

Northwest RPO Performance Measures

Performance Measure 1:

Pursuant to the Code of Federal Regulations (23 CFR § 490) regarding National Performance Management Measures for the Highway Safety Improvement Program (HSIP), Pennsylvania has established the 2020 targets for the following Safety Performance Measures:

- 1) Number of fatalities
- 2) Rate of fatalities per 100 million Vehicle Miles Travelled (VMT)
- 3) Number of serious injuries
- 4) Rate of serious injuries per 100 million VMT
- 5) Number of non-motorized fatalities and serious injuries.

The Pennsylvania Department of Transportation (PennDOT) is required to establish these targets by August each year.

The RPO is required to establish targets within 180 days of PennDOT establishing its targets by agreeing to plan and program projects in support of the PennDOT targets, or by establishing their own quantifiable targets.

A state is determined to have met or made significant progress toward meeting established targets if the outcome in 4 of 5 performance measures is better than the baseline number. For Pennsylvania's 2018 targets, the Federal Highway Administration (FHWA) will report this determination by March 31, 2020.

Preliminary data indicate Pennsylvania did not meet our 2018 targets and will be subject to the provisions of 23 United States Code § 148 (i). This will require the Department to submit an implementation plan that identifies gaps, develops strategies, action steps and best practices, and includes a financial and performance review of all HSIP funded projects. This plan will be due June 30, 2020. In addition, we will be required to obligate in Federal Fiscal Year (FFY) 2021 an amount equal to the FFY 2017 HSIP apportionment.

The performance measures 1 that the RPO adopted are:

Performance Measure	5-year Rolling Averages		
	TARGET	ACTUAL	BASELINE
	2016-2020	2016-2020	2014-2018
Number of Fatalities	34.8		30.6
Fatality Rate	1.494		1.251
Number of Serious Injuries	98.9		98.4
Serious Injury Rate	4.246		4.022
Number of Non-motorized Fatalities and Serious Injuries	12.5		11.8

* Future VMT estimated to be 0.5% higher per year starting in 2019

Performance Measure 2:

The Moving Ahead for Progress in the 21st Century Act (MAP-21) and Fixing America's Surface Transportation (FAST) Act established a series of performance measures to ensure effective use of Federal transportation funds. Title 23 Part 490 of the Code of Federal Regulations (23 CFR 490) establishes measures to assess pavements on the National Highway System (NHS), bridges carrying the NHS, and pavements on the Interstate, which are collectively referred to as the PM-2 measures. 23 CFR 490.105 establishes measures to assess the performance of the NHS, freight movement on the Interstate, and the Congestion Mitigation and Air Quality Improvement (CMAQ) Program. These measures are collectively referred to as the PM-3 measures. The RPO elected to adopt the State's PM2 & PM3.

PM-2 Performance Measures include:

1. Percentage of pavements on the Interstate System in Good condition
2. Percentage of pavements on the Interstate System in Poor condition
3. Percentage of pavements on the NHS (excluding the Interstate System) in good condition
4. Percentage of pavements on the NHS (excluding the Interstate System) in Poor condition
5. Percentage of NHS bridge deck area classified as in Good condition
6. Percentage of NHS bridge deck area classified as in Poor condition

Performance Measure 3:

PM-3 Performance Measures include:

1. Percent of Person-miles Traveled on the Interstate System that are Reliable
2. Percent of Person-miles Traveled on the Non-Interstate NHS that are Reliable
3. Interstate System Truck Travel Time Reliability Index
4. Annual Hours of Peak-Hour Excessive Delay (PHED) per Capita
5. Percent Non-Single Occupant Vehicle (SOV) Travel
6. On-Road Mobile Source Emissions Reduction for CMAQ-funded Projects

For the three reliability measures, PennDOT has set statewide targets (sub-state targets are optional). Metropolitan Planning Organizations (MPOs) baseline reliability measures have been provided for informative purposes only. For the first performance period, the annual hours of excessive delay and non-SOV travel measures must be developed for the Pittsburgh and Philadelphia urbanized areas only. PennDOT has worked closely with the Southwestern Pennsylvania Commission (SPC) and the Delaware Valley Regional Planning Commission (DVRPC) to develop these targets and to include the necessary multi-state coordination partners in the target-setting process.

