Guidance: FHWA Procedure for Safety Performance Measure Computation and State Target Achievement Assessment

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1 Overview

Safety Performance Management (Safety PM) is part of the overall Transportation Performance Management (TPM) program, which the Federal Highway Administration (FHWA) defines as a strategic approach that uses system information to make investment and policy decisions to achieve national performance goals. The Safety PM Final Rule\(^1\) is codified under Title 23 of the Code of Federal Regulations (CFR)\(^2\), part 490, subpart B. The regulation establishes national safety performance requirements for the purposes of carrying out the Highway Safety Improvement Program (HSIP) and to assess fatalities and serious injuries on all public roads. Therefore, the purpose of this document is to provide the data sources and calculations for the safety performance measures that FHWA will use when determining whether a State DOT has met or made significant progress towards meeting their safety performance targets. This document is guidance only and does not create any requirements other than those stipulated in statute or regulations.

1.1 Safety Performance Measures

The Safety PM regulation (23 CFR 490.207(a)) established five safety performance measures for the purpose of carrying out the HSIP. The safety performance measures are:

1. Number of fatalities;
2. Rate of fatalities;
3. Number of serious injuries;
4. Rate of serious injuries; and
5. Number of non-motorized fatalities and non-motorized serious injuries.

The main attributes of the safety performance measures are as follows:

- Safety targets are established annually for each of the safety performance measures (23 CFR 490.209(a)).
- Each safety performance measure is based on a 5-year rolling average (23 CFR 490.207(b)).
- All rate measures are expressed in 100 million vehicle miles traveled (VMT) (23 CFR 490.205).
- Safety targets are reported by each State Department of Transportation (DOT) to FHWA in the State HSIP Annual Report (23 CFR 490.213(a)).
- Safety targets must be identical for the common measures in the National Highway Traffic Safety Administration (NHTSA) Highway Safety Plan (HSP) (23 CFR 490.209(a)(1)).
- Safety performance measures are applicable to all public roads covered by the HSIP (23 CFR 490.203).
- The performance targets represent the anticipated performance outcome for all public roads regardless of ownership and functional class (23 CFR 490.209(a)(3)).

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2 Code of Federal Regulations: [https://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=7c955ec3c47ba5f35529b89f21c02213&mc=true&n=pt23.1.490&r=PART&ty=HTML](https://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=7c955ec3c47ba5f35529b89f21c02213&mc=true&n=pt23.1.490&r=PART&ty=HTML)
The FHWA will evaluate whether a State DOT has met or made significant progress toward meeting performance targets (23 CFR 490.211(c)).

The Metropolitan Planning Organizations (MPO) will establish performance targets for each of the measures (23 CFR 490.209(c)) no later than 180 days after the respective State DOT establishes and reports targets in the State HSIP annual report (23 CFR 490.209(c)(1)).

The MPO’s will annually report their established safety targets to their respective State DOT, in a manner that is documented and mutually agreed upon by both parties (23 CFR 490.213(b)).

The term Performance Year (PY) is being used for the purposes of this document, but is not a defined term under 23 CFR part 490. Since all safety performance measures are based on 5-year rolling averages, this document will refer to the last calendar year (CY) of the 5-year period as the Performance Year. For example, if the last calendar year of the 5-year period is CY2018, it would include years 2014 through 2018 and be denoted as PY2018, as shown in the example in Figure 1.

![Figure 1 – Performance Year Example](image)

To ensure consistent definitions, a distinction between metric and measure was made in 23 CFR 490.101.

- A metric is defined as a quantifiable indicator of performance or condition (e.g., annual number of fatalities).
- A measure is defined as an expression based on a metric that is used to establish targets and to assess progress toward meeting established targets (e.g., 5-year rolling average of number of fatalities).

1.2 Met or Made Significant Progress

The FHWA will determine annually whether a State DOT has “met or made significant progress towards meeting its safety performance targets.” The FHWA will not make determinations for MPO targets established under 23 CFR 490.209(c) or State DOT additional targets under 23 CFR 490.209(b).

For the purpose of this document, the following terms will be used:

- “Actual performance” is the outcome for a performance measure for a performance year.
- “Baseline performance” is the outcome for a performance measure for the year prior to the establishment of the State’s target.

A State DOT is determined to have “met or made significant progress toward meeting its safety performance targets” when at least four of the performance targets established are: (1) met; or (2) not met but made significant progress towards meeting the targets. A performance target is met when the
actual performance is less than or equal to the target. If the actual performance is greater than the target, then the target has not been met.

