METROCOG Fargo-Moorhead Metropolitan Council of Governments

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From: Ari Del Rosario
Date: February 12, 2021
Re: Technical Report on FHWA National Performance Management Measure 3 – Performance of the NHS (Subpart E) & Freight Movement on the Interstate (Subpart F) MN

Overview

On December 4, 2015, the Fixing America's Surface Transportation (FAST) Act was passed. This law continues the performance measure methodology established in MAP-21 with further clarification and the establishment of performance measure targets. These revisions include the establishment of quantifiable targets for each performance measure identified in §490 Subpart E to assess performance on the NHS and §490 Subpart F to assess freight movement on the Interstate.
As part of the target establishment, Metro COG must (1) report their established targets to the respective State DOTs (i.e. resolutions) and (2) report the baseline condition / performance and progress toward the achievement of the targets in the system performance report in the LRTP.

§490 Subpart E

Per §490 Subpart E every four years each State DOT is required by Federal Highway Administration (FHWA) to establish two (2) travel reliability performance measure targets. Travel time reliability is defined by the consistency or dependability of travel times from day to day or across different times of the day. The State DOTs also need to report annually on each of these targets. Below are the performance measure targets for travel reliability:

- Percent of person-miles traveled on the Interstate that are reliable
- Percent of person-miles traveled on the Non-Interstate NHS that are reliable

FHWA requires the use of National Performance Management Research Data Set (NPMRDS) to calculate the travel reliability for each roadway segment. NPMRDS uses passive travel data (probe data) to anonymously track how people travel and at what speed the vehicle travels. The NPMRDS provides a monthly archive of probe data that includes average travel times that are reported every 5-minutes when data is available on the NHS.
Using the NPMRDS probe data, the Level of Travel Time Reliability (LOTTR) can be calculated for four (4) analysis periods using the following ratio:

Longer travel times (80th percentile of travel times)
to
Normal travel times (50th percentile of travel times)

The analysis periods are:

Morning Weekday (6am-10am)
Midday Weekday (10am -4pm)
Afternoon Weekday (4pm-8pm)
Weekends (6am-8pm)

Reliable segments of roadway are considered to have a ratio of 1.50 or less, whereas segments of roadway with a ratio above 1.50 are considered unreliable.
It is important to note that between 2016 and 2017, NPMRDS switched probe data providers from HERE to INRIX. With that switch there was a dramatic increase in the reliability of the data.

§490 Subpart F

Per §490 Subpart F every four years each State DOT is required by Federal Highway Administration (FHWA) to establish one (1) freight movement on the Interstate performance measure target. The State DOTs also need to report annually on each of these targets. Below is the performance measure target for freight movement:

- Truck Travel Time Reliability Index

The NPMRDS provides truck travel times on the Interstate system in 15-minute increments.

Good	7-9
Fair	5-6
Poor	0-4

Data

§490 Subpart E – Auto Travel Time Reliability Data

Within the MN portion of the MPA the Travel Time Reliability (TTR) has been assessed. The following table illustrates the PM3 – TTR within each MN's portion of the MPA and the associated State DOT set performance targets.

	2019 MN Portion of MPA	**MnDOT set Targets**
% of Reliable Person Miles on the Interstate	100%	80%
% of Reliable Person Miles on the Non-Interstate NHS	99%	75%

* Cells filled in green mean that the relative portion of the MPA meets or exceeds the associated State DOT's set targets.

Travel time reliability is about consistency. The higher the percentage of reliability, it means that more often the travel time is the same. For example, it takes a person to travel from point A to point B 15 minutes. If the travel time reliability is 90%, it will take that person 15 minutes to get from point A to point B, 9 out of 10 times. The 10th time it may take the person a longer time or a short time to travel that distance.

§490 Subpart F – Truck Travel Time Reliability Data

Within the MN portion of the MPA the Truck Travel Time Reliability (TTTR) Index has been assessed. The following table illustrates the PM3 – TTTR Index within MN's portion of the MPA and the associated State DOT set performance targets.

	2019 MN Portion of MPA	MnDOT set Targets
Truck Travel Time Reliability Index	1.16	1.50

*Cells filled in green mean that the relative portion of the MPA meets or exceeds the associated State DOT's set targets.

