OPERATE A RELIABLE AND CONVENIENT TRANSPORTATION SYSTEM

Nicole Hood, State Highway Safety and Traffic Engineer

Tracker

MEASURES OF DEPARTMENTAL PERFORMANCE

Missourians expect to get to their destinations on time, without delay regardless of their choice of travel mode. We coordinate and collaborate with our transportation partners throughout the state to keep people and goods moving freely and efficiently. We also maintain and operate the transportation system in a manner to minimize the impact to our customers and partners.

RESULT DRIVER:
Nicole Hood
State Highway Safety and Traffic Engineer

MEASUREMENT DRIVER:
Alex Wassman
Traffic Management and Operations Engineer

PURPOSE OF THE MEASURE:
This measure tracks the mobility of significant state routes in St. Louis, Kansas City, Springfield and Columbia.

MEASUREMENT AND DATA COLLECTION:
Travel time data is collected continuously via wireless technology. To assess mobility, MoDOT compares travel times during rush hour to free-flow conditions where vehicles can travel at the posted speed limit. This measure also assesses reliability, an indicator of how variable those travel times are on a daily basis.

The charts in this measure show the average travel time and the 95th percentile travel time, which is the time motorists should plan in order to reach their destinations on time 95% of the time.

The maps display the mobility of specific sections of roadways during rush hour.

The target for this measure is updated quarterly. This target is established by projecting a 10% improvement over the same quarter of the previous year. The minimum value for the target time is 10 minutes. This corresponds to the time it takes to travel 10 miles at the posted speed limit of 60 miles per hour.

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Travel times and reliability on major routes – 5a

During the third quarter of 2019, average travel times in St. Louis and Kansas City were longer in all rush periods compared to the same period last year with the exception of the morning rush in Kansas City. The average 10-mile travel time in St. Louis was 11 minutes during the morning and 12 minutes, 21 seconds during the evening. For Kansas City, the average travel time was 10 minutes, 59 seconds during the morning and 11 minutes, 54 seconds during the evening. Overall, average speeds ranged between 49 miles per hour and 55 miles per hour.

The planning times account for unexpected delays and indicate how much time customers need to plan for their trip in order to arrive on time 95% of the time. In St. Louis, the average 10-mile planning times were 15 minutes, 30 seconds during the morning and 18 minutes, 57 seconds during the evening. This means customers in the St. Louis evening rush needed to plan 8 minutes, 57 seconds more for a 10-mile trip than they would need in free-flow conditions. In Kansas City, the average planning times were 14 minutes, 16 seconds during the morning and 17 minutes, 13 seconds during the evening. Customers in the Kansas City evening rush needed to plan 7 minutes, 13 seconds more for a 10-mile trip than they would need in free-flow conditions. The planning times in St. Louis and Kansas City represent average rush-hour speeds between 32 and 42 mph. Similar to the average travel times, the planning times in St. Louis and Kansas City were longer in all rush periods compared to the same period last year with the exception of the morning rush in Kansas City.

The average travel times in both regions are higher than the target for the third quarter 2019. The morning average travel times in St. Louis and Kansas City are, respectively, 1 minute and 54 seconds greater than the target. The evening average travel times are 2 minutes, 23 seconds and 1 minute, 31 seconds greater than the target.

Individual freeway segments within the regions experienced longer travel times than the regional averages as depicted in the maps. The maps also depict rush hour conditions on selected arterial routes compared to normal traffic flow during non-peak traffic conditions.

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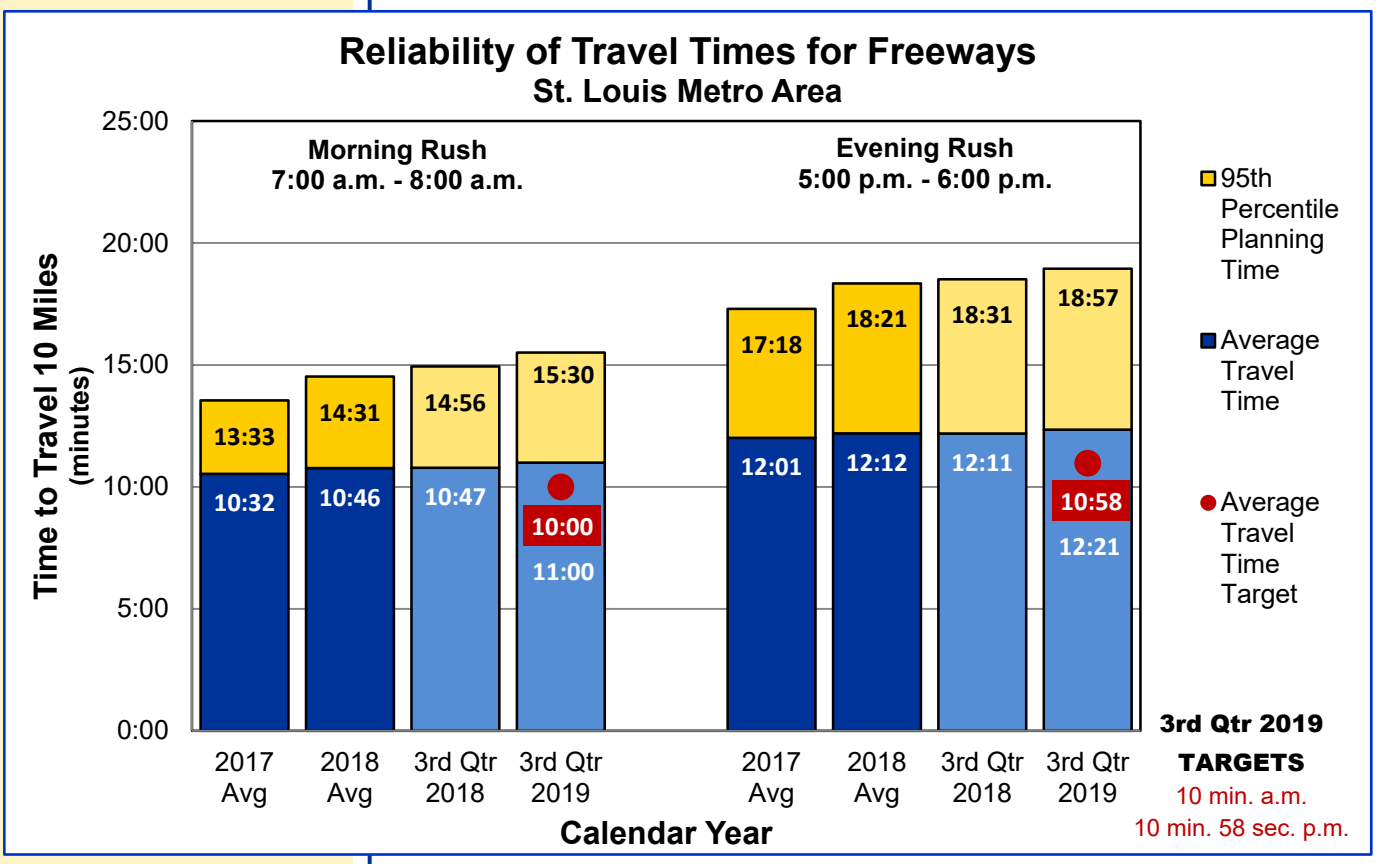

