



Des Moines Area MPO 2019 Travel Time Reliability and Freight Reliability

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CONTENTS

Background	3
Performance Goals in <i>Mobilizing Tomorrow</i>	4
System and Freight Performance Measures.....	5
Percent of Reliable Person-Miles Traveled on Interstate	6
2017-2021 Five-Year Target	6
2050 Target	7
Percent of Reliable Person-Miles Traveled on Non-Interstate NHS	8
2017-2021 Five-Year Target	8
2050 Target	9
Interstate Truck Travel Time Reliability	10
2017-2021 Five-Year Target	10
2050 Target	11
Appendix	12
System Reliability Methodology	12
Freight Reliability Methodology.....	12

List of Figures

Figure 1: 2017-2019 Interstate Travel Time Reliability for 2017-2021 Five-Year Target.....	6
Figure 2: 2017-2019 Interstate Travel Time Reliability for 2050 Target.....	7
Figure 3: 2017-2019 Non-Interstate NHS Travel Time Reliability for 2017-2021 Five-year Target	8
Figure 4: 2017-2019 Non-Interstate NHS Travel Time Reliability for 2050 Target	9
Figure 5: 2017-2019 Truck Travel Time Reliability for 2017-2021 Five-Year Target.....	10
Figure 6: 2017-2019 Truck Travel Time Reliability Index for 2050 Target	11

List of Tables

Table 1: Des Moines Area MPO System and Freight Performance Targets.....	4
Table 2: Comparison of Des Moines Area MPO System and Freight Performance Measures	5
Table 3: Comparison of Percent of Person Miles Traveled on Interstate that are Reliable	6
Table 4: Comparison of Percent of Person Miles Traveled on Non-Interstate NHS that are Reliable	8
Table 5: Comparison of Interstate Truck Travel Time Reliability Index	10

Background

In May 2017, the Federal Highway Administration (FHWA) released the final rulemaking on performance measures that State Departments of Transportation (DOTs) and Metropolitan Planning Organizations (MPOs) will report for system performance on the Interstate and non-Interstate National Highway System (NHS) for the National Highway Performance Program (NHPP) and for freight performance on the Interstate system for the National Highway Freight Program (NHFP).

The measures related to system and freight performance are:

- System Performance
 - Percent of Reliable Person-Miles Traveled on the Interstate
 - Percent of Reliable Person-Miles Traveled on the Non-Interstate NHS
- Freight Performance
 - Percent of Interstate System Mileage Providing for Reliable Truck Travel Time (Truck Travel Time Reliability Index)

Three additional performance measures (total emissions reductions by applicable pollutants under the Congestion Mitigation and Air Quality - CMAQ program, annual hours of peak hour excessive delay per capita, and percent of non-single occupancy vehicle travel which includes travel avoided by telecommuting) were also included as part of FHWA's final rulemaking but will not be addressed in this report.

For the system performance measures, reliability is defined by the Level of Travel Time Reliability (LOTTR) or the ratio of the 80th percentile travel time to an average 50th percentile travel time for a road segment. Data is sourced from the FHWA's National Performance Management Research Data Set (NPMRDS) and collected on: Mondays-Fridays 6 am – 10 am, 10 am – 4pm, and 4 pm – 8 pm; Saturdays-Sundays 6 am – 8 pm. The threshold for reliability is below 1.50 for all collected time periods.

For freight performance, reliability is defined by the Truck Travel Time Reliability (TTTR) Index. Data is sourced from the FHWA's NPMRDS and reported by five periods: morning peak (6 am – 10 am Monday-Friday), midday (10 am – 4 pm Monday-Friday), and afternoon peak (4 pm – 8 pm Monday-Friday) Mondays through Fridays; overnights for all days (8 pm – 6 am Sunday-Saturday); and weekends (6 am – 8 pm Saturday-Sunday). The TTTR is a ratio of the 95th percentile time to an average 50th percentile travel time for each road segment.

