughter Ln	19

Two of these road sections are new to the top 10 list:

- Gulf Fwy (IH45) in Houston - #6 this year, #11 last year
- IH 35 in Austin - #10 this year, #19 last year

Full results and multi-year comparisons of all road segments, over 1,800 in all, can be found in the full spreadsheet at (https://mobility.tamu.edu/texas-most-congested-roadways/).

And while congestion is often a by-product of desirable economic growth, for individuals attempting to navigate a congested roadway it is simply "a problem." TxDOT is already seeking solutions to many of these problem sections and the Texas Transportation Commission accelerated those solutions for several road segments through the Texas Clear Lanes program, a 2015 initiative announced by Governor Abbott to provide relief at major chokepoints across the state. Many of the Texas Clear Lanes projects are on or adjacent to some of the most congested sections in the top 100 list.

INTRODUCTION

Everything is interconnected – that's the complicated reality behind the Texas 100 Most Congested Roadways list. And everyone feels it. Economic prosperity is connected to congestion, congested freeways are frequently connected to congested streets. Also, many elements create change, a fact that is also reflected in the 2019 report. There are many transportation variables and urban economic factors that influence congestion levels, so it is difficult to explain all of the causes for roadway segments moving up or down the congestion list. This report describes how a few of the most common factors affect roadway, corridor and regional congestion.

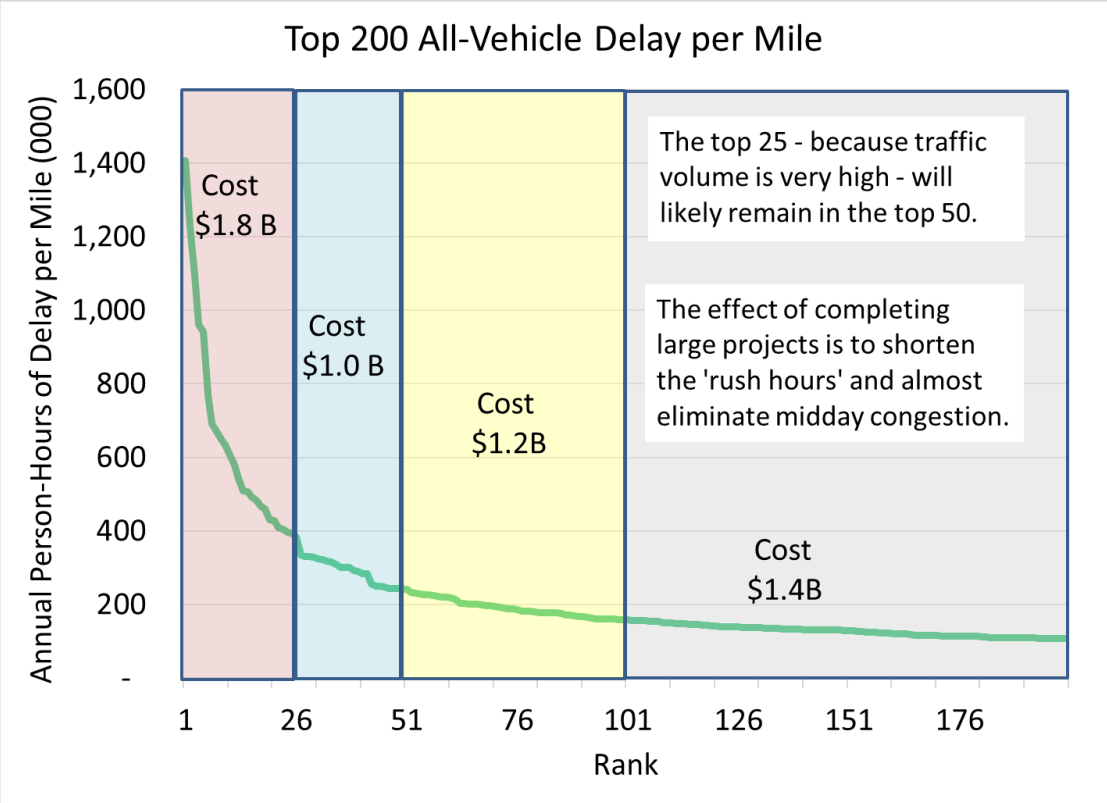
What has not changed since its beginning in 2009 is the goal of this effort: to use traffic volume and speed data to arrive at a measure of traffic congestion and the frustration that travelers and shippers feel. The primary measure quantifies how much more time it takes to travel a mile on a congested road than it does to travel that same mile of road during uncongested conditions. This year's report presents some of the findings from the most recent study, as well as describes some of the changes in technology and in data collection that have affected the research methodology over time.