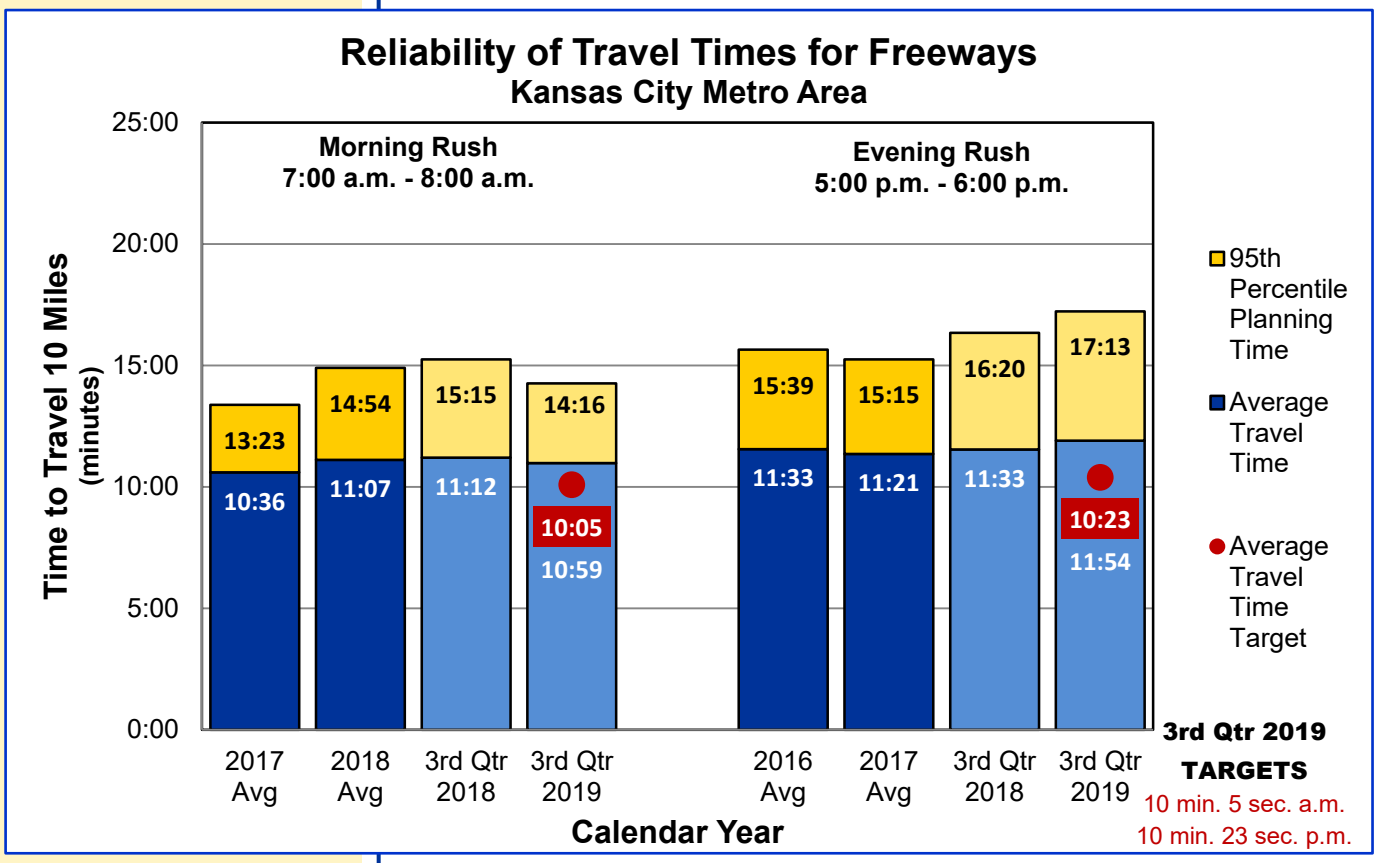

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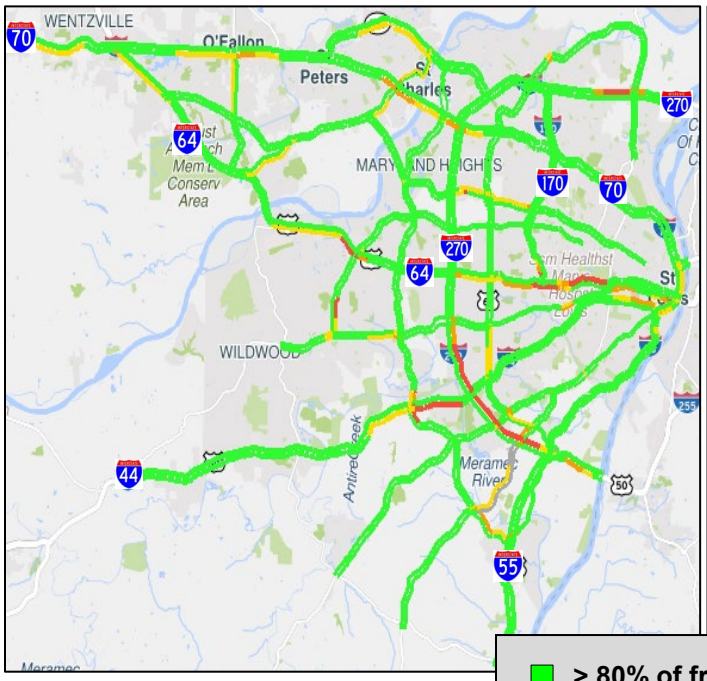
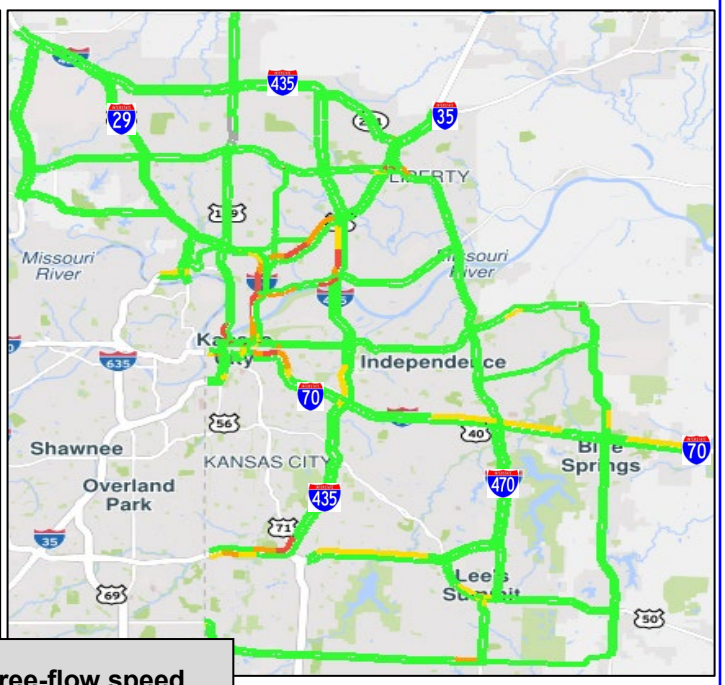
a.m. Mobility

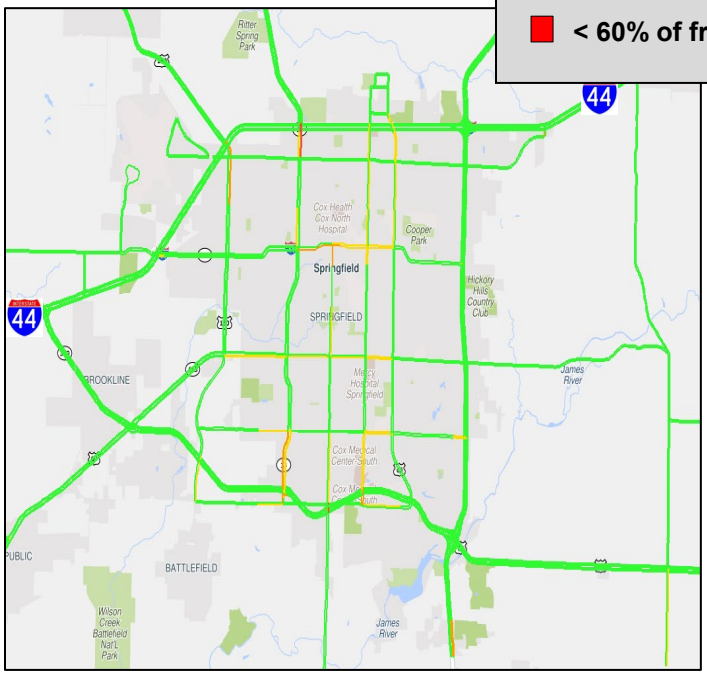


St. Louis Area

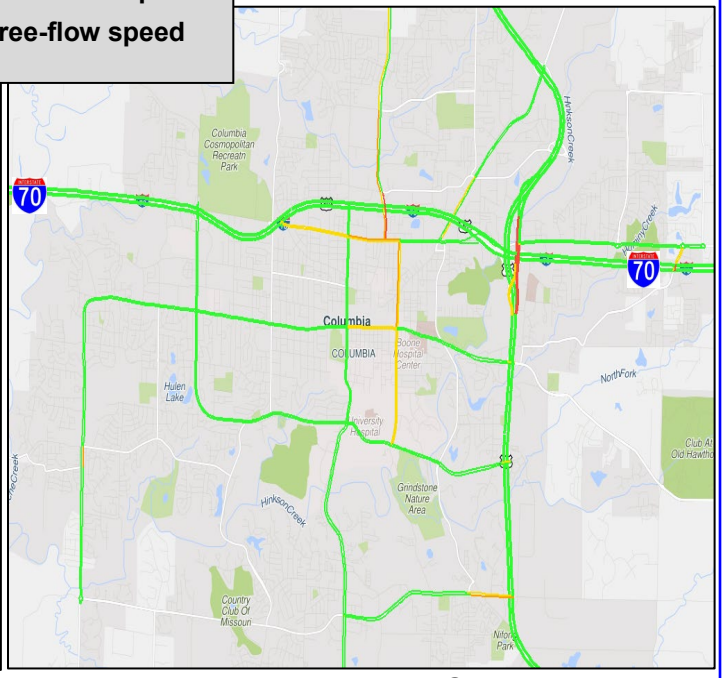


Kansas City Area

- > 80% of free-flow speed
- 70-80% of free-flow speed
- 60-70% of free-flow speed
- < 60% of free-flow speed