If FHWA determines that a target is not met, FHWA will assess whether the State DOT has made significant progress towards meeting that target by comparing the actual performance and the baseline performance. If the target has not been met, but the actual performance is less than the baseline performance (indicates that a State DOT has improved performance compared to the baseline performance), then FHWA will determine that the State DOT has made significant progress towards meeting that target. If the actual performance is greater than the baseline performance, then FHWA will determine that the State DOT has not made significant progress towards meeting that target.

The FHWA will make the described evaluations for each of the five performance measures. If FHWA determines that four out of the five performance targets reported by a State DOT have been met (the actual performance is less than or equal to the target) or made significant progress towards meeting the target (the actual performance is less than the baseline performance), then that State DOT will be determined to have “met or made significant progress towards achieving its safety performance targets.”

1.3 Data Sources for Computing Safety Performance Measures

The FHWA will use public data sources to assess safety target achievement and to determine whether a State DOT has met or made significant progress towards meeting their performance targets. These data sources are defined below.

1.3.1 Fatality Analysis Reporting System

The safety performance metrics for the annual number of fatalities and the annual numbers of non-motorized fatalities come from the NHTSA Fatality Analysis Reporting System (FARS) database. The FARS data is published annually and becomes available approximately in December of each calendar year. For example, fatality data for CY2018 will be available by December 2019. The FARS Query Tool can be used to access fatality data. The FARS data contains both final data on fatalities for previous years and preliminary data on fatalities for the most recent year.

- The FARS Annual Report File (ARF) is published annually and contains preliminary data on fatalities for the most current year.
- The Final FARS data replace the FARS ARF and contains additional cases or updates to cases that became available after the FARS ARF was released, and is no longer subject to future changes.

When computing the performance measures for Number of Fatalities and Fatality Rate, the FARS ARF data are used if Final FARS data are not available, as stipulated in CFR 490.207(b). Please note that the year of the FARS data file refers to the calendar year when the fatalities occurred.

The FARS Query Tool is available at:

https://www-fars.nhtsa.dot.gov//QueryTool/QuerySection/SelectYear.aspx
1.3.2 Highway Safety Improvement Program Annual Report

The safety performance metrics for number of serious injuries and number of non-motorized serious injuries comes from the State DOT data submitted in the HSIP Annual Report. As specified in 23 CFR 490.209(a)(5), the State DOT must include, in the HSIP Annual Report, the most recent five years of serious injury data and non-motorized serious injury data by calendar year. The HSIP Annual Report also contains safety performance targets for the five performance measures. The year of the HSIP Annual Report refers to the year of reporting. For example, the 2017 HSIP Annual Report means the report was submitted in 2017 (by August 31, 2017) and includes the baseline performance for PY2016 and the performance targets for PY2018. However, FHWA will use the most recent HSIP Annual Report that is available at the time of assessment to collect the baseline data for serious injuries and non-motorized serious injuries. The HSIP Annual Report data becomes available by December of each calendar year. A download of the HSIP Annual Report data is available via a Microsoft Excel spreadsheet from the HSIP Program Manager.

The HSIP Reports are available at: https://safety.fhwa.dot.gov/hsip/reports/

1.3.3 Highway Statistics Series

The safety performance metric for VMT estimates are provided in FHWA’s Highway Statistics Series Publication in Table VM-2 (Vehicle-miles of travel, by functional system). The Highway Statics Series is available at: https://www.fhwa.dot.gov/policyinformation/statistics.cfm

The VMT numbers are used as the denominator to calculate the rate of fatalities and the rate of serious injuries per 100 million VMT. The VMT data in HPMS becomes available approximately in December of each calendar year. For example, in December 2019, VMT estimates for CY2018 will be available. Please note that the year in the HPMS data and the Highway Statistics Series refers to the calendar year the VMT occurred.

