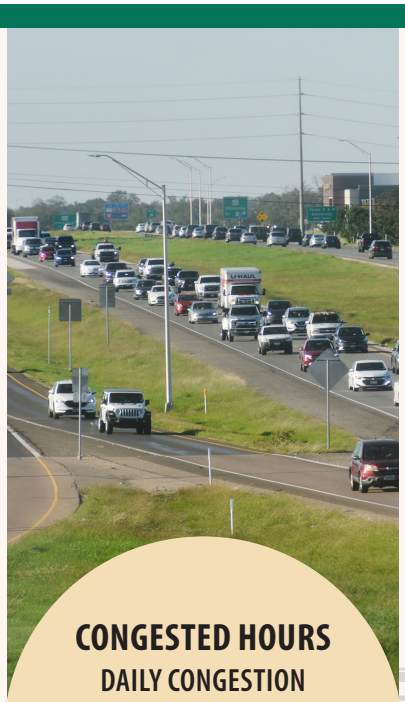
FHWA-HOP-24-027

2023 URBAN CONGESTION TRENDS

U.S. Department of Transportation
Federal Highway Administration



CONGESTED HOURS
DAILY CONGESTION

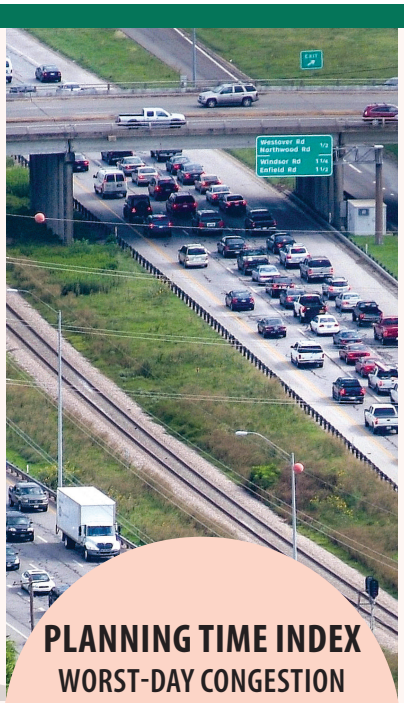
–10 MINUTES FROM LAST YEAR

2023..... 2:45
2022..... 2:55

TRAVEL TIME INDEX
AVERAGE CONGESTION

+2 POINTS FROM LAST YEAR

2023 .....1.24
2022 .....1.22



PLANNING TIME INDEX
WORST-DAY CONGESTION

+8 POINTS FROM LAST YEAR

2023..... 1.88
2022..... 1.80

For more 2023 trend information, see page 6.

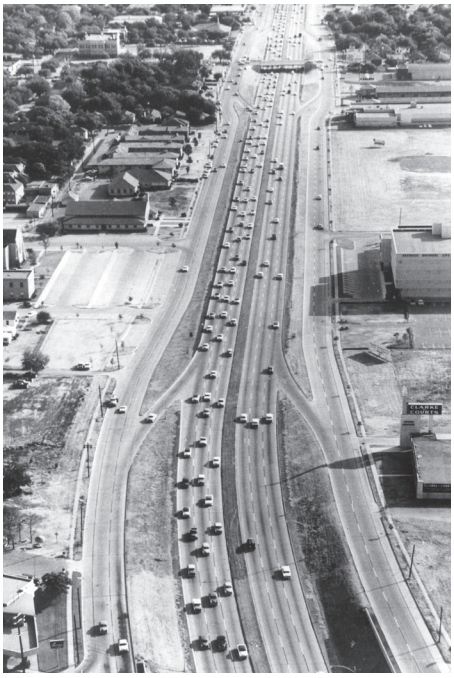
Source: Texas A&M Transportation Institute Communications.

Congestion Measure Definitions

Congested Hours—average amount of time in hours when freeways operate in *congested conditions* during a day (*congested conditions* means at less than 90 percent of free-flow speed between 6 a.m. and 10 p.m.).

Travel Time Index (TTI)—time penalty for a trip on an average day. A TTI of 1.30 indicates a 20-minute free-flow trip takes 26 minutes (20 × 1.30) in the rush hours (weekdays 6 a.m. to 9 a.m. and 4 p.m. to 7 p.m.).