Performance Goals in *Mobilizing Tomorrow*

Mobilizing Tomorrow, approved in 2014 and updated in 2019, is the Des Moines Area MPO's long-range, regional transportation plan for the year 2050. *Mobilizing Tomorrow* outlines four high-level goals to direct Greater Des Moines toward an enhanced transportation system. Each of the goals identified several performance measures to help track the plan's implementation. Goal 1 in *Mobilizing Tomorrow* seeks to "manage and optimize transportation infrastructure and services" and includes the aforementioned system and freight performance measures.

In *Mobilizing Tomorrow*, the system and freight performance measures have both a five-year target and a 2050 target.

Table 1: Des Moines Area MPO System and Freight Performance Targets

Performance Measure	Five-Year Target	2050 Target
	2017-2021	
Percent of Person Miles Traveled on Interstate that are Reliable	100	95
Percent of Person Miles Traveled on Non-Interstate NHS that are Reliable	66	75
Interstate Truck Travel Time Reliability Index	1.28	1.28

System and Freight Performance Measures







For the Des Moines Area MPO's 2017-2021 Five-Year Target, one of the three performance measures met or exceeded the targets:

- Percent of Person Miles Traveled on Non-Interstate NHS that are Reliable

For the Des Moines Area MPO's 2050 target, two of the three performance measures met or exceeded the targets:



- Percent of Person Miles Traveled on Interstate that are Reliable
- Percent of Person Miles Traveled on Non-Interstate NHS that are Reliable

Table 2: Comparison of Des Moines Area MPO System and Freight Performance Measures

Performance Measure	2019	Five-Year Target	Performance	2050 Target	Performance
		2017-2021			
Percent of Person Miles Traveled on Interstate that are Reliable	97.6	100		95	
Percent of Person Miles Traveled on Non-Interstate NHS that are Reliable	94.3	66		75	
Interstate Truck Travel Time Reliability Index	1.33	1.28		1.28	

Percent of Reliable Person-Miles Traveled on Interstate

Table 3: Comparison of Percent of Person Miles Traveled on Interstate that are Reliable

Performance Measure	2019	Five-Year Target	Performance	2050 Target	Performance
		2017-2021			
Percent of Person Miles Traveled on Interstate that are Reliable	97.6	100		95	