Table 1 below provides a description of the five safety performance measures and the corresponding data sources. These data sources will be used to compute the safety performance measures and to assess whether a State DOT has met or made significant progress towards meeting their safety performance targets.
<table>
<thead>
<tr>
<th>Safety Performance Measures</th>
<th>Safety Performance Measure Description</th>
<th>Data</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of Fatalities</strong></td>
<td>The total number of persons suffering fatal injuries in a motor vehicle crash during a calendar year</td>
<td>Fatalities</td>
<td>Final FARS and FARS ARF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Target</td>
<td>HSIP Annual Report</td>
</tr>
<tr>
<td><strong>Rate of Fatalities</strong></td>
<td>The ratio of the total number of fatalities to the number of VMT (expressed in 100 million VMT)</td>
<td>Fatalities</td>
<td>Final FARS and FARS ARF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VMT</td>
<td>VM-2 Table in Highway Statistics Series</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Target</td>
<td>HSIP Annual Report</td>
</tr>
<tr>
<td><strong>Number of Serious Injuries</strong></td>
<td>The total number of persons suffering at least one serious injury in a motor vehicle crash during a calendar year</td>
<td>Serious injuries</td>
<td>HSIP Annual Report</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Target</td>
<td>HSIP Annual Report</td>
</tr>
<tr>
<td><strong>Rate of Serious Injuries</strong></td>
<td>The ratio of the total number of serious injuries to the number of VMT (expressed in 100 million VMT)</td>
<td>Serious injuries</td>
<td>HSIP Annual Report</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VMT</td>
<td>VM-2 Table in Highway Statistics Series</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Target</td>
<td>HSIP Annual Report</td>
</tr>
<tr>
<td><strong>Number of Non-Motorized Fatalities and Non-Motorized Serious Injuries</strong></td>
<td>The total number of fatalities with the FARS person attribute codes: (5) Pedestrian, (6) Bicyclist, (7) Other Cyclist, (8) Person on Personal Conveyances and the total number of serious injuries where the injured person is, or equivalent to, a pedestrian (2.2.36) or a pedalcyclist (2.2.39) as defined in the American National Standards Institute (ANSI) D16.1-2007.</td>
<td>Non-motorized fatalities</td>
<td>Final FARS and FARS ARF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-motorized serious injuries</td>
<td>HSIP Annual Report</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Target</td>
<td>HSIP Annual Report</td>
</tr>
</tbody>
</table>
2 Safety Performance Measure Computation Equations

This section provides the computation equations for the five safety performance measures. Please note that annual fatality metrics are a whole number while the rate metrics and calculated measures are rounded to the nearest decimal place, as indicated in each of the equations.

2.1 Number of Fatalities

Number of Fatalities Measure \(PY\) =

\[
\frac{\text{Fatalities}_{PY-4} + \text{Fatalities}_{PY-3} + \text{Fatalities}_{PY-2} + \text{Fatalities}_{PY-1} + \text{Fatalities}_{PY}}{5}
\]

Where,

Number of Fatalities Measure \(PY\) = Calculated fatality measure for the PY (rounded to the nearest tenth decimal place)

Fatalities \(PY\) = Annual number of fatalities metric (whole number)

2.2 Rate of Fatalities

Rate of Fatalities Measure \(PY\) =

\[
\frac{\left(\frac{\text{Fatalities}_{PY-4}}{\text{Total VMT}_{PY-4}}\right) + \left(\frac{\text{Fatalities}_{PY-3}}{\text{Total VMT}_{PY-3}}\right) + \left(\frac{\text{Fatalities}_{PY-2}}{\text{Total VMT}_{PY-2}}\right) + \left(\frac{\text{Fatalities}_{PY-1}}{\text{Total VMT}_{PY-1}}\right) + \left(\frac{\text{Fatalities}_{PY}}{\text{Total VMT}_{PY}}\right)}{5}
\]

Where,

Rate of Fatalities Measure \(PY\) = Calculated fatality rate measure for the PY (rounded to the nearest thousandth decimal place)

Fatalities \(PY\) = Annual number of fatalities metric (whole number)

Total VMT \(PY\) = Annual VMT per 100 million metric (calculated per 100 million and rounded to the nearest hundredth decimal place)

\[
\frac{\text{Fatalities}_{PY}}{\text{Total VMT}_{PY}} = \text{Annual fatality rate metric (rounded to the nearest hundredth decimal place)}
\]

2.3 Number of Serious Injuries

Number of Serious Injuries Measure \(PY\) =

\[
\frac{\text{Serious Injuries}_{PY-4} + \text{Serious Injuries}_{PY-3} + \text{Serious Injuries}_{PY-2} + \text{Serious Injuries}_{PY-1} + \text{Serious Injuries}_{PY}}{5}
\]

Where,
Number of Serious Injuries Measure $p_Y = \text{Calculated serious injury measure for the PY (rounded to the nearest tenth decimal place)}$

Serious Injuries $p_Y = \text{Annual number of serious injuries metric (whole number)}$