Planning Time Index (PTI)—time penalty for a trip to be on time for 95 percent of trips (e.g., late for work on 1 day per month). A PTI of 1.60 indicates a 20-minute free-flow trip takes more than 32 minutes (20 × 1.60) 1 day per month.



Source: Texas A&M Transportation Institute Communications.

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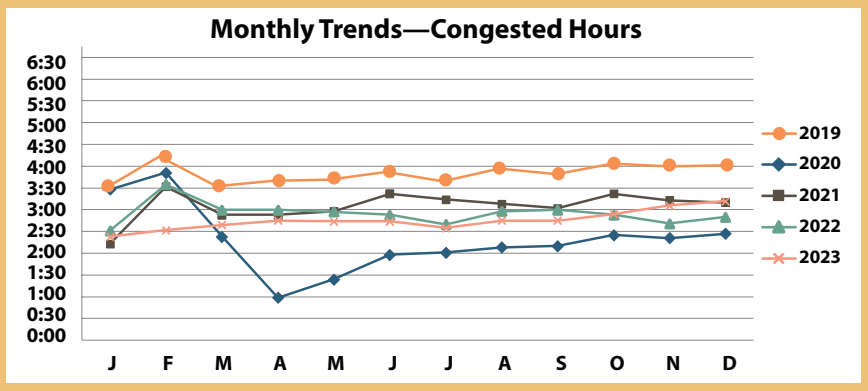
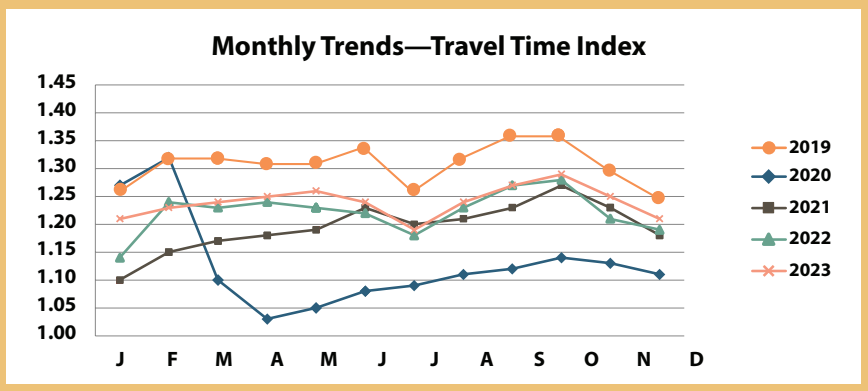
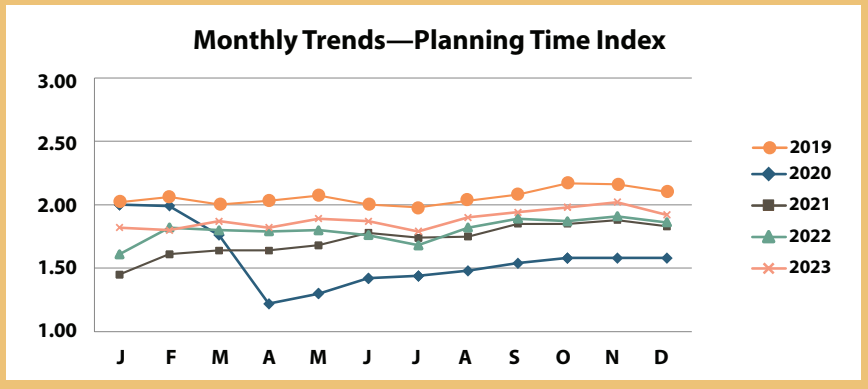
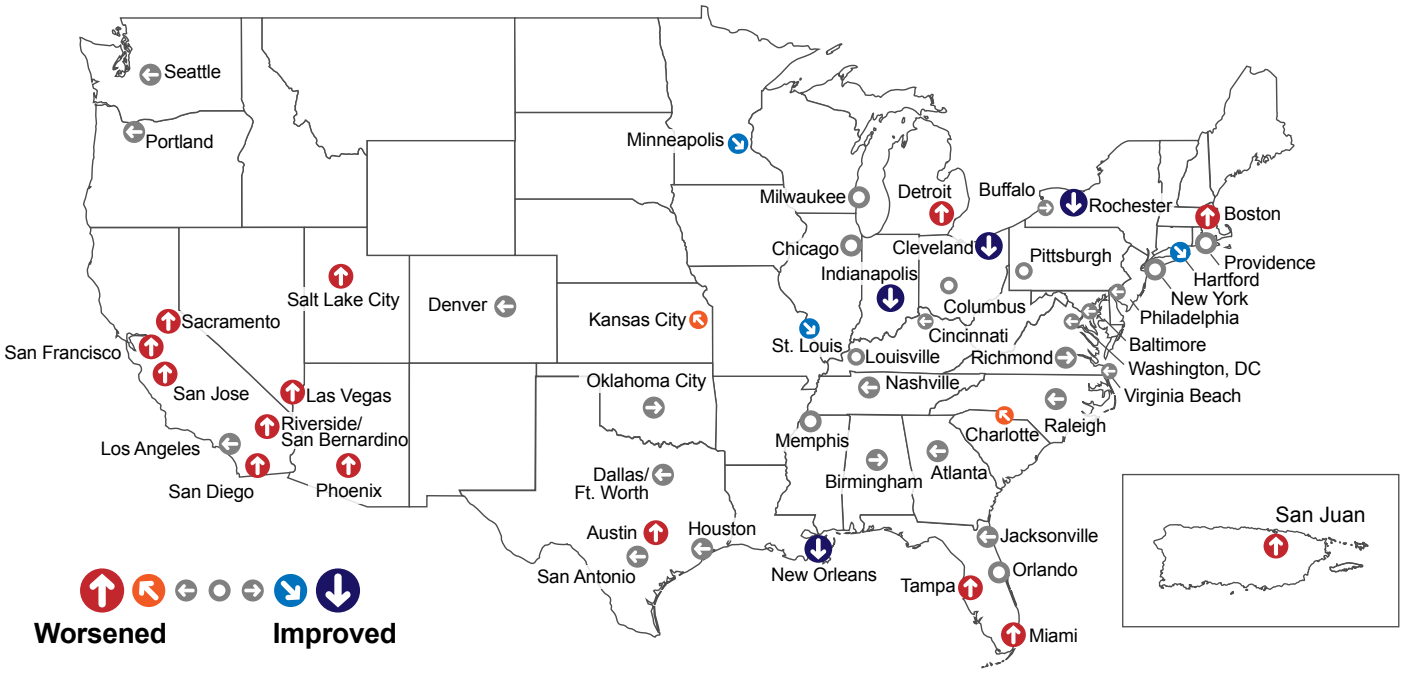