Truck Travel Time Reliability (TTTR) Index is meant to assess the reliability of the travel time it takes to travel a segment of the Interstate System. The higher the number the more unreliable the segment of roadway is. Thus, it is better to have a lower TTTR Index than a higher one. For example, the Twin Cities MPA has a TTTR Index of 2.32 for 2019. That region is significantly more congested along the Interstate system than the Fargo-Moorhead MPA.

Penalties

The penalties for PM3 are unclear.

Recommendation

It is the professional opinion of staff that a MnDOT's targets are consistent with the regions planning goals and efforts.
Metro COG staff are proposing to set consistent targets across the region for Travel Time Reliability. For PM3 – System Reliability, Metro COG staff recommend adopting MnDOT's 2018-2021 targets. Those targets are as follows:

- Percentage of Person Miles Traveled on the Interstate that are Reliable: 80%
- Percentage of Person Miles Traveled on the Non-Interstate NHS that are Reliable: 75%
- Truck Travel Time Reliability Index: 1.5

At their February 18, 2021 meeting, the Policy Board approved the MnDOT 2021 Reliability Targets for PM3 for the Minnesota portion of the MPO, and were adopted with the signing the enclosed resolution.

Methodology

$$100 \times \frac{\sum_{i=1}^{R} SL_i \times AV_i \times OF_j}{\sum_{i=1}^{T} SL_i \times AV_i \times OF_j}$$

R = total number of Interstate System reporting segments that are exhibiting an LOTTR below 1.50 during all of the time periods identified in § 490.511(b)(1)(i) through (iv);
I = Interstate System reporting segment "i";
SL_i = length, to the nearest thousandth of a mile, of Interstate System reporting segment "i";
AV_i = total annual traffic volume to the nearest single vehicle, of the Interstate System reporting segment "i";
J = geographic area in which the reporting segment "i" is located where a unique occupancy factor has been determined;
OF_i = occupancy factor for vehicles on the NHS within a specified geographic area within the State/Metropolitan planning area; and
T = total number of Interstate System reporting segments.

RESOLUTION 2021-R005
OF THE FARGO-MOORHEAD
METROPOLITAN COUNCIL OF GOVERNMENTS

Adopting Performance Targets to Assess NHS Performance and Freight Movement on the Interstate System

Whereas, the U.S. Department of Transportation established performance measures for pavement and bridge condition on the National Highway System as detailed in 23 CFR 490, Subpart E, National Performance Management Measures to Assess Performance of the National Highway System, and 23 CFR 490, Subpart F, National Performance Management Measures to Assess Freight Movement on the Interstate System;

Whereas, the Minnesota Department of Transportation (MnDOT) established performance targets for each of the two Travel Time Reliability performance measures in accordance with 23 CFR 490.507(a); and

Whereas, MnDOT established a performance target to calculate the Freight Reliability performance measure in accordance with 23 CFR 490.607; and

Whereas, metropolitan planning organizations (MPOs) must establish performance targets for the Travel Time Reliability and Freight Reliability measures; and

Whereas, MPOs establish Travel Time Reliability and Freight Reliability targets by either agreeing to plan and program projects so that they contribute to the accomplishment of the State DOT Travel Time Reliability target or Freight Reliability target or commit to a quantifiable target for the metropolitan planning area; and

Now, therefore, be it resolved, that the Fargo-Moorhead Metropolitan Council of Governments agrees to plan and program projects so that the projects contribute to the accomplishment of MnDOT's System Reliability targets for calendar years of 2018 through 2021:

Percentage of Person Miles Traveled on the Interstate that are Reliable: 80%;
Percentage of Person Miles Traveled on the Non-Interstate NHS that are Reliable: 90%;
Truck Travel Time Reliability Index: 1.5.