### 2.4 Rate of Serious Injuries

**Rate of Serious Injuries Measure $p_Y = \boxed{\left(\frac{\text{Serious Injuries}_{p_Y-4}}{\text{Total VMT}_{p_Y-4}} + \frac{\text{Serious Injuries}_{p_Y-3}}{\text{Total VMT}_{p_Y-3}} + \frac{\text{Serious Injuries}_{p_Y-2}}{\text{Total VMT}_{p_Y-2}} + \frac{\text{Serious Injuries}_{p_Y-1}}{\text{Total VMT}_{p_Y-1}} + \frac{\text{Serious Injuries}_{p_Y}}{\text{Total VMT}_{p_Y}}\right)}$} / 5

Where,

Rate of Serious Injuries Measure $p_Y = \text{Calculated serious injury rate measure for the PY (rounded to the nearest thousandth decimal place)}$

Serious Injuries $p_Y = \text{Annual number of serious injury metric (whole number)}$

Total VMT $p_Y = \text{Annual VMT (per 100 million) metric (calculated per 100 million and rounded to the nearest hundredth decimal place)}$

Serious Injuries $p_Y$ \(\text{Total VMT}_{p_Y} \) = Annual serious injury rate metric (rounded to the nearest hundredth decimal place)

### 2.5 Number of Non-Motorized Fatalities and Non-Motorized Serious Injuries

**Number of Non-Motorized Measure $p_Y = \boxed{\left(\frac{\text{Non-Motorized}_{p_Y-4} + \text{Non-Motorized}_{p_Y-3} + \text{Non-Motorized}_{p_Y-2} + \text{Non-Motorized}_{p_Y-1} + \text{Non-Motorized}_{p_Y}}{\text{Total VMT}_{p_Y}}\right)}$} / 5

Where,

Number of Non-Motorized Measure $p_Y = \text{Calculated number of non-motorized fatalities and number of serious injury measure for the PY (rounded to the nearest tenth decimal place)}$

Non-Motorized $p_Y = \text{Combined annual number of non-motorized fatalities and non-motorized serious injuries metric (whole number)}$
3 Obtaining Number of Fatality Metrics through NHTSA FARS

3.1 Obtaining the Metric for Number of Fatalities Measures

The following instructions detail how to obtain the annual number of fatalities metric by State using the FARS Query Tool.

**Step 1:** Go to ‘Query FARS Data’: [http://www-fars.nhtsa.dot.gov/QueryTool/QuerySection/SelectYear.aspx](http://www-fars.nhtsa.dot.gov/QueryTool/QuerySection/SelectYear.aspx).

**Step 2:** Select a Year in the drop-down list and click ‘Submit’

![Step 2 Image](image1.png)

**Step 3:** Select ‘Option 1’ and click ‘Submit’

![Step 3 Image](image2.png)
**Step 4:** Under the ‘Person fields’ section, check ‘Injury Severity’ and ‘Person Type’ and click ‘Submit’

![Image of the page showing the check boxes for 'Injury Severity' and 'Person Type' with a red circle highlighting them and a 'Submit' button]

**Step 5:** Select ‘All’ for State, select ‘(4) Fatal Injury (K)’ for Injury Severity, select ‘All’ for Person Type and click ‘Univariate Tabulation’

![Image of the univariate tabulation page with 'All' highlighted for State, Injury Severity, and Person Type, and a 'Univariate Tabulation' button]
**Step 6:** From the drop-down list under ‘Select Data to Count’ select ‘Number of Persons’ and click ‘Submit’.

**Step 7:** The Number of Fatalities metrics by State can be obtained as shown below by exporting a text (.txt) file or a Microsoft Excel (.xls) spreadsheet.
Step 8: To find out whether metric values are from FINAL FARS or FARS ARF, click ‘File Versions’ as highlighted below.

![File Versions](image)

Step 9: The following pop-box will open detailing the data year, file version and release date.

![Data Year Table](image)
3.2 Obtaining the Metric for Numbers of Non-Motorized Fatalities Measure

The following instructions detail how to obtain the annual number of non-motorized fatalities metric by State using the FARS Query Tool.

**Steps 1 through 4:** Follow Steps 1 through 4 above for obtaining a metric for the number of fatalities.

**Step 5:** Select ‘All’ for State, select ‘(4) Fatal Injury (K)’ for Injury Severity, select ‘(5) Pedestrian, (6) Bicyclists, (7) Other Cyclists, and (8) Person and Personal Conveyances’ for Person Type and click ‘Univariate Tabulation’.