Urban Congestion Trends

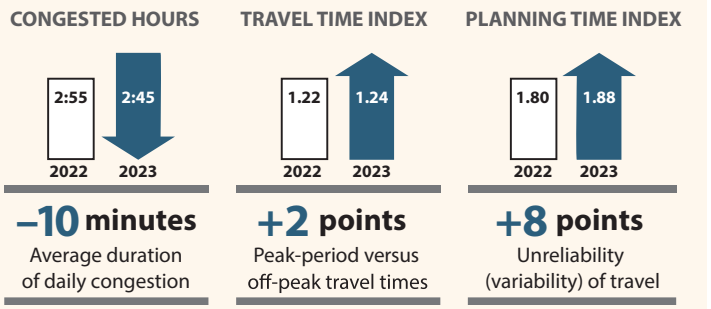
Year-to-Year Congestion Trends in the United States (2022 to 2023)



8% of cities had all three measures **improve**

65% of cities had **no change or mixed results**

27% of cities had all three measures **worsen**



–10 minutes
Average duration of daily congestion

+2 points
Peak-period versus off-peak travel times

+8 points
Unreliability (variability) of travel

Congestion Facts

- From 2022 to 2023, the overall average national congestion measures were mixed.
- Across the country, 65 percent of the 52 reported-on metropolitan statistical areas (MSAs) had mixed results across the three measures.
- At least one congestion measure improved in 38, or 73 percent, of the MSAs.
- The hours of congestion on an average day decreased in 69 percent of the MSAs, averaging about 17 minutes less than 2022 for those areas with a reduction.
- Travel time on the worst day of the month, however, increased in 83 percent of the MSAs.

Source: Texas A&M Transportation Institute Communications.

The National Performance Management Research Data Set and Work Zone Mobility Performance Measurement

Federal Highway Administration's (FHWA's) Work Zone Management Program engages with State Departments of Transportation (DOTs) and conducts research to understand work zone mobility performance measurement best practices, challenges, and opportunities. The information gathered increases awareness of data, tools, and methods for systematic work zone performance measurement. Topics of interest include use of probe data and mainstreaming performance measures into agency policies and processes.