WHAT'S ON THE LIST

Congestion is widespread, but its relevance can be subjective – what is very congested in small cities might be considered acceptable in larger cities. In an effort to demonstrate these contextual differences, this study tracks roughly 1,800 road sections across the state, in urban and suburban areas, including at least 18 sections (61 miles) in each of the 25 Texas metro areas (see map on the TTI website (https://mobility.tamu.edu/texas-most-congested-roadways/) for the urban regions). The resulting database is useful in tracking statewide congestion, and can be used to help prioritize projects that address congestion problems in each metro area. Rural Texas congestion is not tracked in this effort.

Figure 1 displays the extra travel time per mile of roadway for the top 200 segments on the list; congestion is not only unevenly distributed across the Texas 100 list, it also declines sharply from the top few roadways. The travel delay per mile begins to flatten at about the 50th ranked section. After the top 100 roadways, congestion changes much less for the remaining sections.

Exhibit 2: Annual Delay Hours per Road Mile - 200 Most Congested Roads in Texas



The most congested roads on the list are in the four largest metro areas of the state: Austin, Dallas/Fort Worth, Houston, and San Antonio:

- The 68 most congested roadways are in these four regions
- 92 of the top 100 congested sections are in these four regions
- 163 of the top 200 are in the four largest regions

The most congested list has been relatively stable. This is partly because the Texas Clear Lanes effort is relatively new and the projects have not yet opened. It is also a result of math; as Exhibit 2 shows, the delay values are more than twice as high for the top 25 sections than for the 100th section. Since 2015, …

This year's Top 25,

- Almost all (20) have been top 25 for 3 of last 4 years
- Zero were ever outside the top 100

This year's 26 to 50,

- Almost all have been in the top 100 (Only 3 spent 1 year each outside the top 100)

This year's 1 to 75,

- Almost all have been in the top 100 (Only 5 spent more than 1 year outside top 100)

This year's 76 to 100,

- Is less consistent - 17 spent more than 1 year outside top 100

The “All-Vehicle Congestion” and “Truck Congestion” rankings in the most congested list can be very different because trucks are a small part of some very congested commuter freeway corridors, for example, Austin’s MoPac Freeway, Dallas’ Woodall Rodgers Freeway and San Antonio’s McAllister Freeway. Truck congestion is a significant part of most Laredo corridors, and many urban Interstate corridors. Roadways that generally carry freight traffic through smaller regions such as Bryan-College Station and Tyler are also ranked much higher on the truck list than the all-vehicle list. Since 2015 the truck list has been almost as stable as the all-vehicle list …

This year’s Top 25

- Almost all (18) have been top 25 for 3 of last 4 years
- Only 1 – Laredo’s Bullock Loop - was ever outside the top 100

This year’s 26 to 50

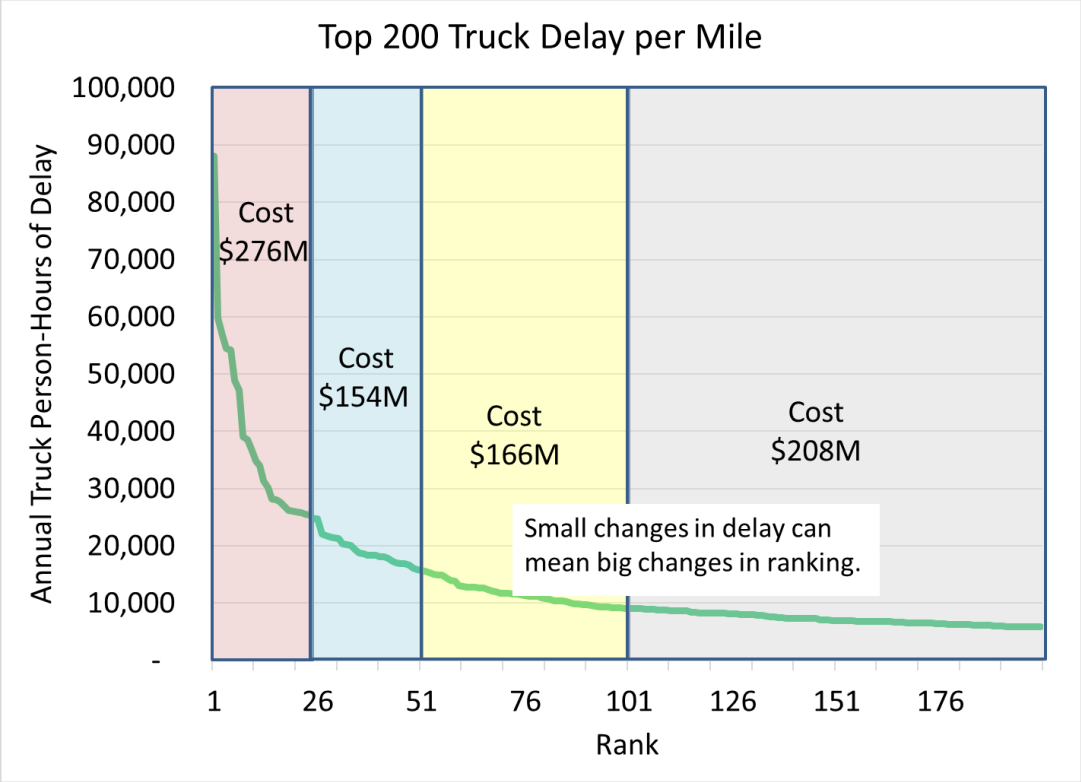
- Almost all have been in the top 100 (Only 3 spent 1 year each outside the top 100)