The mobile source emissions measure targets are produced statewide and for each MPO that is in nonattainment or maintenance of the National Ambient Air Quality Standards.

Federal regulations require RPOs to establish targets for each performance measure, within 180 days of PennDOT establishing targets either by agreeing to plan and program projects in support of PennDOT targets, or by committing to their own quantifiable targets. The Federal Highway Administration (FHWA) will determine annually whether PennDOT has met, or has made significant progress toward meeting established statewide targets.

PM-2 Baseline & Target Values for Pavement Measures

Interstate:

Measure	2017 Baseline	2019 2-year Target	2021 4-year Target
Percentage in Good Condition	67.2%	<i>N/A</i>	60.0%
Percentage in Poor Condition	0.4%	<i>N/A</i>	2.0%

NHS Non-Interstate:

Measure	2017 Baseline	2019 2-year Target	2021 4-year Target
Percentage in Good Condition	36.8%	35.0%	33.0%
Percentage in Poor Condition	2.3 %	4.0%	5.0%

Definitions:

Pavement performance measures required for FHWA reporting include four distress components:

- International Roughness Index (IRI) - Quantifies how rough the pavement is by measuring the longitudinal profile of a traveled wheel track and generating a standardized roughness value in inches per mile.
- Cracking - Measures the percentage of pavement surface that is cracked.
- Rutting- Measures the depth of ruts (surface depression) in bituminous pavement in inches.
- Faulting - Quantifies the difference in elevation across transverse concrete pavement joints in inches.

These distress measurements translate to good, fair, or poor condition scores. The following table summarizes the pavement condition metrics for IRI, cracking percent, rutting, and faulting:

Rating	Good	Fair	Poor
IRI (inches/mile)	<95	95-170	>170
Cracking Percentage (%)	<5	CRCP: 5-10 Jointed: 5-15 Asphalt: 5-20	CRCP: >10 Jointed: >15 Asphalt: >20
Rutting (inches)	<0.20	0.2Q-0.40	>0.40
Faulting (inches)	<0.10	0.1D-0.15	>0.15

- IRI and cracking apply to both bituminous and concrete pavements, while rutting is exclusively for bituminous and faulting is exclusively for concrete. Each one-tenth-mile pavement section is considered in good condition if all three of its distress components are rated as good, and in poor

condition if two or more of its three distress components are rated as poor.

- 23 CFR part 490.315(a), Subpart C, requires that no more than 5 percent of a state's NHS Interstate lane-miles be in poor pavement condition.
- PennDOT's pavement condition target (its desired state of good repair) for NHS Interstate roadways mirrors the federal standard: no more than 5 percent of Pennsylvania's NHS Interstate pavements shall be rated in poor condition.
- PennDOT's pavement condition targets are consistent with its asset management objectives of maintaining the system at the desired state of good repair, managing to LLCC, and achieving national and state transportation goals.
- 23 CFR 490.313(b)(4)(i) requires the total mainline lane-miles of missing, invalid, or unresolved sections for Interstate System and non-Interstate NHS shall be limited to no more than 5 percent of the total lane miles. A section is missing if any one of the data requirements specified in 23 CFR 490.309 and 23 CFR 490.311(c) are not met or that reported section does not provide sufficient data to determine its Overall Condition.