Traditionally, transportation agencies have struggled to accurately measure and monitor the mobility performance of work zones due to a lack of data — both mobility data and accurate work zone activity data. One solution to a lack of mobility data is the National Performance Management Research Data Set (NPMRDS). Step 4 of the 10-step process shown in Figure 1 highlights the NPMRDS Massive Data Downloader, a tool that allows users to easily download data from NPMRDS.

A critical step in the process is to map the work zone area of interest to specific NPMRDS roadway segments. The work zone area of interest generally includes:

- Advance area and transition area
- Work zone activity area
- Post-activity/termination area

The following are the key activities performed in this step:

- Select road segments (called Traffic Message Channels (TMCs) in NPMRDS)
- Select the analysis timeframe, including periods before, during, and after the work zone

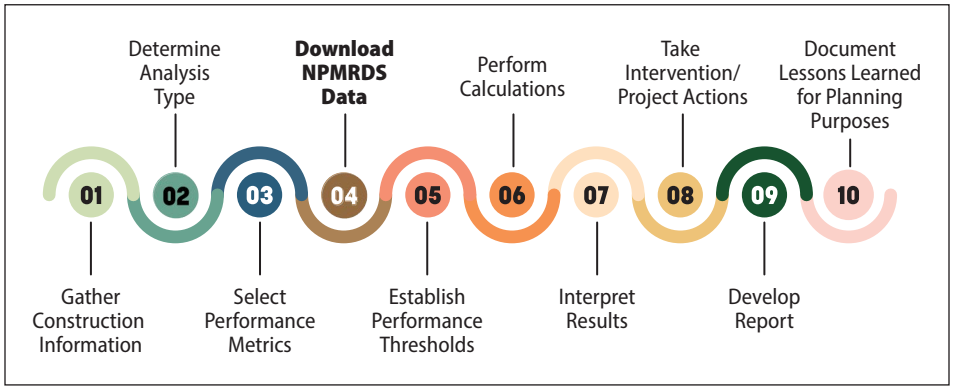


Figure 1. 10-Step Process.
Source: Texas A&M Transportation Institute Communications.

- Choose the units for speed and travel time
- Choose the aggregation (averaging) level: 60-, 15-, 10-, or 5-minute
- Download and import the data into an analysis tool of choice

The data aggregation level describes the granularity of the performance measurement. In most cases, hourly data provide a good understanding of congestion effects of work zones. However, agencies may choose to use more granular aggregation levels if they want to understand the intra-hour congestion build up and dissipation effects of work zone traffic.

A more detailed discussion and application is in the recently published *Measuring Work Zone Mobility Performance Using the National Performance Management Research Data Set (NPMRDS) Case Study: Application to the Texas Department of Transportation GO I-10 Project*, which is one in a series of resources on work zone mobility performance measurement. This real-world example illustrates a simple, repeatable process that State DOTs can adopt for a systematic, routine, inexpensive, and easy-to-adopt process for their work zone performance measurement.

For more information, contact
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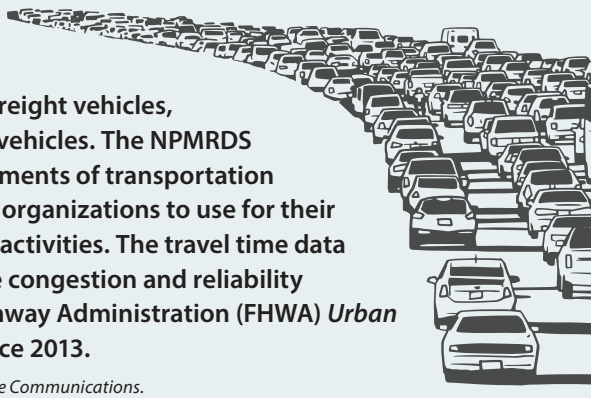
The NPMRDS includes actual, observed travel times on the National Highway System (NHS) for freight vehicles, passenger vehicles, and all vehicles. The NPMRDS is available for State departments of transportation and metropolitan planning organizations to use for their performance management activities. The travel time data have been used to calculate congestion and reliability metrics for the Federal Highway Administration (FHWA) *Urban Congestion Report* (UCR) since 2013.



Source: Texas A&M Transportation Institute Communications.