![Univariate Tabulation](image)
Step 6: From the drop-down list under ‘Select Data to Count’ select ‘Number of Persons’ and then click ‘Submit’.

Steps 7 through 9: The Number of Non-Motorized Fatalities metrics by State can be obtained by exporting a text (.txt) file or a Microsoft Excel (.xls) spreadsheet (similar to the Steps 7 through 9 above for obtaining a metric for the number of fatalities).
Obtaining VMT Metrics through the HPMS Highway Statistics Series

The following instructions detail how to obtain the annual VMT by State using the HPMS Highway Statistics Series.

**Step 1:** Go to the Highway Statistics Series website at: [https://www.fhwa.dot.gov/policyinformation/statistics.cfm](https://www.fhwa.dot.gov/policyinformation/statistics.cfm)

**Step 2:** Select the year of the Highway Statistics and click ‘Go’
Step 3: Under ‘5. Highway Travel’ select VM-2 Table ‘5.4.1 Vehicle-miles of travel, by functional system’

Step 4: The total VMT for each State is listed in the last column under ‘Total’ and can either be viewed (as shown below) or downloaded as a Microsoft Excel file
5 Example Safety Performance Measure Computation and Determining Significant Progress

This section provides an example of how to calculate the performance measures for PY2018. The approximate time of measure calculation would be December 2019, which is approximately when the FARS, VMT, and HSIP data all become available. As noted previously, FHWA will use the most recent HSIP Annual Report that is available for collecting baseline performance data for serious injuries and non-motorized serious injuries. This example illustrates the computation of the five safety performance measures and whether a State DOT met or made significant progress towards meeting their performance targets. Table 2 below provides a list of data sources and the corresponding years required for calculating PY2018 actual performance and PY2016 baseline performance for the five safety performance measures.
### Table 2 – 2018 Safety Performance Measure Data Sources for Measure Calculation

<table>
<thead>
<tr>
<th>Safety Performance Measures</th>
<th>Metrics for PY2018 Actual Performance</th>
<th>PY2018 Target</th>
<th>Metrics for PY2016 Baseline Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Safety Data</td>
<td>VMT Data</td>
<td>Safety Data</td>
</tr>
<tr>
<td>Number of Fatalities</td>
<td>2014-2017 Final FARS and 2018 FARS ARF from NHTSA FARS</td>
<td>N/A</td>
<td>2017 HSIP Annual Report</td>
</tr>
<tr>
<td>Number of Serious Injuries</td>
<td>2019 HSIP Annual Report</td>
<td>N/A</td>
<td>2017 HSIP Annual Report</td>
</tr>
<tr>
<td>Number of Non-Motorized Fatalities and Non-Motorized Serious Injuries</td>
<td>Fatality Numbers: 2014-2017 Final FARS and 2018 FARS ARF from NHTSA FARS</td>
<td>N/A</td>
<td>2017 HSIP Annual Report</td>
</tr>
</tbody>
</table>

Table 3 represents sample values of the metrics for each of the performance measures. The following example demonstrates the calculations of the 5-year rolling average for each of the performance measures actual performance and baseline performance. If the actual performance is less than or equal to the target, no further analysis would be required. If the actual performance is greater than the target, the baseline performance is calculated to determine if actual performance is better than the baseline performance. In this example, the performance year is 2018 (PY2018) and the baseline performance year is 2016 (PY2016).
Table 3 – Sample Safety Performance Metrics for Measure Calculations

<table>
<thead>
<tr>
<th>Year</th>
<th>Fatalities (FARS)</th>
<th>Serious Injuries (HSIP)</th>
<th>Non-Motorized Fatalities (FARS)</th>
<th>Non-Motorized Serious Injuries (HSIP)</th>
<th>Total VMT (HPMS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>486</td>
<td>1,746</td>
<td>29</td>
<td>71</td>
<td>30,215</td>
</tr>
<tr>
<td>2013</td>
<td>416</td>
<td>1,811</td>
<td>22</td>
<td>70</td>
<td>30,048</td>
</tr>
<tr>
<td>2014</td>
<td>384</td>
<td>1,709</td>
<td>25</td>
<td>79</td>
<td>29,727</td>
</tr>
<tr>
<td>2015</td>
<td>386</td>
<td>1,670</td>
<td>27</td>
<td>88</td>
<td>29,497</td>
</tr>
<tr>
<td>2016</td>
<td>431</td>
<td>1,717</td>
<td>16</td>
<td>95</td>
<td>29,900</td>
</tr>
<tr>
<td>2017</td>
<td>386</td>
<td>1,581</td>
<td>16</td>
<td>97</td>
<td>30,021</td>
</tr>
<tr>
<td>2018</td>
<td>405*</td>
<td>1,592</td>
<td>33*</td>
<td>104</td>
<td>30,572</td>
</tr>
</tbody>
</table>