Springfield Area



Columbia Area

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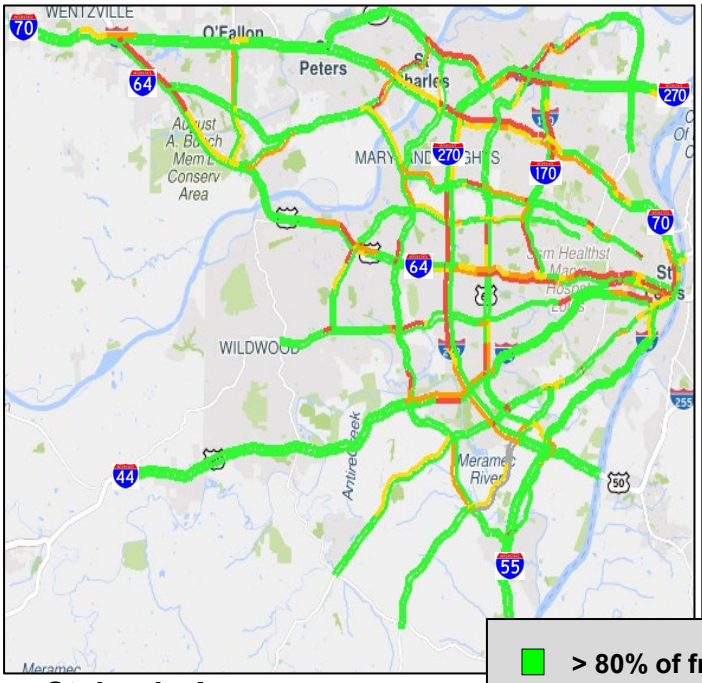
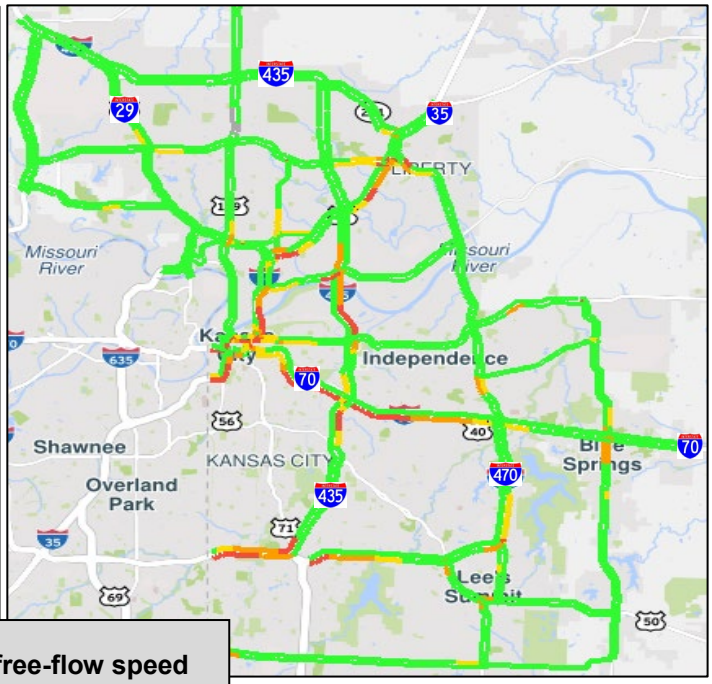
p.m. Mobility

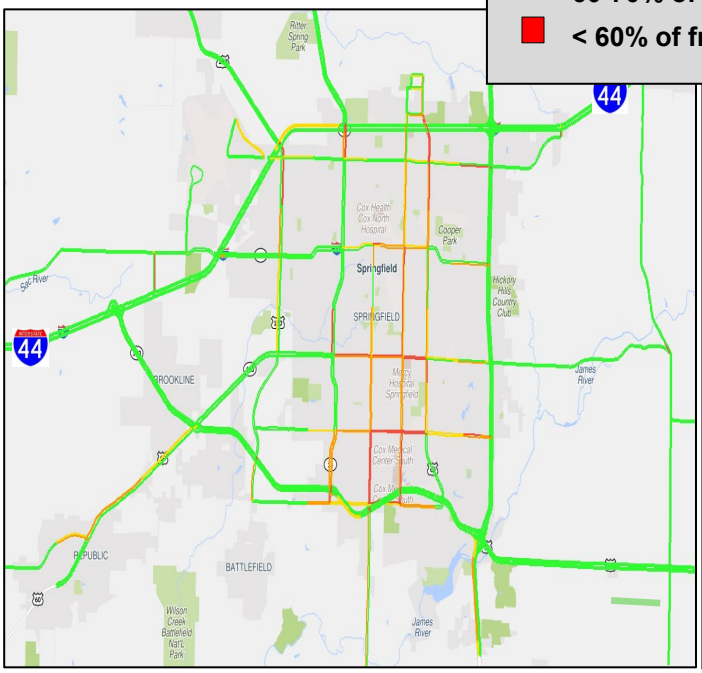


St. Louis Area

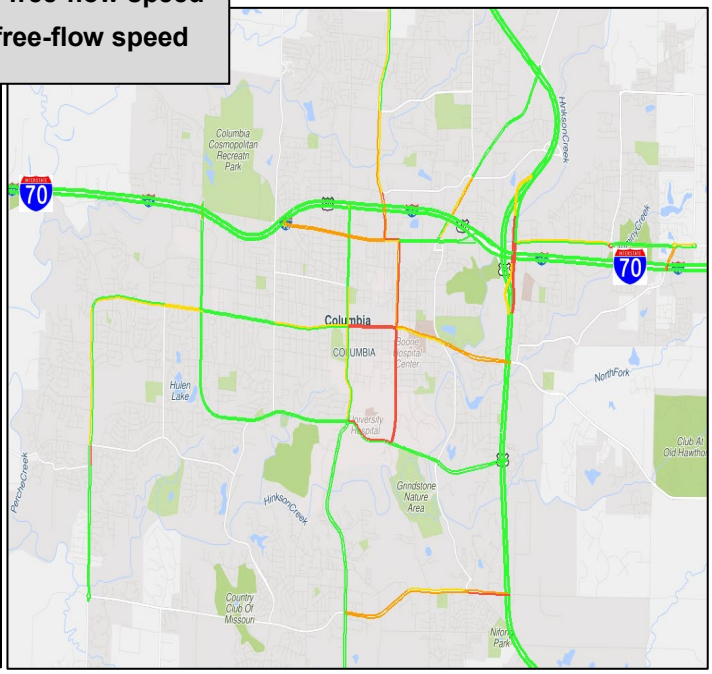


Kansas City Area

- > 80% of free-flow speed
- 70-80% of free-flow speed
- 60-70% of free-flow speed
- < 60% of free-flow speed



Springfield Area



Columbia Area

RESULT DRIVER:
Nicole Hood
State Highway Safety and Traffic Engineer

MEASUREMENT DRIVER:
Brian Umfleet
District Traffic Engineer

PURPOSE OF THE MEASURE:
This measure tracks the annual cost and impact of traffic congestion to motorists for motorist delay, travel time, excess fuel consumed per auto commuter and congestion cost per auto commuter.

MEASUREMENT AND DATA COLLECTION:
A reporting tool available in the Regional Integrated Transportation Information System looks at user delay costs. This data, in combination with industry standard costs for passenger cars and trucks, reflects the overall costs of congestion. RITIS also includes historic data so trend lines can be tracked and evaluated. The unit cost per passenger car is $17.91 per hour and is obtained from the Texas A&M Transportation Institute. The unit cost per truck is $66.65 obtained from the American Transportation Research Institute, which specializes in tracking freight mobility and provides the best source of data related to freight costs. For previous reporting, the department used data provided by the TTI, which annually produces the Urban Mobility Report. The target for this measure is updated annually in April and is established by projecting a 10% improvement over a four-year average.

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Cost and impact of traffic congestion – 5b

Recurring congestion occurs at regular times, although the traffic jams are not necessarily consistent day-to-day. Nonrecurring congestion is an unexpected traffic crash or natural disaster that affects traffic flow. When either occurs, the time required for a given trip becomes unpredictable. This unreliability is costly for commuters and truck drivers moving goods, which results in higher prices to consumers.

While the desired trend for both costs is downward, challenges exist in Missouri's metropolitan regions to continue toward this desired outcome. A comprehensive look at congestion is needed, looking beyond typical solutions of adding capacity. Using smarter technology to help guide motorists is a must. Still, the desired outcome is lower congestion costs and an indication that traffic is moving more efficiently.

The 2018 target was $494 million. The actual calculation from the Regional Integrated Transportation Information System data is $573 million. This report looks at the 2015 to 2018 cost of congestion in the urban areas of Kansas City and St. Louis, as well as rural I-44 and I-70 across the state.

Congestion costs in Kansas City and St. Louis have steadily increased for all years except 2018. Vehicle miles travelled in St. Louis and Kansas City continue to show steady growth through this time period. Congestion costs for both rural I-44 and I-70 increased for both 2017 and 2018 while volume trends have continued steady to slightly downward.

Volume growth is often seen when gas prices remain low. The average cost of gas increased $0.37 per gallon from 2017 to $2.79 per gallon in 2018. Since mid-2016, while gas prices have fluctuated a bit, the price has been fairly steady.

Traffic congestion is widely viewed as a growing problem in many urban areas because the overall volume of vehicular traffic in many areas (based on vehicle miles travelled) continues to grow faster than the overall capacity of the transportation system. Capacity is not merely defined by roadway expansion, but also by things such as carpool efforts, transit usage increases, flexible work hours, incident clearance practices, work zone management and several other factors. Like many other state departments of transportation, MoDOT puts forth great effort in incident clearance practices, work zone management and other factors that impact mobility.