This year’s 1 to 75

- Almost all have been in the top 100 (Only 12 spent more than 1 year outside top 100)

This year’s 76 to 100

- Is less consistent - 18 spent more than 1 year outside top 100



These are the areas where congestion is generally the most intense and continues for long periods throughout the day. Highest on the list are urban segments where congestion also occurs outside the peak travel period. For example, Figure 2 shows that the highest ranking segment for 2019, I-610 West in Houston from the Katy Freeway to the Southwest Freeway, has about 48 percent of its delay outside of the traditional peak periods (6:00-9:00am and 4:00-7:00pm) which shows that this is not only a "rush hour" phenomenon. In contrast, the segment ranked at position #14 for 2019 (I-10 between Sam Houston Tollway and I-610 in Harris County) suffers much less off-peak period delay (about 28 percent of its delay is outside of the peak periods). Many of the highly ranked sections have much more delay outside the traditional peak periods than those sections further down the list.

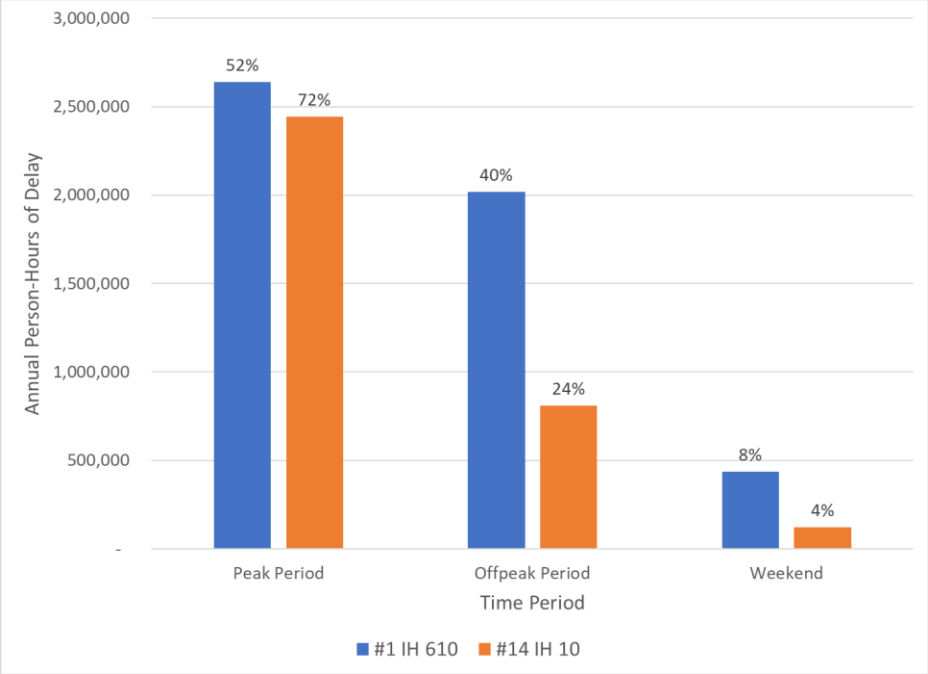


Exhibit 3. Comparison of Segment #1 with Segment #14 for Off-Peak Period Congestion

Congestion is not a uniquely urban or downtown problem, or even one related only to the road section on the congestion list. Some urban road segments jump up the list because nearby construction or maintenance projects cause traffic to divert onto the usually uncongested section.