Methodology:

- Since no historical data at tenth-mile increments exists, previously collected segment-level data for the years 2013-2016 was quantified and used to determine deterioration rates for each condition. For each segment, the change of each condition value was determined from 2013 to 2014, from 2014 to 2015, and from 2015 to 2016.
- If a value was missing for any year, no change was calculated. If a condition value equaled zero for any year, it was excluded based on the assumption that a significant repair (i.e., a project) had been completed. The change in condition for each year was averaged for each segment; the segment averages were then averaged to determine an overall deterioration rate for each condition.
- There are instances where there was incremental improvement from one year to the next for the conditions. This is attributed to minor maintenance and/or bias in the collection process. These values were included in the analysis. The overall deterioration rate was then increased by 3 percent to reflect the impact of inflation. Since minor maintenance is reflected in the deterioration rate, and our ability to continue to perform those activities is affected by inflation, as a worst case, the deterioration would increase proportionately to the decrease in spending power for this work.
- Where the segment average resulted in a negative number (i.e., the condition value improved over the three year period), a value of zero was used for the segment average since deterioration was not reflected in that segment average value. The resultant deterioration rates are provided in the following table:

Condition	Interstate	NHS Non-Interstate
Faulting (inch)	0.00024	0.00153
Concrete Cracking	0.94%	0.89%
Rutting (inch)	0.00651	0.00890
Bituminous Cracking	0.56%	0.90%

- The appropriate deterioration rates were applied to each condition, and values for each tenth-mile increment were determined for the years 2021, 2025, and 2029. These values reflect a state of "do nothing."

- Based on data from MPMS, all projects programmed on the Interstate and NHS non-Interstate networks for the next four years (2018-2021) were compiled. The mileage of these programmed projects that affected pavements in good, fair, and poor condition was determined, and these proportions were projected over the next four-year period (2022-2025) and the following four-year period (2026-2029). Since the TYP is not fully developed beyond the first four years, projecting programmed mileage for the first four years is a better representation of the volume of work to be expected, assuming constant funding while reducing affected miles by 3 percent annual inflation.
- Given the mileages in good, fair, and poor condition, and the projected programmed miles in each condition, resultant mileages were determined for the years 2021, 2025, and 2029. The mileage with missing data was assumed constant over this duration.

PM-2 Baseline and Target Values for Bridge Measures

Measure	2017 Baseline	2019 2-year Target	2021 4-year Target
Percentage in Good Condition	25.6%	25.8%	26.0%
Percentage in Poor Condition	5.5%	5.6%	6.0%

Definitions:

Separate bridge structure condition ratings are collected for deck, superstructure, and substructure components during regular inspections using the National Bridge Inventory Standards. For culvert structures, only one condition rating is collected (the culvert rating). A rating of 9 to 0 on the FHWA condition scale is assigned to each component. Based on its score a component is given a good, fair, or poor condition score rating.

The FHWA scoring system for bridge condition metrics for deck, superstructure, substructure, and culvert components is summarized in the following table:

Rating	Good	Fair	Poor
Deck	≥ 7	5 or 6	≤ 4
Superstructure	≥ 7	5 or 6	≤ 4
Substructure	≥ 7	5 or 6	≤ 4
Culvert	≥ 7	5 or 6	≤ 4

- A structure's overall condition rating is determined by the lowest rating of its deck, superstructure, substructure, and/or culvert. If any of the components of a structure qualify as poor, the structure is rated as poor.
- 23 CFR 490.411(a) requires that no more than 10 percent of a state's total NHS bridges by deck area are in poor condition.
- PennDOT's bridge condition targets are consistent with its asset management objectives of maintaining the system at the desired state of good repair, managing to LLCC, and achieving

national and state transportation goals.

Methodology:

- Several different types of models have been created and run with historic data to determine the level of accuracy of the predictive models based on previous deterioration investigations.
- The outputs from the best performing models were combined and used in conjunction with historic trends to produce a short-term projection

PM-3 Baseline and Target Values for Reliability and Peak Hour Delay

Measures (Baseline Estimated using R/T/5 Data Extract from May 8, 2018)

Measure	2017 Baseline	²⁰¹⁹ 2-year Target	²⁰²¹ 4-year Target
Interstate Reliability {Statewide}	89.8%	89.8%	89.8%
Non-Interstate Reliability {Statewide}	87.4%	N/A	87.4%
Truck Reliability Index {Statewide}	1.34	1.34	1.34