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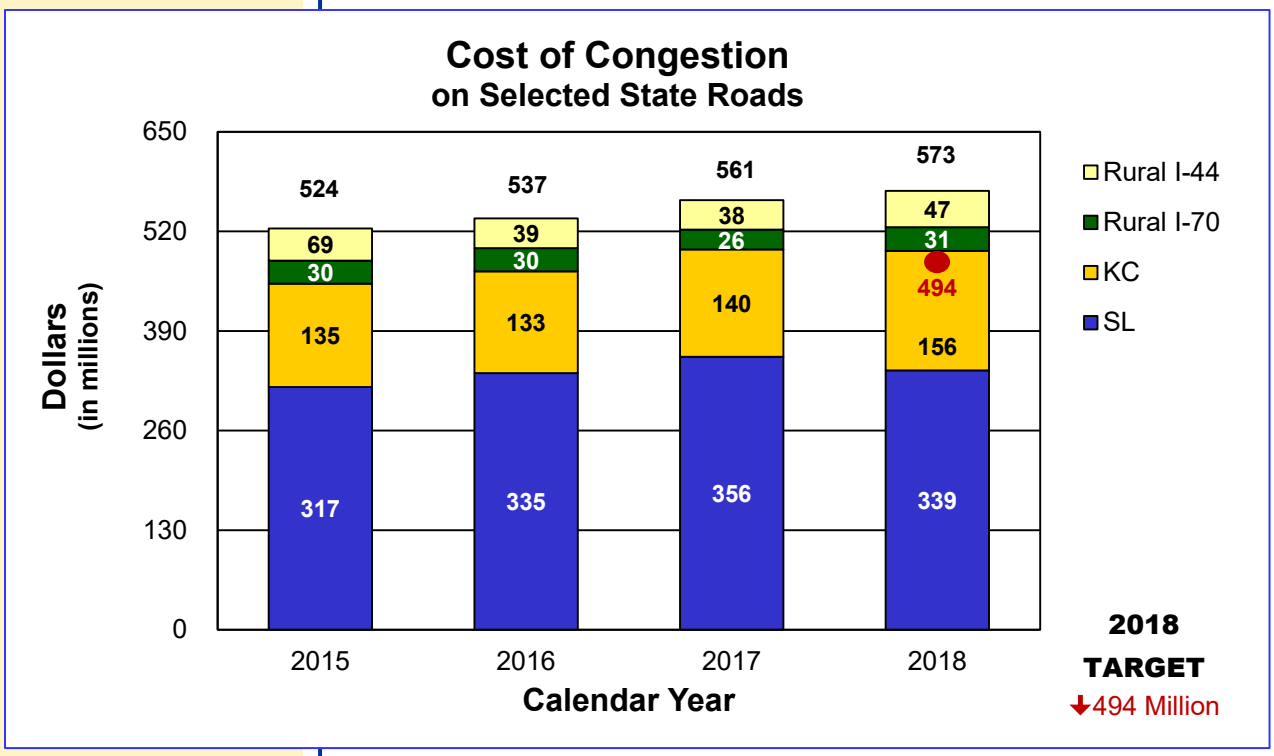

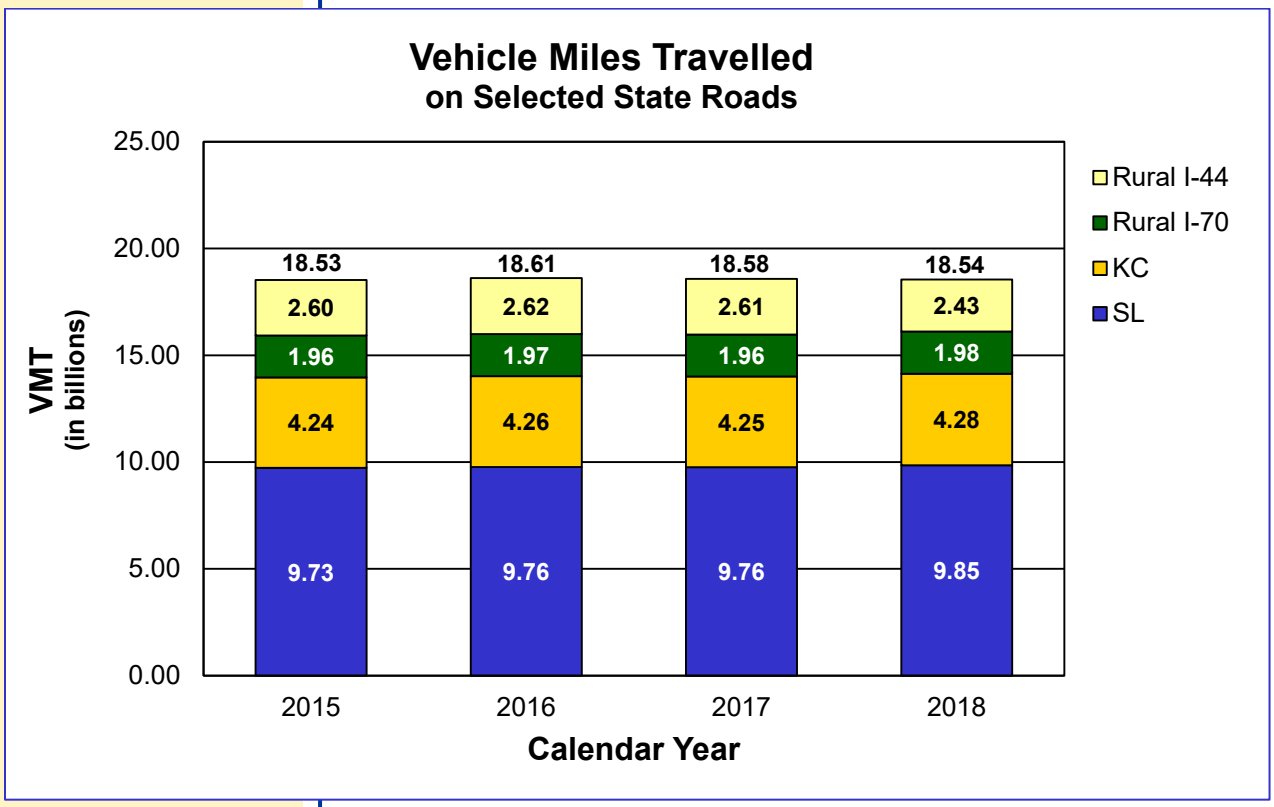

RESULT DRIVER:
Nicole Hood
State Highway Safety and Traffic Engineer

MEASUREMENT DRIVER:
Randy Johnson
KC Scout Manager

PURPOSE OF THE MEASURE:
This measure is used to determine the trends in incident clearance on the state highway system.

MEASUREMENT AND DATA COLLECTION:
Advanced transportation management systems are used by the St. Louis and Kansas City traffic management centers to record incident start time and the time when all lanes are declared cleared. Traffic incidents can be divided into three general classes of duration set forth by the Manual on Uniform Traffic Control Devices that include minor, intermediate and major. Each class has unique traffic control characteristics and needs.

This target is established by projecting a 10% improvement over a five-year average.

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Average time to clear traffic incident – 5c

A traffic incident is an unplanned event that blocks travel lanes and temporarily reduces the number of vehicles that can travel on the road. The speed of incident clearance is essential to the highway system returning back to normal conditions. Responding to and quickly addressing the incident (crashes, debris and stalled vehicles) improves system performance.

St. Louis recorded 3,409 incidents in the third quarter of 2019. The average time to clear traffic incidents was 25.0 minutes, an increase of 1.6% from the third quarter of 2018.

Kansas City recorded 2,395 incidents in the third quarter of 2019. The average time to clear traffic incidents was 22.6 minutes, a decrease of 11.4% from the third quarter of 2018.

The third quarter for Kansas City and St. Louis revealed an array of incidents that included tractor trailers, debris in roadway and multiple fatalities. Both regions are continuing to see an increase in the number of incidents which increase the challenges of reducing the average time to clear. For St. Louis, multiple incidents involving fatalities and numerous tractor trailer crashes with spilled loads onto the highway had a direct impact on their average time to clear. For Kansas City, a concentrated effort to push/pulling vehicles helped reduce their average time to clear. Various MoDOT staff from across the state currently serving on a Transportation Systems Management and Operations implementation team are focusing on improving Traffic Incident Management. Both St. Louis and Kansas City districts continue piloting automated systems to send notifications to vehicles approaching in-action Emergency Response vehicles to improve safety. Also, there has been an increase in the number of people trained in Traffic Incident Management in various districts across the state.

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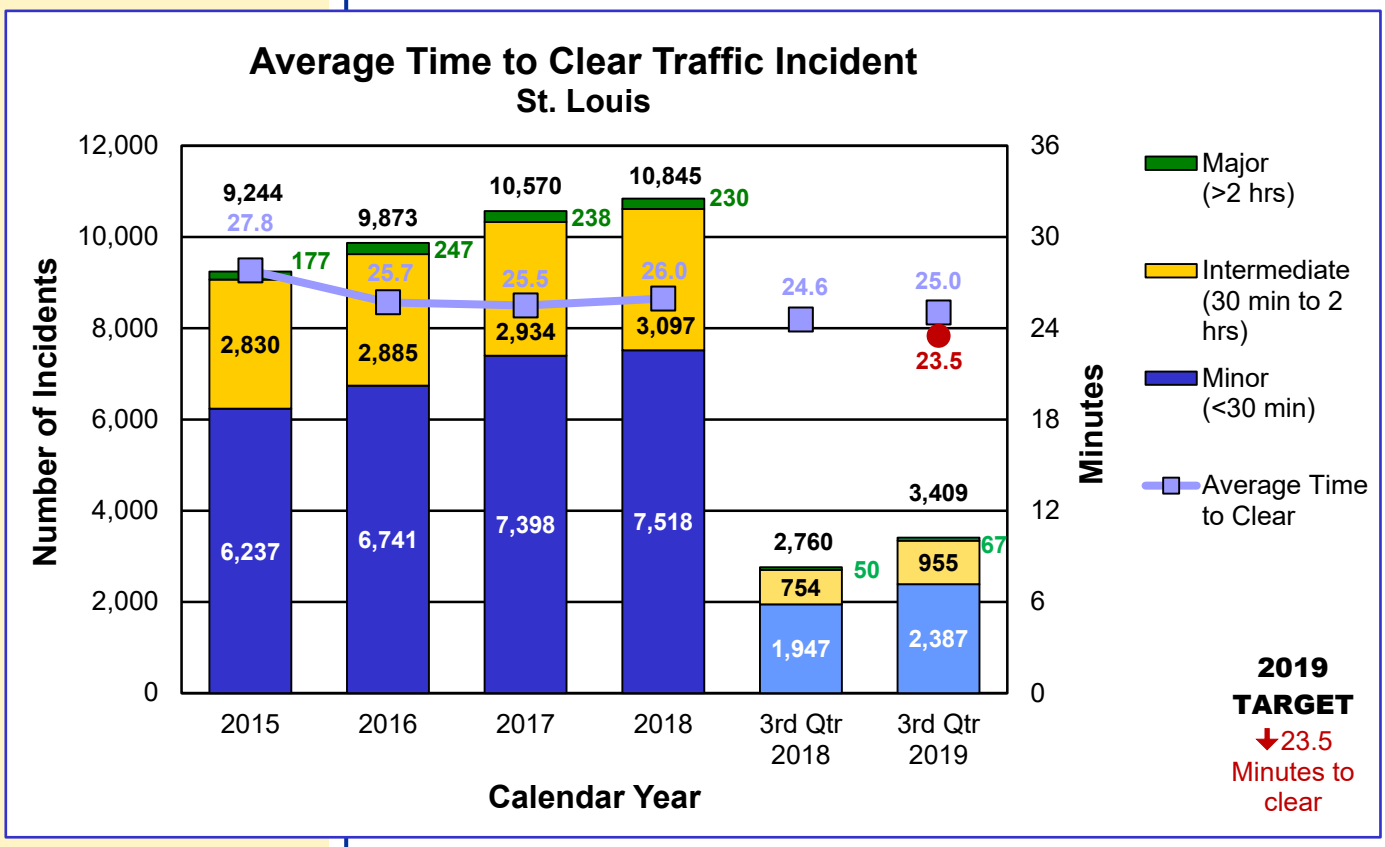