WHAT ARE THE INFLUENCING FACTORS THAT PUT ROADS ON THE LIST

Economic Prosperity

The most enduring trend since 2009 has been growth – in population, jobs, travel demands, traffic volume – everything except road and transit capacity necessary to accommodate the

growth. Traffic congestion may be an inevitable result of growth, but the congestion growth rate is not seen as reasonable.

Land Use

Land use changes along or near a corridor can have a dramatic impact on that corridor. In urban areas that are developing densely, thousands of trips may be added to a corridor very quickly when people move into newly available housing units or take advantage of new offices, retail stores or restaurants. For example, recent high-density development along Westheimer Road in Houston between SH-6 and IH-610 is one reason that this segment of road is ranked at #57 on the list. That kind of change can send a roadway to a higher position on the list in a short period of time.

Construction

Construction on a road – or on a nearby road - can be the reason for congestion changes. Big construction projects often cause congestion on the road where the project is being built. In smaller cities, even short-term and smaller projects like pavement overlays, re-striping, traffic signal work at a single intersection or right-turn additions can affect annual congestion statistics.

Projects on nearby or connecting roads can also cause congestion on a road where there would otherwise be none. When the road under construction becomes congested, backed-up traffic shifts to connecting roads and they become congested as well. For example, construction on Austin's Loop 1/MoPac creates congestion on other nearby roadways (Cesar Chavez, Bee Caves, and South Lamar) when traffic along Loop 1 is slowed due to construction.

Congestion Outside the Peak Period

Congestion outside the normal peak traffic periods is another frequent condition that moves a road up on the congested list. These roads "where it's always rush hour" not only see regular congestion, but also see more intense problems from traffic crashes and stalled vehicles. This is the case with I-35 through Central Austin, or I-610 West in Houston.

Off-peak period delay can also be significant on arterials, or high-capacity urban thoroughfares, whose traffic lights are timed to serve all travel directions at smaller cross street intersections, rather than prioritizing the major street peak direction, causing delay on the bigger arterial streets. During rush hour, however, the arterials are prioritized and their delay time is lessened.

Weather

Even an exceptionally bad weather year can cause a road segment to appear in the congestion data. Heavy rains can slow traffic, regular flooding can block it, and high winds can deposit debris on the roads or down signs that obstruct traffic until removed or repaired. Extreme weather, especially high heat followed by excessive rains, can accelerate roadway damage,

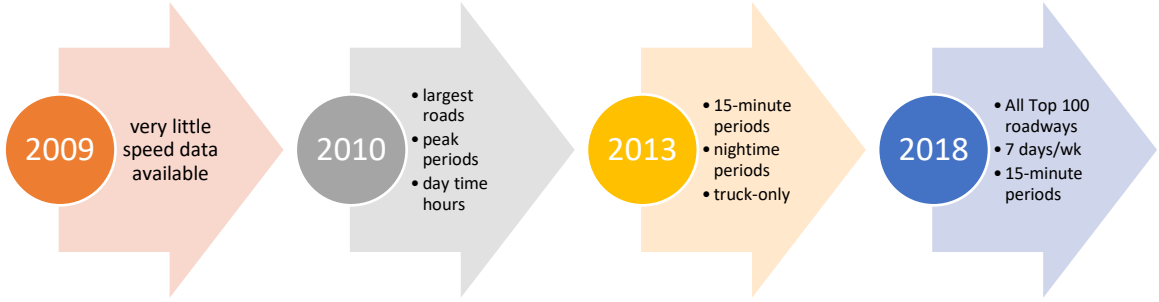
creating large cracks that worsen with the weight of traffic. That kind of damage can slow traffic, and the effort to repair the problem can also obstruct a road and cause congestion.

HOW HAS THE METHODOLOGY CHANGED OVER THE YEARS?

Eleven years of this project have seen changes to road use in Texas. There have also been changes to speed data availability since the first year of this report, both for the time periods and the number of roadways for which it was captured. In 2009, the study's first year, there was very little directly collected speed data so speeds were estimated using traffic volume and number of roadway lanes. Since 2010, however, speed data has continued to improve in both temporal and spatial coverage. In that year, private sector companies were supplying hourly speed data for only the state's largest roadways, generally during higher traffic periods, and during most daytime hours. However, by year four of the report, speeds were available for 15-minute periods, including many overnight periods. As of the 2017 reporting period, speed data was available for over 95 percent of the 15-minute periods for all seven days of the week on all the Texas 100 roadway sections.

In addition, data collection companies who once collected only truck or fleet data now collect passenger vehicle data from anonymized sources like cell phones and in-dash devices. The result is that the reporting has become more accurate both in terms of the timeframes and vehicle types they measure. *(See Exhibit 4 below)*.