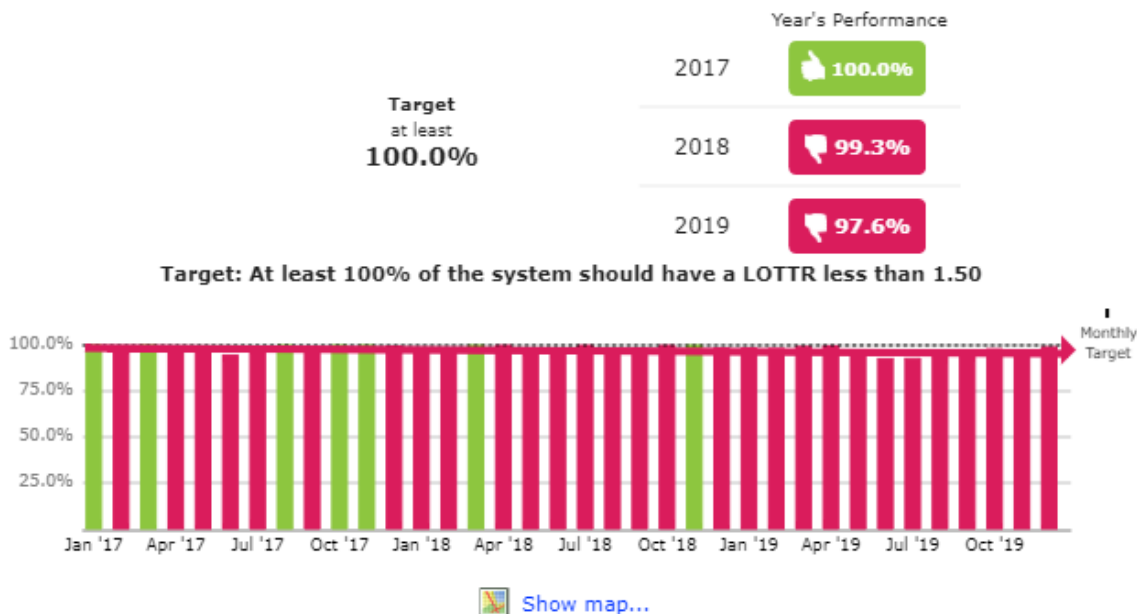
2017-2021 Five-Year Target

The Des Moines Area MPO’s 2017-2021 Five-Year Target for the Percent of Person-Miles Traveled on the Interstate that are Reliable is 100%.

The Des Moines Area MPO met its Five-Year Target in 2017 but not in 2018 or 2019. Given that the MPO’s Five-Year Target of 100% is a high standard, it is tolerable that the 2018 and 2019 performances were below by only 0.7 and 2.4 percentage points, respectively. However, there is a slight downward trend in performance from 2017 to 2019.

Figure 1: 2017-2019 Interstate Travel Time Reliability for 2017-2021 Five-Year Target

MAP-21 Percent of the Person-Miles Traveled on the Interstate That Are Reliable (the Interstate Travel Time Reliability measure)



Calculated using 99.49% of miles in Des Moines Area MPO

Data source: NPMRDS INRIX (2017-2020)

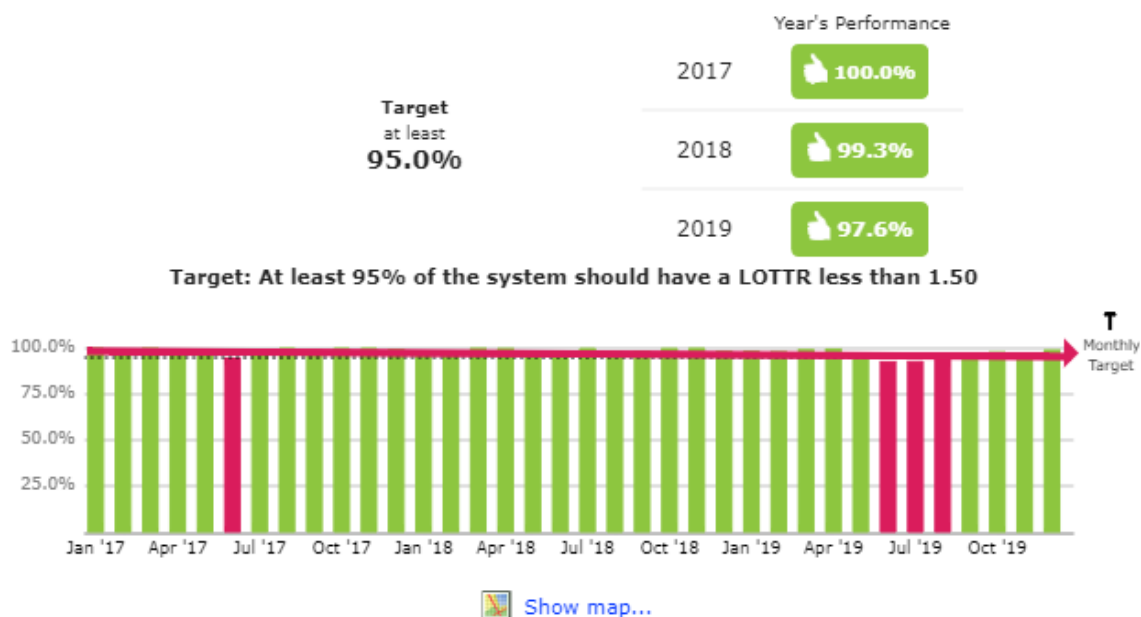
2050 Target

The Des Moines Area MPO's 2050 Target for the Percent of Person-Miles Traveled on the Interstate that are Reliable is 95%.