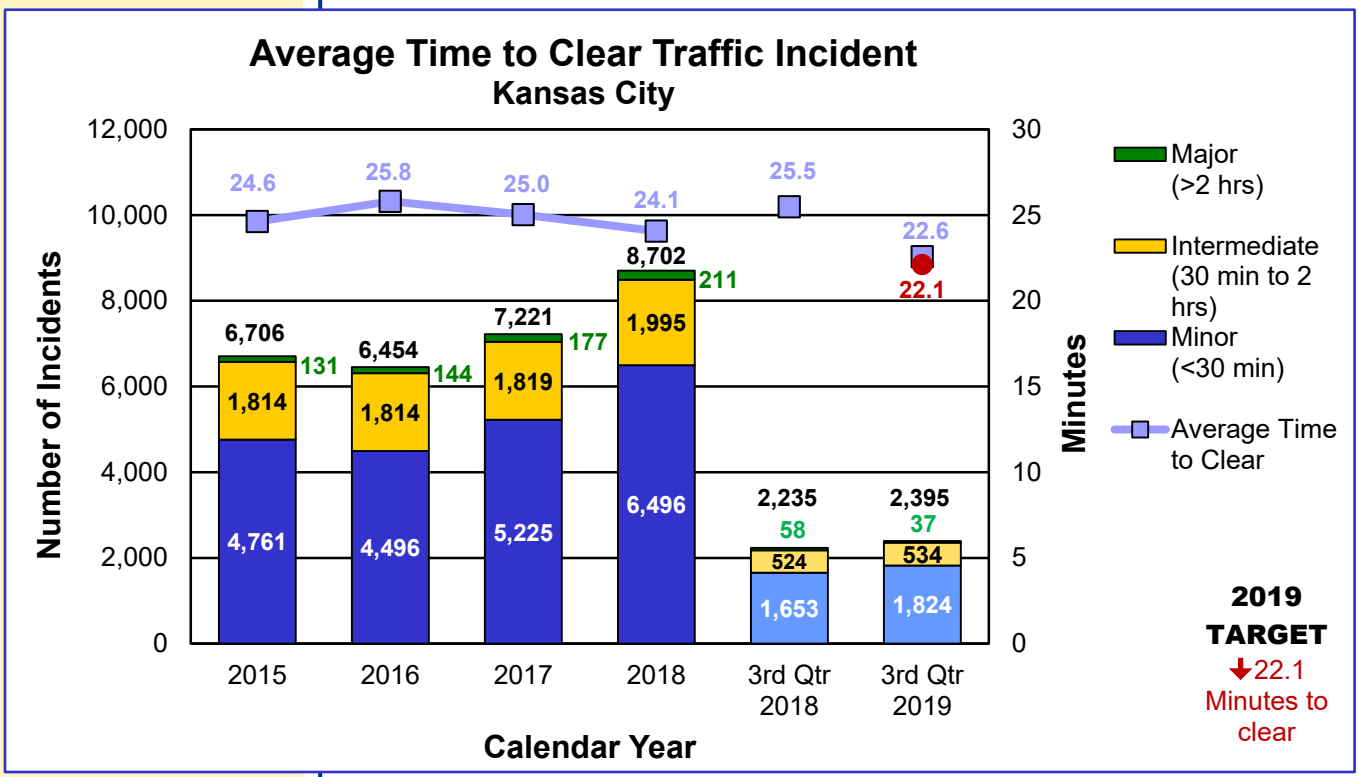

RESULT DRIVER:
Nicole Hood
State Highway Safety and Traffic Engineer

MEASUREMENT DRIVER:
Laurel McKean
Assistant District Engineer

PURPOSE OF THE MEASURE:
This measure tracks the number of and delay caused by unplanned incidents on the divided four-lane section of Interstate 44 and Interstate 70.

MEASUREMENT AND DATA COLLECTION:

Incidents were input by KC Scout, Gateway Guide and Ozarks Traffic Transportation Management Operators in Transuite. The incidents are uploaded into the Regional Integrated Transportation Information System where the duration of each incident is calculated.

The segment of I-70 included in this tracker measure is between MO 7 in Blue Springs, MO to Route Z in Wentzville, MO The segment of I-44 included is between the Oklahoma State Line to Route 100 in Gray Summit, MO.

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Unplanned incident impacts on major interstate routes – 5d

Interstates are the arteries that connect the nation and keep people and commerce flowing. When interstates shut down in Missouri, the country is cut in half. Keeping interstates free-flowing is a top priority for MoDOT, but sometimes unplanned incidents affect the department's ability to keep the interstates moving. An unplanned incident can be weather related, emergency road and bridge repair, traffic crashes or other incidents.Traffic crashes and delays are two ways MoDOT can track incidents and develop strategies to reduce the impact to the traveling public.

Of the types of unplanned incidents that can occur, traffic crashes create the majority of the impacts. The I-70 and I-44 Highway Safety Manual Analysis project has completed I-70 draft results and I-44 is in the data processing stage. Initial draft results for I-70 are shown in the table below.

I-70 WESTBOUND	OBSERVED CRASHES	PREDICTED CRASHES	EXPECTED CRASHES	DIFFERENCE # CRASHES	PERCENT DIFFERENCE
Rural	714	576	624	47	8%
Urban	187	147	167	20	14%
I-70 WB Grand Total	**900**	**723**	**790**	**67**	**9%**

I-70 EASTBOUND	OBSERVED CRASHES	PREDICTED CRASHES	EXPECTED CRASHES	DIFFERENCE # CRASHES	PERCENT DIFFERENCE
Rural	727	653	677	24	4%
Urban	165	123	136	13	11%
I-70 EB Grand Total	**892**	**775**	**813**	**38**	**5%**

Observed crashes represent the actual crashes which occurred. Predicted crashes represent the number of crashes expected per year based on the configuration and traffic volumes of the roadway. Expected crashes take the predicted crash information along with the observed crashes and uses statistical methods to normalize the data over a time frame to reduce the fluctuation of daily occurences. Both westbound and eastbound I-70 indicate a higher number of expected crashes than predicted indicating there is opportunity to reduce crashes along the corridor.

The number of the incidents and the average duration of incidents is graphically displayed for the third quarter of calendar year 2019.

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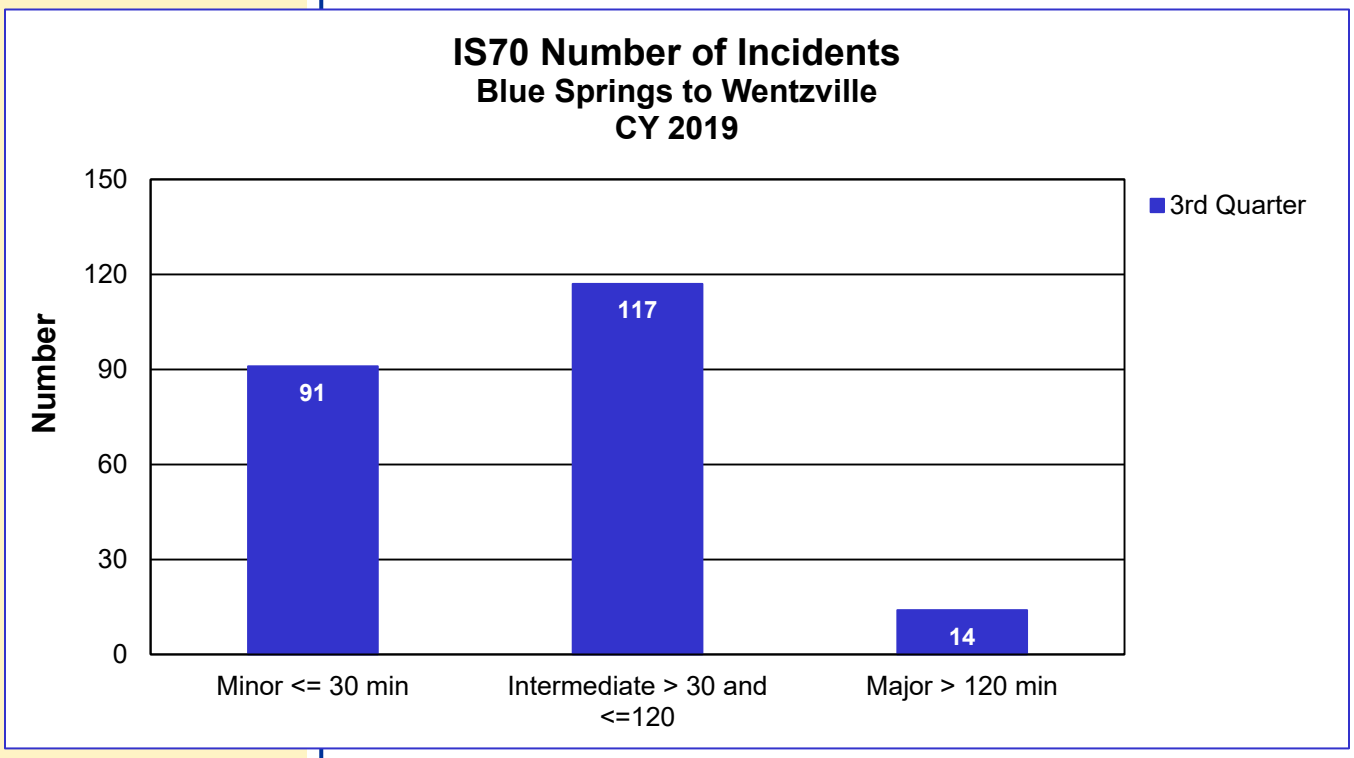