Exhibit 4: Timeline Showing Changes to Speed Data Availability



Conclusion

The 100 Most Congested Roadways report provides a birds-eye view of congestion in Texas. It is designed to show where delay hours are occurring, in order of severity. It also shows the type of traffic (commuters or trucks) is affected by congestion, the differences between peak and off-peak period congestion levels, and more. What this report does not show is what

specifically is causing the congestion on a given roadway, or identify specific solutions. However, the report's discussions on congestion describe a variety of reasons why it occurs, and give analysts some insight into what strategies might be effective. This report also provides a brief description of the research methodology and the factors that influence it. Future reports will continue to note changes to methodologies as they occur.

Appendix A. Methodology & Definitions

Annual Hours of Delay

The annual measure of delay is the starting point for calculating all of the congestion measures below. To arrive at this measure, researchers must first acquire four data elements:

- Actual travel speed
- Free-flow travel speed
- Vehicle volume (passenger vehicles and trucks)
- Vehicle occupancy (persons per vehicle) to calculate delay in person-hours

Researchers use the traffic volume and traffic speed data for each section of road to create the large dataset that contains each of the Texas 100 reporting segments. For example, on a given point on a roadway, researchers gather the travel speed and traffic volume for each 15-minute time period of the average week. This means that data is gathered for 672 discreet periods of each week for each segment. They can then compare this data with free flow speeds to determine the difference between a congested period and a free flowing one. By factoring in vehicle occupancy, they are then able to calculate the delay time per person for each roadway. For details about the methodology used and any changes made since the prior year, see *100 Texas Congested – 2019 Method (final)*.

Definitions of Measures

DELAY	
Annual Delay	The sum of the extra travel time in the peak period, off-peak period, and weekend.
Annual Delay Per Mile	Annual hours of delay divided by segment length so that comparable values are obtained.
Peak Period Delay	The hours of delay that occur during the 6:00am-9:00am and 4:00-7:00pm timeframe on weekdays.
Off-Peak Period Delay	The hours of delay that occur on weekdays outside of the peak period.
Weekend Delay	The hours of delay that occur on weekends.
Texas Congestion Index	Score indicating the relationship between the peak-period, average travel time and the free-flow travel time. The score is arrived at by dividing the congested travel time by the free flow travel time. For example, for a segment where a free-flow trip takes 30 minutes, and a trip during peak periods takes 36 minutes, the TCI score would be 1.2.
Planning Time Index	A travel time reliability measure indicating the amount of time that should be planned to arrive on-time for 19 trips out of 20. A value of 2.50 means that for a 30 minute trip in light traffic, 75 minutes should be planned.
Commuter Stress Index	Score indicating the relationship between the peak period, average travel time for the morning and evening peak travel direction and the free-flow travel time for the peak direction of travel only.
VOLUME, SPEED & FUNCTIONAL CLASS	
Peak Period Average Speed	The average speed during the 6:00am-9:00am and 4:00-7:00pm timeframe.
Average Uncongested Speed	The average operating speeds during light traffic conditions, typically during overnight hours.
Functional Class	Coding system for road segments for purposes of analysis. 1=interstates and freeways, 3=major and minor arterial streets.
TRUCKS	
Annual Truck Delay	The portion of annual delay from trucks.
Annual Truck Delay Per Mile	Annual hours of truck delay divided by the segment length
Peak Period Truck Delay	The hours of truck delay that occur during the 6:00am-9:00am and 4:00-7:00pm timeframe on weekdays.
Off-Peak Period Truck Delay	The hours of truck delay that occur in non-peak periods on weekdays.
Weekend Truck Delay	The hours of truck delay that occur on weekends.
Annual Truck Congestion Cost	The portion of annual congestion cost from trucks.
Peak Period Average Truck Speed	The average truck speed during the 6:00am-9:00am and 4:00-7:00pm timeframe.
Average Uncongested Truck Speed	The average truck operating speeds during light traffic conditions, typically during overnight hours.
CONGESTION COST, EXCESS FUEL & ADDITIONAL EMISSIONS DUE TO CONGESTION	
Annual Congestion Cost	The cost of wasted time and fuel associated with congestion.
Excess Fuel Consumed	Additional gallons of fuel consumed due to congestion.
Excess Truck Fuel Consumed	The portion of excess fuel consumed by trucks due to congestion.
Additional CO2 Produced	Pounds of additional carbon dioxide produced because of congestion.
Additional Truck CO2 Produced	Pounds of additional carbon dioxide produced by trucks because of congestion.