The Des Moines Area MPO met its 2050 Target in 2017, 2018 and 2019 by 5.0, 4.3, and 2.6 percentage points, respectively. However, there is a slight downward trend in performance from 2017 to 2019.

Figure 2: 2017-2019 Interstate Travel Time Reliability for 2050 Target

MAP-21 Percent of the Person-Miles Traveled on the Interstate That Are Reliable (the Interstate Travel Time Reliability measure)



Calculated using 99.49% of miles in Des Moines Area MPO

Data source: NPMRDS INRIX (2017-2020)

Percent of Reliable Person-Miles Traveled on Non-Interstate NHS

Table 4: Comparison of Percent of Person Miles Traveled on Non-Interstate NHS that are Reliable

Performance Measure	2019	Five-Year Target	Performance	2050 Target	Performance
		2017-2021			
Percent of Person Miles Traveled on Non-Interstate NHS that are Reliable	94.3	66	☑	75	☑

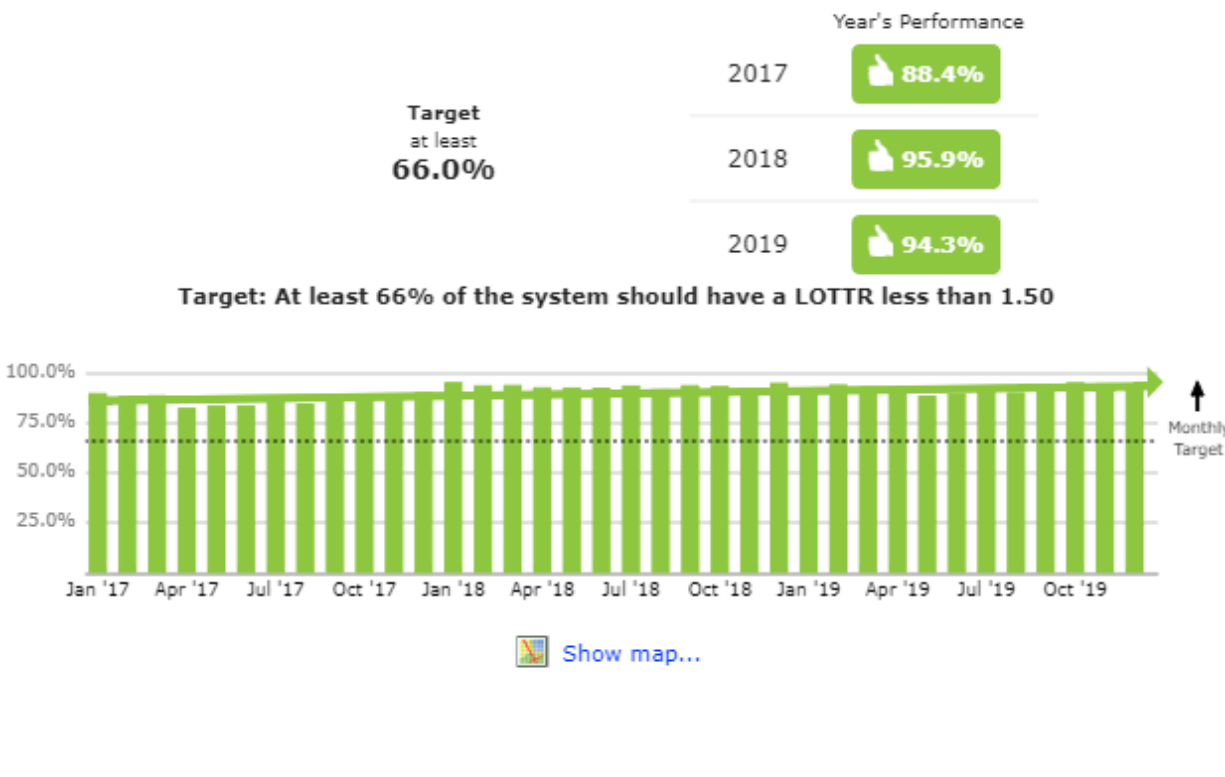
2017-2021 Five-Year Target

The Des Moines Area MPO’s 2017-2021 Five-Year Target for the Percent of Person-Miles Traveled on the Non-Interstate NHS that are Reliable is 66%.