Fargo-Moorhead Metropolitan Council of Governments

Dave Fenelon, Metro COG Policy Board Chair

Cindy Gray, Metro COG Executive Director

Date: 2/18/21

METROCOG Fargo-Moorhead Metropolitan Council of Governments

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From: Ari Del Rosario
Date: February 12, 2021
Re: Technical Report on FHWA National Performance Management Measure 3 – Performance of the NHS (Subpart E) & Freight Movement on the Interstate (Subpart F) ND

Overview

On December 4, 2015, the Fixing America's Surface Transportation (FAST) Act was passed. This law continues the performance measure methodology established in MAP-21 with further clarification and the establishment of performance measure targets. These revisions include the establishment of quantifiable targets for each performance measure identified in §490 Subpart E to assess performance on the NHS and §490 Subpart F to assess freight movement on the Interstate.
As part of the target establishment, Metro COG must (1) report their established targets to the respective State DOTs (i.e. resolutions) and (2) report the baseline condition / performance and progress toward the achievement of the targets in the system performance report in the LRTP.

§490 Subpart E

Per §490 Subpart E every four years each State DOT is required by Federal Highway Administration (FHWA) to establish two (2) travel reliability performance measure targets. Travel time reliability is defined by the consistency or dependability of travel times from day to day or across different times of the day. The State DOTs also need to report annually on each of these targets. Below are the performance measure targets for travel reliability:

- Percent of person-miles traveled on the Interstate that are reliable
- Percent of person-miles traveled on the Non-Interstate NHS that are reliable

FHWA requires the use of National Performance Management Research Data Set (NPMRDS) to calculate the travel reliability for each roadway segment. NPMRDS uses passive travel data (probe data) to anonymously track how people travel and at what speed the vehicle travels. The NPMRDS provides a monthly archive of probe data that includes average travel times that are reported every 5-minutes when data is available on the NHS.
Using the NPMRDS probe data, the Level of Travel Time Reliability (LOTTR) can be calculated for four (4) analysis periods using the following ratio:

Longer travel times (80th percentile of travel times)
to
Normal travel times (50th percentile of travel times)

The analysis periods are:

Morning Weekday (6am-10am)
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Afternoon Weekday (4pm-8pm)
Weekends (6am-8pm)

Reliable segments of roadway are considered to have a ratio of 1.50 or less, whereas segments of roadway with a ratio above 1.50 are considered unreliable.
It is important to note that between 2016 and 2017, NPMRDS switched probe data providers from HERE to INRIX. With that switch there was a dramatic increase in the reliability of the data.

§490 Subpart F

Per §490 Subpart F every four years each State DOT is required by Federal Highway Administration (FHWA) to establish one (1) freight movement on the Interstate performance measure target. The State DOTs also need to report annually on each of these targets. Below is the performance measure target for freight movement:

- Truck Travel Time Reliability Index

The NPMRDS provides truck travel times on the Interstate system in 15-minute increments.

Good	7-9
Fair	5-6
Poor	0-4

Data

§490 Subpart E – Auto Travel Time Reliability Data

Within the ND portion of the MPA the Travel Time Reliability (TTR) has been assessed. The following table illustrates the PM3 – TTR within ND's portion of the MPA and the associated State DOT set performance targets.

	2019 ND Portion of MPA	NDDOT set Targets
% of Reliable Person Miles on the Interstate	100%	85%
% of Reliable Person Miles on the Non-Interstate NHS	82%	85%

* Cells filled in green mean that the relative portion of the MPA meets or exceeds the associated State DOT's set targets. Cells filled in pink mean that the relative portion of the MPA does not meet the associated State DOT set targets.

Travel time reliability is about consistency. The higher the percentage of reliability, it means that more often the travel time is the same. For example, it takes a person to travel from point A to point B 15 minutes. If the travel time reliability is 90%, it will take that person 15 minutes to get from point A to point B, 9 out of 10 times. The 10th time it may take the person a longer time or a short time to travel that distance.

§490 Subpart F – Truck Travel Time Reliability Data

Within the ND portion of the MPA the Truck Travel Time Reliability (TTTR) Index has been assessed. The following table illustrates the PM3 – TTTR Index within ND's portion of the MPA and the associated State DOT set performance targets.

	2019 ND Portion of MPA	NDDOT set Targets
Truck Travel Time Reliability Index	1.27	1.50

*Cells filled in green mean that the relative portion of the MPA meets or exceeds the associated State DOT's set targets.