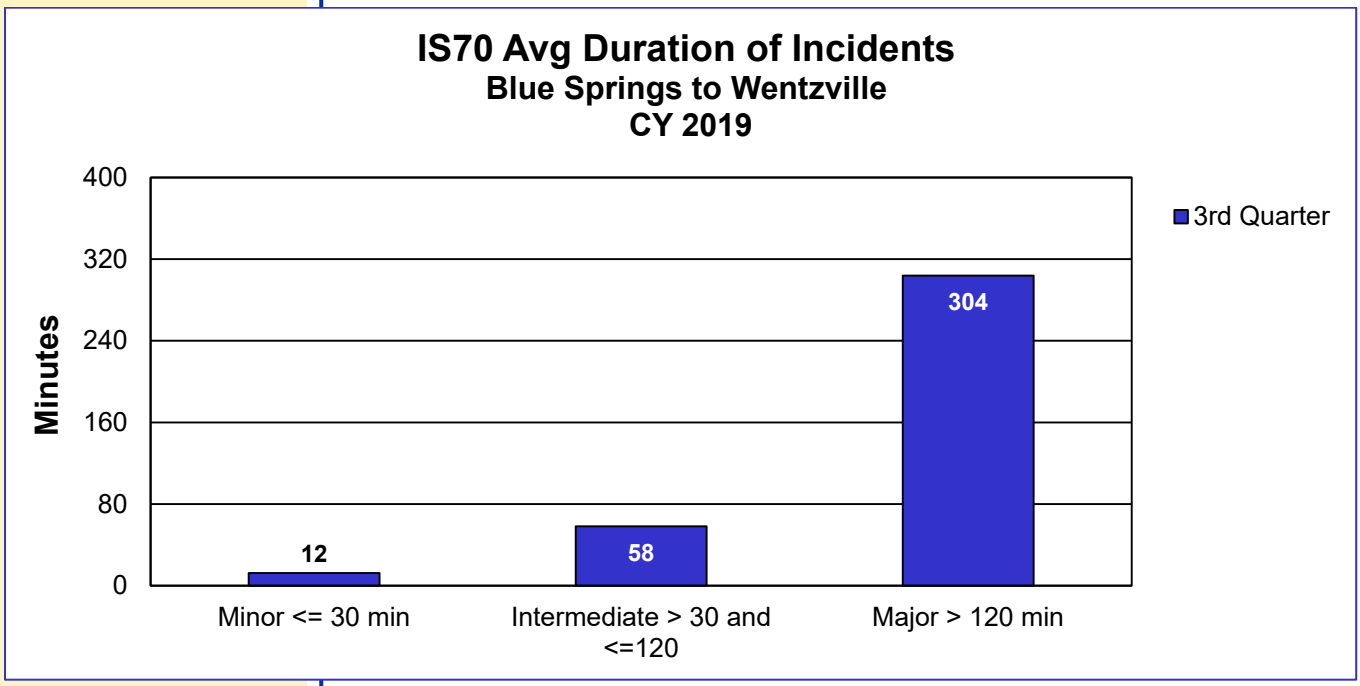

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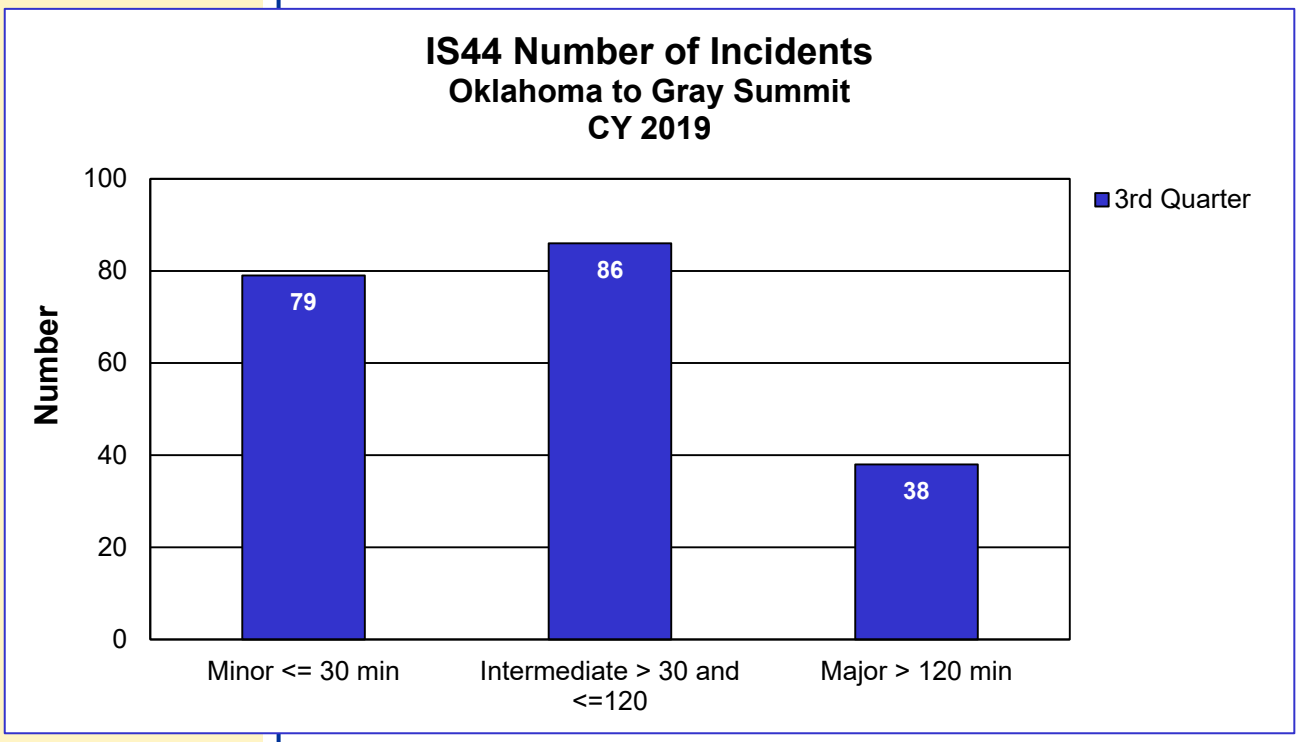

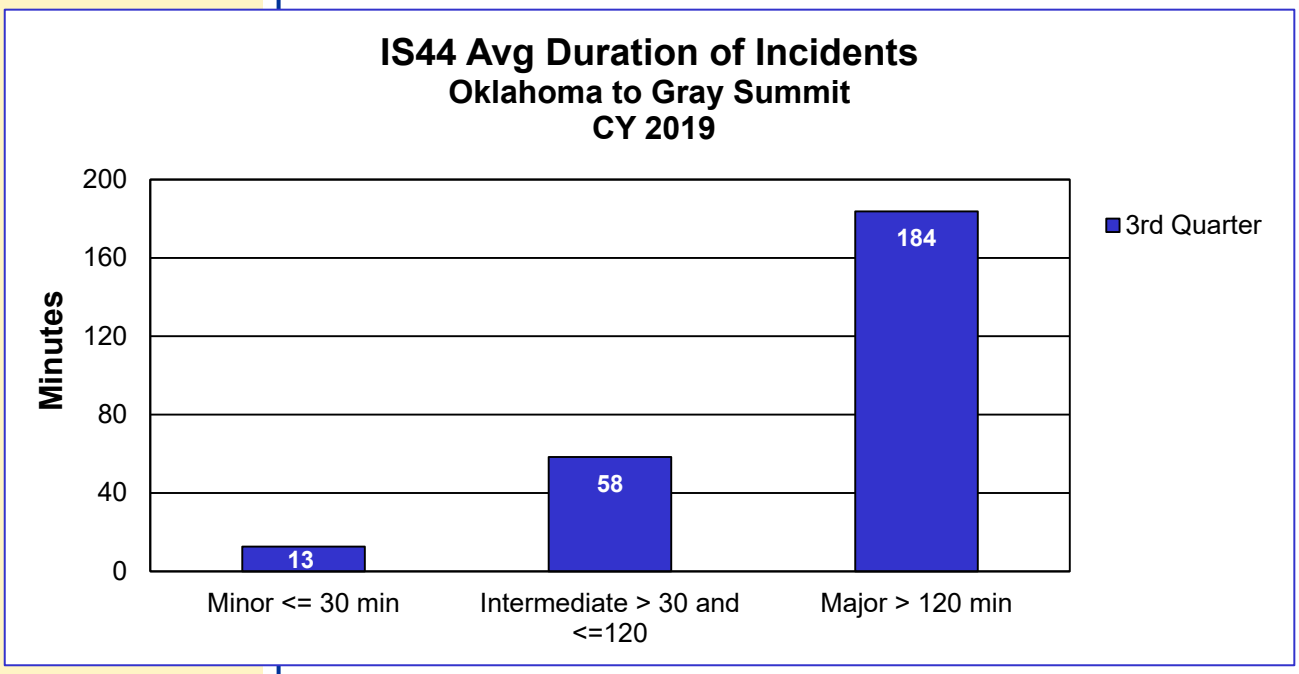

RESULT DRIVER:
Nicole Hood
State Highway Safety and Traffic Engineer

MEASUREMENT DRIVER:
Troy Hughes
Design Liaison Engineer

PURPOSE OF THE MEASURE:
Work zones are designed to allow the public to travel through safely and with minimal disruptions. This measure indicates how well significant work zones perform.