The Des Moines Area MPO met its Five-Year Target in 2017, 2018, and 2019 by 22.4, 29.9, and 28.3 percentage points, respectively. There is an upward trend in performance from 2017 to 2019.

Figure 3: 2017-2019 Non-Interstate NHS Travel Time Reliability for 2017-2021 Five-year Target

MAP-21 Percent of the Person-Miles Traveled on the Non-Interstate NHS That Are Reliable (the Non-Interstate NHS Travel Time Reliability measure)



Calculated using 99.64% of miles in Des Moines Area MPO

Data source: NPMRDS INRIX (2017-2020)

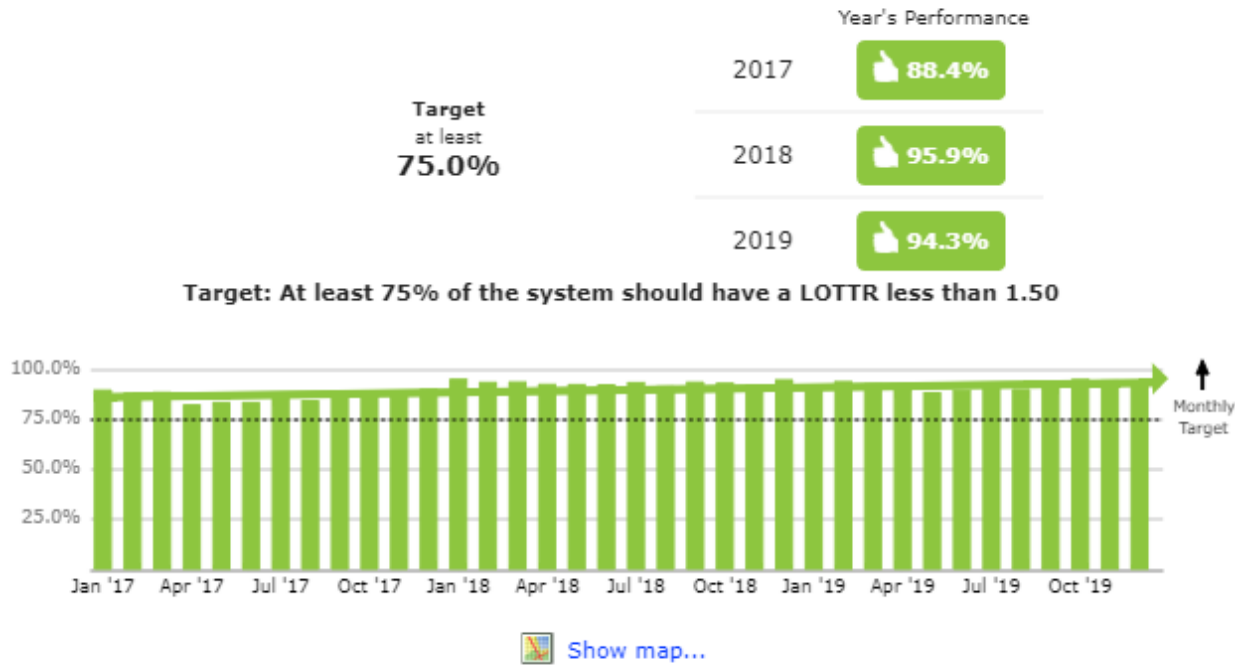
2050 Target

The Des Moines Area MPO’s 2050 Target for the Percent of Person-Miles Traveled on the Non-Interstate NHS that are Reliable is 75%.