* FARS ARF

Table 4 – Sample PY2018 Performance Targets

<table>
<thead>
<tr>
<th>Performance Measure</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Fatalities</td>
<td>390.0</td>
</tr>
<tr>
<td>Rate of Fatalities per 100 million VMT</td>
<td>1.320</td>
</tr>
<tr>
<td>Number of Serious Injuries</td>
<td>1,650.0</td>
</tr>
<tr>
<td>Rate of Serious Injuries per 100 million VMT</td>
<td>5.585</td>
</tr>
<tr>
<td>Number of Non-Motorized Fatalities and Serious Injuries</td>
<td>112.0</td>
</tr>
</tbody>
</table>

5.1 Number of Fatalities Measure Computation Example

Calculation for the number of fatalities measure using the metrics from Table 3 and the target from Table 4, as summarized below.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>486</td>
<td>416</td>
<td>384</td>
<td>386</td>
<td>431</td>
<td>386</td>
<td>405*</td>
<td>390.0</td>
</tr>
</tbody>
</table>

*FARS ARF

**Step 1:** Calculate the Number of Fatalities Measure for PY2018 actual performance using the annual metrics for fatalities for 2014 through 2018.

\[
\text{PY2018 Number of Fatalities} = \frac{(384 + 386 + 431 + 386 + 405)}{5} = 398.4
\]

**Step 2:** Determine if the PY2018 actual performance (398.4) is less than or equal to the PY2018 target (390.0).
PY2018 Number of Fatalities > PY2018 Target

398.4 > 390.0

Target Met = No

**Step 3**: Since the PY2018 actual performance for the number of fatalities measure is greater than the PY2018 Target, the target has not been met. Therefore, the next step is to calculate the PY2016 baseline performance using 2012 through 2016 metrics. *(Note: If the target is equal to or less than the actual performance, this step would not be required)*

\[
\text{PY2016 Number of Fatalities Baseline} = \frac{486 + 416 + 384 + 386 + 431}{5} = 420.6
\]

**Step 4**: Determine if the PY2018 actual performance (398.4) is less than the PY2016 baseline performance (420.6).

\[
\text{PY2018 Number of Fatalities < PY2016 Number of Fatalities Baseline}
\]

\[
398.4 < 420.6
\]

Better than Baseline = Yes

**Step 5**: Since the actual performance for the number of fatalities measure is less than the baseline performance, it is determined that significant progress has been made for this measure.

### 5.2 Rate of Fatalities Measure Computation Example

Calculation for the rate of fatalities measure using the metrics from Table 3 and the target from Table 4, as summarized below.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatalities</td>
<td>486</td>
<td>416</td>
<td>384</td>
<td>386</td>
<td>431</td>
<td>386</td>
<td>405*</td>
<td>1.320</td>
</tr>
<tr>
<td>Total VMT</td>
<td>30,215</td>
<td>30,048</td>
<td>29,727</td>
<td>29,497</td>
<td>29,900</td>
<td>30,021</td>
<td>30,572</td>
<td></td>
</tr>
<tr>
<td>VMT/100M</td>
<td>302.15</td>
<td>300.48</td>
<td>297.27</td>
<td>294.97</td>
<td>299.00</td>
<td>300.21</td>
<td>305.72</td>
<td></td>
</tr>
</tbody>
</table>

*FARS ARF

**Step 1**: Calculate the Rate of Fatalities Measure for PY2018 actual performance using the annual metrics for fatalities and VMT per 100 million for 2014 through 2018.

\[
\text{PY2018 Rate of Fatalities} = \frac{384}{297.27} + \frac{386}{294.97} + \frac{431}{299.00} + \frac{386}{300.21} + \frac{405}{305.72} = \frac{1.29 + 1.31 + 1.44 + 1.29 + 1.32}{5} = 1.330
\]
**Step 2:** Determine if the PY2018 actual performance (1.330) is less than or equal to the PY2018 target (1.320).