Operational Strategies for Recurring Congestion: FHWA Case Study for Hard Shoulder Running

Source: Washington State DOT.

The FHWA Office of Operations will soon publish a *Primer on the Influence of Operations Strategies on Third Performance Management Rulemaking (PM3) and other Travel Time Based Measures.* The document develops methods and guidance for conducting before/after evaluations of operations strategies dealing with recurring congestion. The methodology uses empirical data to track changes in travel time as well as influencing factors like incidents, weather, and demand. The methodology is applied to seven real-world case studies where operations strategies were implemented.

One of the case studies evaluated a section of Interstate 405 (I-405) in the Seattle-Tacoma-Bellevue metropolitan statistical area, often referred to as the "Puget Sound Region." I-405 travels east of Lake Washington, connecting to I-5 both north and south of the lake. A wide variety of performance measures were used to understand roadway performance. Analysis of congestion identified how congestion formation and duration in the I-405 corridor had changed. Using the congestion analysis, researchers were quickly able to identify that the ramp volumes entering from SR 527 into an already dense traffic stream on I-405 were the primary cause of congestion in the northern section of the northbound corridor in the PM peak period. Since the ramp was already dynamically metered, additional operational improvements were needed to reduce the congestion caused by traffic entering from that ramp.

The selected operational solution was to add an additional lane at the ramp, allowing the ramp traffic to remain on the new lane until drivers decide that they wish to be in one of the adjacent lanes. The goal of this hard shoulder running solution was to reduce overall congestion in the corridor during the afternoon peak period, when ramp volumes were creating congestion which then propagated upstream of the ramp, slowing traffic and increasing travel times for the corridor. This improvement was expected to greatly reduce the congestion caused by merging ramp traffic and should consequently improve travel times for the whole corridor segment leading up to, and including, the ramp traffic.

The detailed performance measures available were able to not only identify locations and causes for congestion formation leading to the selection and implementation of hard shoulder running, but those measures were also able to fully describe the resulting changes in corridor performance. The result was improving median travel times from 12.1 minutes in 2016 to 7.2 minutes in 2018 along the roughly 6-mile corridor. The FHWA Office of Operations Tool for Benefit Cost Analysis estimated a benefit cost ratio of 5.53 for this hard shoulder running implementation.

For additional information on this example of using the before/after evaluation methodology and other operational strategies see *Influence of Operations Strategies on Third Performance Management Rulemaking (PM3) and Other Travel Time-Based Measures Primer Part I: Recurring Congestion Strategies (FHWA-HOP-23-060).*

Summary of Performance Measure Trends for Calendar Year 2023

National-level traffic performance measures used by the *Urban Congestion Trends Report* were again mixed in 2023. The latest data from the FHWA Office of Highway Policy Information shows traffic volumes increased for 2023, and as displayed in this report, travel time variability increased on average and for most MSAs, which manifests itself in the higher TTI and PTI measures. Congested hours across the MSAs decreased slightly, by an average of 10 minutes compared with 2022, and are down just over an hour on average when compared with the 2019 pre-pandemic measure (2:45 in 2023 and 3:47 in 2019).

Based on the TTI and using a hypothetical 30-minute trip at free flow for comparison across years, travel time during rush hours was up roughly 1 ½ minutes in 2023 compared with 2022. Similarly, based on the PTI and a typical 30-minute free-flow trip, in 2023, the longest trip out of 20 would have taken longer than 37 minutes, up about 2 ½ minutes from 2022.

Source: Texas A&M Transportation Institute Communications.

The continued collection of these data and measures from the UCR program allows for trend analysis of these three congestion measures. Trend analyses show 2023 may be approaching a relatively steady state that is consistent with performance measures from 2021 and 2022 but improved from pre-pandemic levels.

Source: (top) Texas Department of Transportation and (bottom) Texas A&M Transportation Institute Communications.

The FHWA *2023 Urban Congestion Trends* report details trends and the current state of congestion and reliability on the NHS in 52 of the largest metropolitan areas in the United States. This report also includes examples of how agencies are using the NPMRDS for performance reporting and analysis, as well as for operational strategy evaluation and benefit calculation.

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Contact Information

Visit the Operations Performance Measurement Program Urban Congestion Reports Web page for quarterly congestion trend updates: https://ops.fhwa.dot.gov/perf_measurement/ucr/index.htm.