The Des Moines Area MPO met its 2050 Target in 2017, 2018 and 2019 by 13.4, 20.9, and 19.3 percentage points, respectively. There is an upward trend in performance from 2017 to 2019.

Figure 4: 2017-2019 Non-Interstate NHS Travel Time Reliability for 2050 Target

MAP-21 Percent of the Person-Miles Traveled on the Non-Interstate NHS That Are Reliable (the Non-Interstate NHS Travel Time Reliability measure)




Calculated using 99.64% of miles in Des Moines Area MPO

Data source: NPMRDS INRIX (2017-2020)

Interstate Truck Travel Time Reliability

Table 5: Comparison of Interstate Truck Travel Time Reliability Index

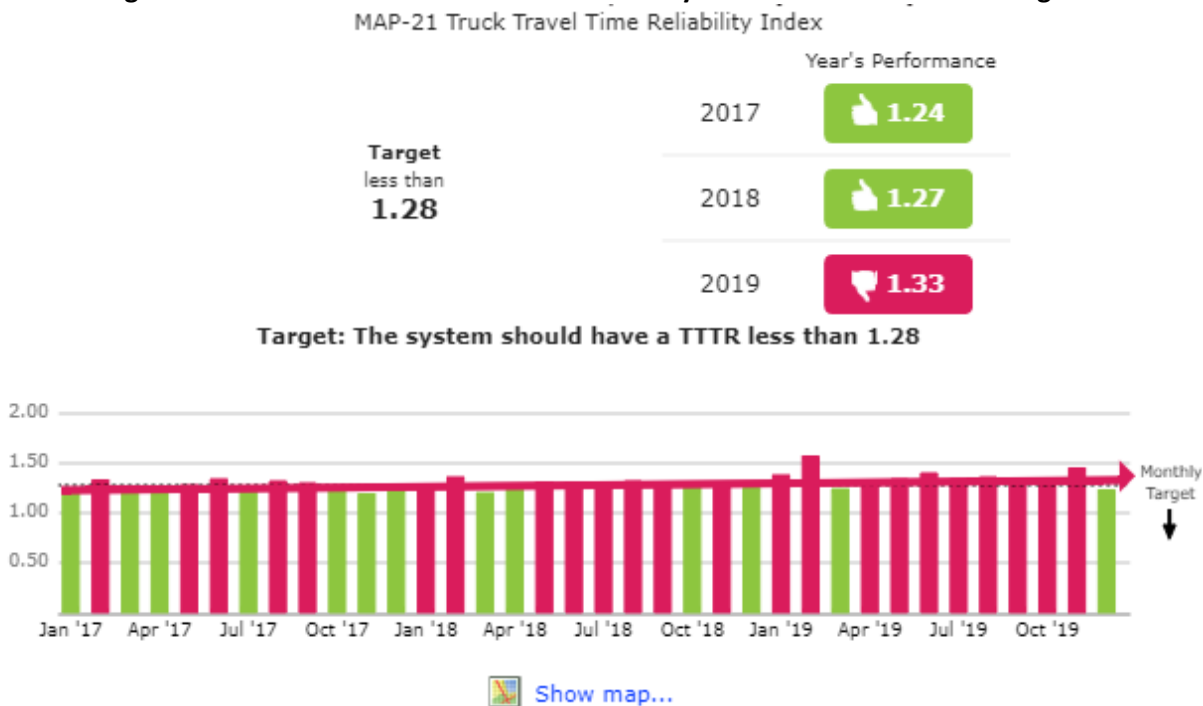
Performance Measure	2019	Five-Year Target	Performance	2050 Target	Performance
		2017-2021			
Interstate Truck Travel Time Reliability Index	1.33	1.28		1.28	

2017-2021 Five-Year Target

The Des Moines Area MPO’s 2017-2021 Five-Year Target for Interstate Truck Travel Time Reliability Index is 1.28.