\[ \text{PY2018 Rate of Fatalities} > \text{PY2018 Target} \]

\[ 1.330 > 1.320 \]

Target Met = No

**Step 3:** Since the PY2018 actual performance for the rate of fatalities measure is greater than the PY2018 Target, the target has not been met. Therefore, the next step is to calculate the PY2016 baseline performance using 2012 through 2016 metrics. (*Note: If the actual performance is less than or equal to the target, this step would not be required*)

\[
\text{PY2016 Rate of Fatalities Baseline} = \frac{486 + 416 + 384 + 386 + 431}{5} = \frac{1.61 + 1.38 + 1.29 + 1.31 + 1.44}{5} = 1.406
\]

**Step 4:** Determine if the PY2018 actual performance (1.330) is less than the PY2016 baseline performance (1.406).

\[ \text{PY2018 Rate of Fatalities} < \text{PY2016 Rate of Fatalities Baseline} \]

\[ 1.330 < 1.394 \]

Better than Baseline = Yes

**Step 5:** Since the actual performance for the rate fatalities measure is less than the baseline performance, it is determined that significant progress has been made for this measure.

### 5.3 Number of Serious Injuries Measure Computation Example

Calculation for the number of fatalities measure using the metrics from Table 3 and the target from Table 4, as summarized below.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1,746</td>
<td>1,811</td>
<td>1,709</td>
<td>1,670</td>
<td>1,717</td>
<td>1,581</td>
<td>1,592</td>
<td>1,650.0</td>
</tr>
</tbody>
</table>

**Step 1:** Calculate the Number of Serious Injuries Measure for PY2018 actual performance using the annual metrics for series injuries for 2014 through 2018.

\[
\text{PY2018 Number of Serious Injuries} = \frac{1,709 + 1,670 + 1,717 + 1,581 + 1,592}{5} = 1,653.8
\]
**Step 2:** Determine if the PY2018 actual performance (1,653.8) is less than or equal to the PY2018 target (1,650.0).

\[
\text{PY2018 Number of Serious Injuries > PY2018 Target} \\
1,653.8 > 1,650.0 \\
\text{Target Met} = \text{No}
\]

**Step 3:** Since the PY2018 actual performance for the number of serious injuries measure is greater than the PY2018 Target, the target has not been met. Therefore, the next step is to calculate the PY2016 baseline performance using 2012 through 2016 metrics. *(Note: If the actual performance is less than or equal to the target, this step would not be required)*

\[
\text{PY2016 Number of Serious Injuries Baseline} = \frac{(1,746 + 1,811 + 1,709 + 1,670 + 1,717)}{5} = 1,730.6
\]

**Step 4:** Determine if the PY2018 actual performance (1,653.8) is less than the PY2016 baseline performance (1,730.6).

\[
\text{PY2018 Number of Serious Injuries < PY2016 Number of Serious Injuries Baseline} \\
1,653.8 < 1,730.6 \\
\text{Better than Baseline} = \text{Yes}
\]

**Step 5:** Since the actual performance for the number of serious injuries measure is less than the baseline performance, it is determined that significant progress has been made for this measure.

### 5.4 Rate of Serious Injuries Measure Computation Example

Calculation for the rate of serious injuries measure using the metrics from Table 3 and the target from Table 4, as summarized below.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Serious Injuries</td>
<td>1,746</td>
<td>1,811</td>
<td>1,709</td>
<td>1,670</td>
<td>1,717</td>
<td>1,581</td>
<td>1,592</td>
<td>5.585</td>
</tr>
<tr>
<td>Total VMT</td>
<td>30,215</td>
<td>30,048</td>
<td>29,727</td>
<td>29,497</td>
<td>29,900</td>
<td>30,021</td>
<td>30,572</td>
<td></td>
</tr>
<tr>
<td>VMT/100M</td>
<td>302.15</td>
<td>300.48</td>
<td>297.27</td>
<td>294.97</td>
<td>299.00</td>
<td>300.21</td>
<td>305.72</td>
<td></td>
</tr>
</tbody>
</table>

**Step 1:** Calculate the Rate of Serious Injuries Measure for PY2018 actual performance using the annual metrics for serious injuries and VMT per 100 million for 2014 through 2018.

\[
\text{PY2018 Rate of Serious Injuries} = \frac{(1,709 + 1,670 + 1,717 + 1,581 + 1,592)}{5} \\
= \frac{(5.75 + 5.66 + 5.74 + 5.27 + 5.21)}{5} = 5.526
\]
**Step 2:** Determine if the PY2018 actual performance (5.526) is less than or equal to the PY2018 target (5.585).

\[
\text{PY2018 Rate of Serious Injuries} > \text{PY2018 Target} \\
5.526 < 5.585 \\
\text{Target Met} = \text{Yes}
\]

**Step 3:** Since the PY2018 actual performance for the rate of fatalities measure is less than the PY2018 Target, the target has been met. Since the target it met, there is no need to assess whether the actual performance is less than or equal to the baseline performance.