MEASUREMENT AND DATA COLLECTION:
Work zone impacts are identified using automated data collection or by visual observations. An impact is defined as the additional time a work zone adds to normal travel. Impacts resulting in a delay of at least 10 minutes are included in this report.

The targeted hours of work zone congestion are based on previous years' data and an acceptable tolerance of 30 total minutes for work zone congestion statewide. The target for this measure is updated quarterly.

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Work zone delays to the traveling public – 5e

Motorists want to get through work zones with as little inconvenience as possible. MoDOT tries to minimize travel impacts by shifting work to night time hours or during times when there are fewer impacts to the traveling public. Other strategies include using technology in work zones, providing valuable information to customers and innovative uses of traffic control devices to promote efficient traffic flow. To measure the effectiveness of these strategies, MoDOT monitors the performance of work zones with the greatest potential to impact traffic each quarter. The goal is to minimize the number of times a work zone creates a traffic delay of 10 minutes or more.

MoDOT has monitored 868 work zones so far this year with 356 work zones being monitored this quarter. For 2019, there have been 546 work zone delays of at least 10 minutes compared to 207 work zones delays for the same period in 2018. The total congestion for 2019 to date is 492 hours. This quarter there were 246 work zone delays that occurred in 36 work zones and accounted for 167 hours of congestion.

This quarter, projects along I-44 between Route 270 and Grand Blvd. in St. Louis County contributed 100 hours of the congestion. Another contributor to delay was emergency repairs to the Jefferson Barracks Bridge (I-255 EB) which contributed 15.6 hours of congestion. These projects alone contributed to a total of 116 hours of the 167 hours (70%) of congestion for this quarter. Bridge improvement projects continue to be the largest contributor of delay at 84% of the total delay.

The target for the cumulative work zone congestion statewide has been set at 180 hours for the year (45 hours per quarter). This target translates to approximately 30 minutes of work zone congestion per day statewide.

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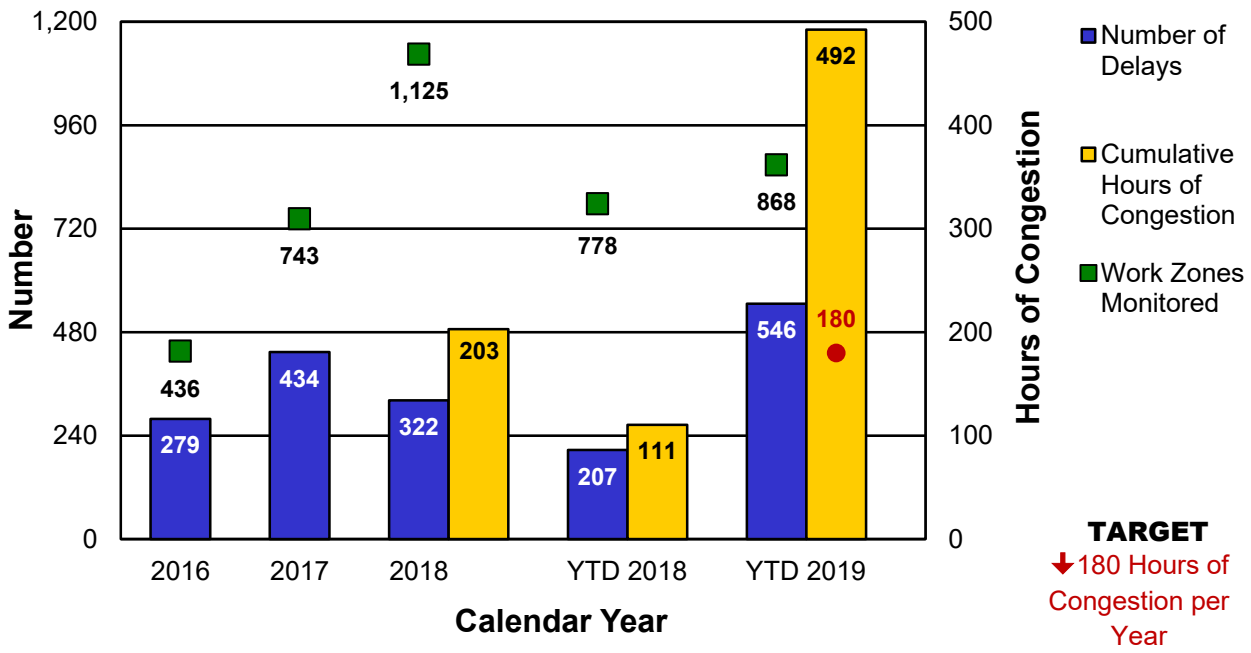
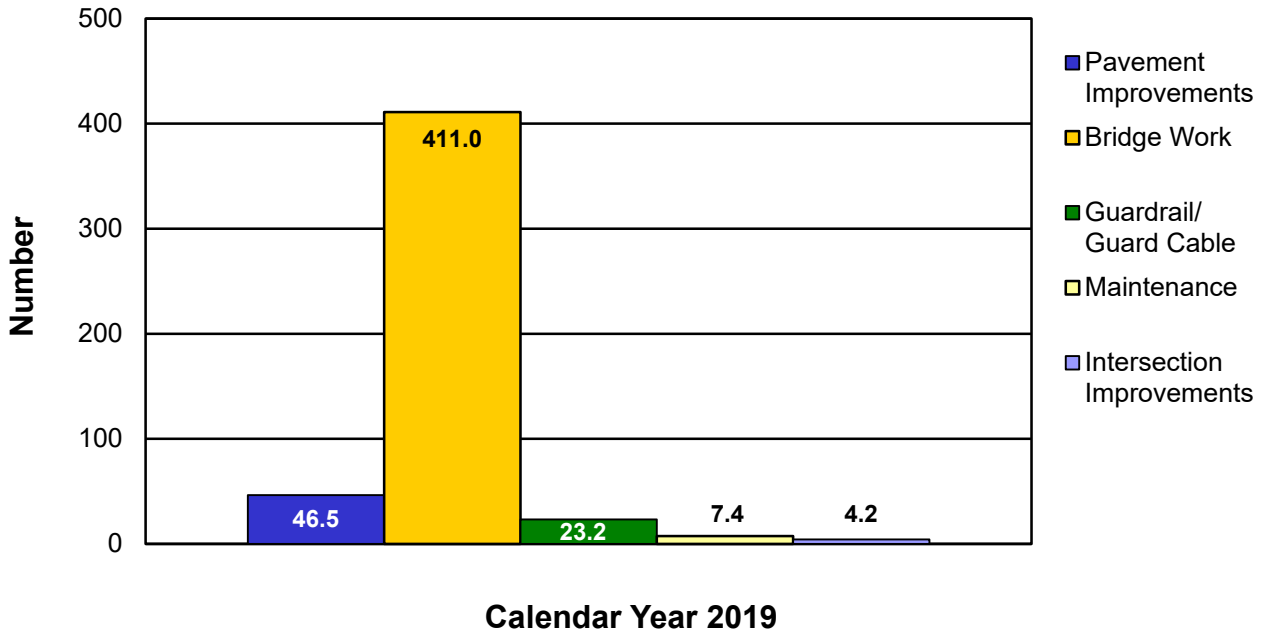
Work Zone Delays Greater than 10 Minutes



Hours of Congestion by Work Type



RESULT DRIVER:
Nicole Hood
State Highway Safety and Traffic Engineer

MEASUREMENT DRIVER:
Arisa Prapaisilp
Assistant District Maintenance Engineer

PURPOSE OF THE MEASURE:
This measure tracks the amount of time needed to perform MoDOT's snow and ice removal efforts.

MEASUREMENT AND DATA COLLECTION:
For major highways and regionally significant routes, the objective is to restore them to a mostly clear condition as soon as possible after the storm has ended. MoDOT calls these "continuous operations" routes. State routes with lower traffic volumes should be opened to two-way traffic and treated with salt or abrasives at critical areas such as intersections, hills and curves. These are called "non-continuous operations" routes. After each winter event, maintenance personnel submit reports indicating how much time it took to meet the objectives for both route classifications.

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Time to meet winter storm event performance objectives – 5f

Knowing the time it takes to clear roads after a winter storm can help the department better analyze the costs associated with that work. MoDOT's response rate to winter events provides good customer service for the traveling public while keeping costs as low as possible. These efforts result in reduced traffic delays due to winter events and, more importantly, safer travel during these events. In recent years, MoDOT has been more aggressive in messaging the public urging them to travel only if necessary during winter events. This messaging is in the form of social media pushes and media releases. In addition, one of MoDOT's Strategic Initiatives is working toward predictive analytics to optimize winter operations resources.