The Des Moines Area MPO met its Five-Year Target in 2017 and 2018 but not in 2019. There is a downward trend in performance (upward trend in terms of the absolute magnitude of the index) from 2017 to 2019.

Figure 5: 2017-2019 Truck Travel Time Reliability for 2017-2021 Five-Year Target



Calculated using 99.49% of miles in Des Moines Area MPO

Data source: NPMRDS INRIX (2017-2020)

2050 Target

The Des Moines Area MPO's 2050 Target for the Truck Travel Time Reliability index is 1.28.

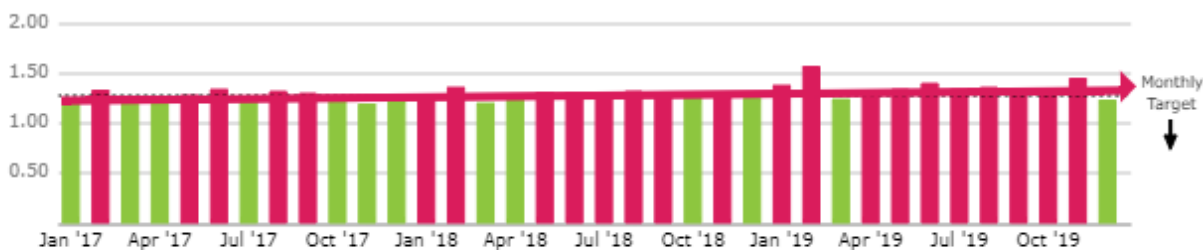
The Des Moines Area MPO met its 2050 Target in 2017 and 2018 but not in 2019. There is a downward trend in performance (upward trend in terms of the absolute magnitude of the index) from 2017 to 2019.

Figure 6: 2017-2019 Truck Travel Time Reliability Index for 2050 Target

MAP-21 Truck Travel Time Reliability Index



Target: The system should have a TTTR less than 1.28



[Show map...](#)

Calculated using 99.49% of miles in Des Moines Area MPO

Data source: NPMRDS INRIX (2017-2020)

Appendix

System Reliability Methodology

Vehicle travel time data are collected in 15-minute intervals within the Des Moines Area MPO's boundary for the following four time periods:

- Weekdays
 - 6 AM to 10 AM
 - 10 AM to 4 PM
 - 4 PM to 8 PM
- Weekends
 - 6 AM to 8 PM

Interstate and Non-Interstate NHS roads are divided into segments known as traffic message channels (TMCs). For each TMC, the level of travel time reliability (LOTR) is calculated for each of the four time periods as the ratio of the 80th percentile travel time to the 50th percentile travel time. A TMC is deemed unreliable if the calculated LOTR is 1.50 or above for any of the four time periods. Each TMC length is multiplied by the annual average daily traffic (AADT) and average vehicle occupancy factor (FHWA default of 1.7) to obtain the person miles traveled. The final percentage metric for Interstate reliability is derived as the sum of all person miles on Interstate TMCs deemed reliable divided by the sum of all person miles on all Interstate TMCs.

Non-Interstate NHS reliability is calculated with the same methodology as above except with Non-Interstate NHS TMCs.

Freight Reliability Methodology

Truck travel time data are collected in 15-minute intervals within the Des Moines Area MPO's boundary for the following five time periods:

- Weekdays
 - 6 AM to 10 AM
 - 10 AM to 4 PM
 - 4 PM to 8 PM
- Weekends
 - 6 AM to 5 PM
- All Days
 - 8 PM to 6 AM

Similar to the System Reliability methodology, for each Interstate traffic message channels (TMCs), the truck travel time reliability (TTTR) index is calculated for each of the five time periods as the ratio of the 95th percentile truck travel time to the 50th percentile truck travel time. The highest TTTR value of the five time periods is then multiplied by the length of the TMC segment. The final TTTR index metric is obtained by adding the TTTR-multiplied TMC lengths together and dividing by the sum of all TMC lengths.




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