Truck Travel Time Reliability (TTTR) Index is meant to assess the reliability of the travel time it takes to travel a segment of the Interstate System. The higher the number the more unreliable the segment of roadway is. Thus, it is better to have a lower TTTR Index than a higher one. For example, the Twin Cities MPA has a TTTR Index of 2.32 for 2019. That region is significantly more congested along the Interstate system than the Fargo-Moorhead MPA.

Penalties

The penalties for PM3 are unclear.

Recommendation

In a metropolitan area it is normal to have a lower percentage of travel time reliability. Metro COG staff do not believe that for our MPA it is appropriate to have a travel time reliability percentage of 85% on the Interstate and the Non-Interstate NHS in North Dakota. It is the professional opinion of staff that MnDOT's targets are more consistent with the regions planning goals and efforts.

Thus, Metro COG staff are proposing to set consistent targets across the region for Travel Time Reliability. For PM3 – System Reliability, Metro COG staff recommend adopting MnDOT's 2018-2021 targets for North Dakota. Those targets are as follows:

- Percentage of Person Miles Traveled on the Interstate that are Reliable: 80%
- Percentage of Person Miles Traveled on the Non-Interstate NHS that are Reliable: 75%
- Truck Travel Time Reliability Index: 1.5

At their February 18, 2021 meeting, the Policy Board approved the NDDOT 2021 Reliability Targets for PM3 for the North Dakota portion of the MPO, and were adopted with the signing the enclosed resolution.

Methodology

$$100 \times \frac{\sum_{i=1}^{R} SL_i \times AV_i \times OF_j}{\sum_{i=1}^{T} SL_i \times AV_i \times OF_j}$$

R = total number of Interstate System reporting segments that are exhibiting an LOTTR below 1.50 during all of the time periods identified in § 490.511(b)(1)(i) through (iv);
I = Interstate System reporting segment "i";
SL_i = length, to the nearest thousandth of a mile, of Interstate System reporting segment "i";
AV_i = total annual traffic volume to the nearest single vehicle, of the Interstate System reporting segment "i";
J = geographic area in which the reporting segment "i" is located where a unique occupancy factor has been determined;
OF_i = occupancy factor for vehicles on the NHS within a specified geographic area within the State/Metropolitan planning area; and
T = total number of Interstate System reporting segments.

RESOLUTION 2021-R006
OF THE FARGO-MOORHEAD
METROPOLITAN COUNCIL OF GOVERNMENTS

Adopting Performance Targets to Assess NHS Performance and Freight Movement on the Interstate System

Whereas, the U.S. Department of Transportation established performance measures for pavement and bridge condition on the National Highway System as detailed in 23 CFR 490, Subpart E, National Performance Management Measures to Assess Performance of the National Highway System, and 23 CFR 490, Subpart F, National Performance Management Measures to Assess Freight Movement on the Interstate System;

Whereas, the North Dakota Department of Transportation (NDDOT) established performance targets for each of the two Travel Time Reliability performance measures in accordance with 23 CFR 490.507(a); and

Whereas, NDDOT established a performance target to calculate the Freight Reliability performance measure in accordance with 23 CFR 490.607; and

Whereas, metropolitan planning organizations (MPOs) must establish performance targets for the Travel Time Reliability and Freight Reliability measures; and

Whereas, MPOs establish Travel Time Reliability and Freight Reliability targets by either agreeing to plan and program projects so that they contribute to the accomplishment of the State DOT Travel Time Reliability target or Freight Reliability target or commit to a quantifiable target for the metropolitan planning area; and

Now, therefore, be it resolved, that the Fargo-Moorhead Metropolitan Council of Governments agrees to plan and program projects so that the projects contribute to the accomplishment of NDDOT's System Reliability targets for calendar years of 2018 through 2021:

Percentage of Person Miles Traveled on the Interstate that are Reliable: 85%;
Percentage of Person Miles Traveled on the Non-Interstate NHS that are Reliable: 85%;
Truck Travel Time Reliability Index: 1.5.

Fargo-Moorhead Metropolitan Council of Governments

Dave Fenelon, Metro COG Policy Board Chair

Cindy Gray, Metro COG Executive Director

Date: 2/18/2021