The 2018-2019 winter season began early with several winter events occuring in November including a named winter storm over the Thanksgiving weekend. Winter Storm Bruce had blizzard conditions in the northwest part of the state and caused the closure of Interstate 29. The impact from Winter Storm Bruce was measured from a vehicle delay perspective. The major routes statewide during this winter storm were measured using cell phone data. The measurement was motorist delay costs which were over $3 million. December was relatively mild, but the new year brought a seemingly unending barrage of winter events lasting through March 3, 2019. Salt supplies became critically low, requiring the imposition of a statewide salt prioritization in February. This challenging winter resulted in an average time to meet MoDOT's objective for continuous operations routes of 4.8 hours, and 5.6 hours for non-continuous routes. These response times are higher than previous years which is due in large part to the impacts of Winter Storm Bruce, salt shortages and the overall increased challenges of this winter compared to previous winters.

On average, winter operations cost about $43 million per year. MoDOT expended $66.4 million this year. This is higher than Missouri's average winter over the last five years, which is expected because of the various challenges faced this season.

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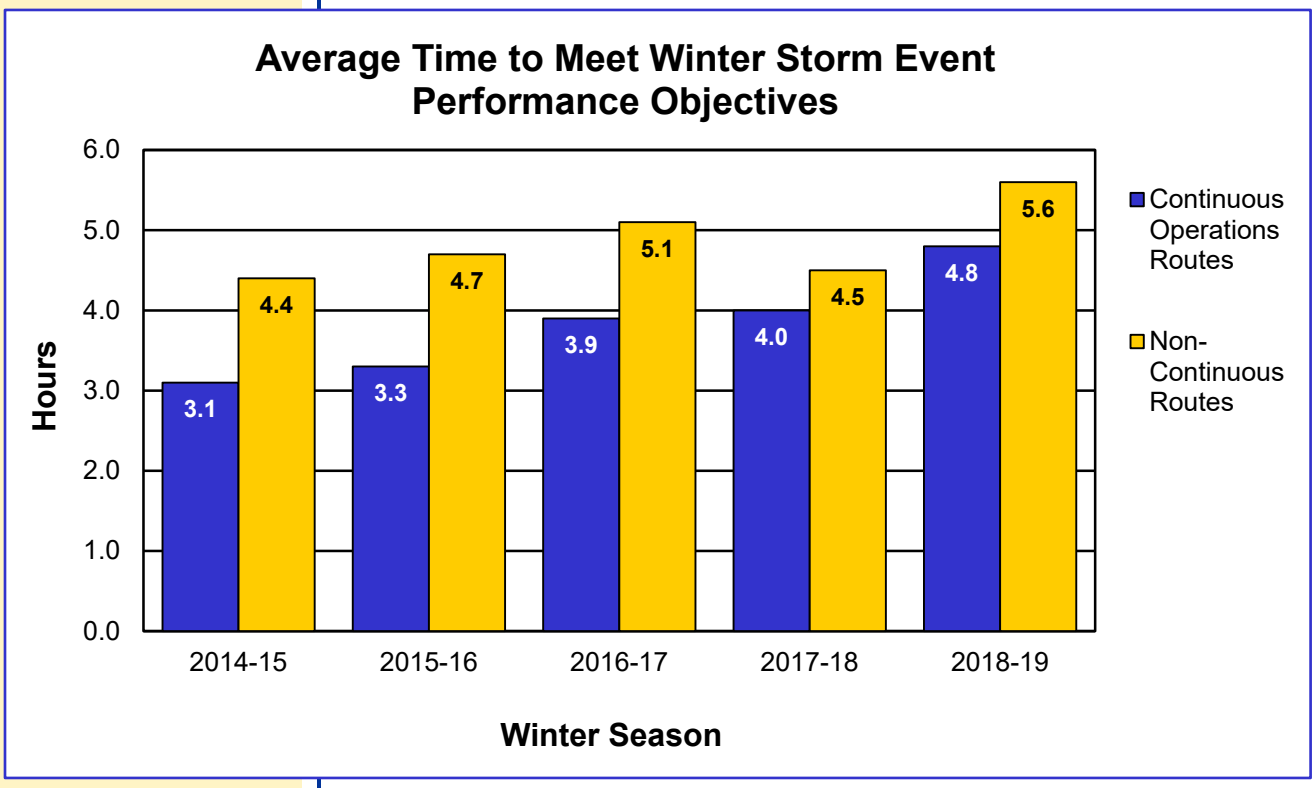

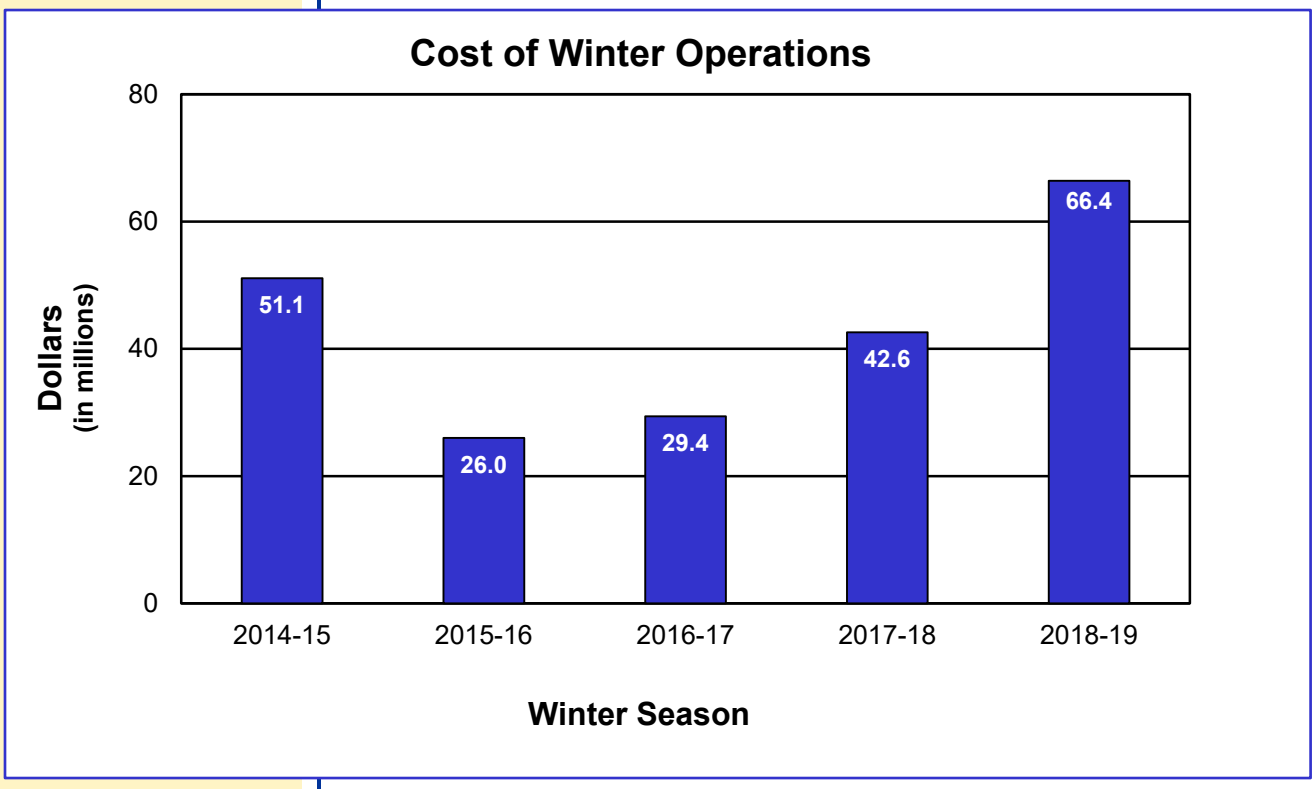

RESULT DRIVER:
Nicole Hood
State Highway Safety and Traffic Engineer

MEASUREMENT DRIVER:
Sarah Kleinschmit
Policy and Innovations Engineer

PURPOSE OF THE MEASURE:
This measure tracks MoDOT's investment in non-motorized facilities and progress toward removing barriers. Accessibility needs occur within the right of way, such as sidewalks and traffic signals. Removal of the barriers listed in MoDOT's 2010 ADA Transition Plan is required as part of the department's compliance with the Americans with Disabilities Act.

MEASUREMENT AND DATA COLLECTION:
MoDOT's investment in non-motorized facilities is determined from the awarded contract amounts for the 20 most common construction elements used on projects each year.
ADA Transition Plan progress is based upon completed work to correct defective items reported in the ADA Transition Plan inventory. The dollar amounts are based on unadjusted estimates from 2008 and do not reflect actual expenditures. This avoids impacts from inflation or changing field conditions.
A progress target line is included indicating MoDOT's progress towards completing the transition plan by 2027. Annual funding levels necessary to complete the transition plan by 2027 determine the target, which is set in April of each year.

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Bike/pedestrian and ADA transition plan improvements – 5g

As required by the Americans with Disabilities Act, MoDOT has identified $151 million in deficient facilities within its right of way and created a transition plan to correct these facilities by August 2027.

In order to complete the transition plan at a steady pace, an annual investment target is approximately $15 million. Since fiscal year 2016, the Missouri Highways and Transportation Commission has retained half of the Transportation Alternatives Program funding it receives each year. Approximately $9 million is reserved for the completion of the transition plan.

Since the beginning of calendar year 2019, $1.39 million in ADA improvements have been completed and $12 million ($30 thousand for FY20) has been awarded. Since 2008, MoDOT has completed over $31 million or 21% towards the correction of the deficient facilities with approximately $120 million remaining. Although this amount is below the 55% target, the districts have projected to invest over $133 million towards ADA facility improvements over the next five years in the Statewide Transportation Improvement Program. That amount is expected to cover transition plan improvements and other ADA needs across the state.

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