### 5.5 Number of Non-Motorized Fatalities and Serious Injuries Measure Computation Example

Calculation for the rate of fatalities measure using the metrics from Table 3 and the target from Table 4, as summarized below.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-motorized Fatalities</td>
<td>29</td>
<td>22</td>
<td>25</td>
<td>27</td>
<td>16</td>
<td>16</td>
<td>33*</td>
<td>112.0</td>
</tr>
<tr>
<td>Non-motorized Serious Injuries</td>
<td>71</td>
<td>70</td>
<td>79</td>
<td>88</td>
<td>95</td>
<td>97</td>
<td>104</td>
<td></td>
</tr>
</tbody>
</table>

*FARS ARF

**Step 1:** Calculate the Number of Non-Motorized Measure for PY2018 actual performance using the annual metrics for non-motorized fatalities and non-motorized serious injuries for 2014 through 2018.

\[
\text{PY2018 Number of Non-Motorized} = \frac{(25+79)+(27+88)+(16+95)+(16+97)+(33+104))}{5} \\
= \frac{(104 + 115 + 111 + 113 + 137)}{5} = 116.0
\]

**Step 2:** Determine if the PY2018 actual performance (116.0) is less than or equal to the PY2018 target (112.0).

\[
\text{PY2018 Number of Non-Motorized} > \text{PY2018 Target} \\
116.0 > 112.0 \\
\text{Target Met} = \text{No}
\]
**Step 3:** Since the PY2018 actual performance for the non-motorized measure is greater than the PY2018 Target, the target has not been met. Therefore, the next step is to calculate the PY2016 baseline performance using 2012 through 2016 metrics. *(Note: If the actual performance is less than or equal to the target, this step would not be required)*

\[
PY16 \text{ Non-Motorized Baseline} = \frac{(29+71)+(22+70)+(25+79)+(27+88)+(16+95)}{5} = 104.4
\]

**Step 4:** Determine if the PY2018 actual performance (116.0) is less than the PY2016 baseline performance (94.2).

\[
\text{PY2018 Number of Non-Motorized} < \text{PY2016 Number of Non-Motorized Baseline}
\]

\[
116.0 < 104.4
\]

Better than Baseline = No

**Step 5:** Since the actual performance for the number of non-motorized fatalities and serious injuries measure is greater than the baseline performance, it is determined that significant progress has not been made for this measure.

### 5.6 Example Determination of Met or Made Significant Progress

To determine whether a State DOT has met or made significant progress toward achieving their performance targets, the computations from the above examples (5.1 through 5.5) will be used and are summarized in Table 5 below.

<table>
<thead>
<tr>
<th>Safety Performance Measures</th>
<th>2018 Target</th>
<th>PY2018 Actual Performance</th>
<th>PY2016 Baseline Performance</th>
<th>Met Target?</th>
<th>Better than the Baseline?</th>
<th>Met or Made Significant Progress?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Fatalities</td>
<td>390.0</td>
<td>398.4</td>
<td>420.6</td>
<td>No</td>
<td>Yes</td>
<td>YES</td>
</tr>
<tr>
<td>Rate of Fatalities</td>
<td>1.320</td>
<td>1.330</td>
<td>1.406</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Number of Serious Injuries</td>
<td>1,650.0</td>
<td>1,653.8</td>
<td>1,730.6</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Rate of Serious Injuries</td>
<td>5.585</td>
<td>5.526</td>
<td>5.792</td>
<td>Yes</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Number of Non-Motorized Fatalities and Serious Injuries</td>
<td>112.0</td>
<td>116.0</td>
<td>104.4</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

In this example, the only target met for PY2018 is the Rate of Serious Injuries Measure. Since this target is met, no further assessment is required for this measure. The performance targets for the Number of Fatalities Measure, Rate of Fatalities Measure, and Number of Serious Injury Measure were not met. Therefore, those measures were compared against the PY2016 baseline performance to determine if
the actual performance was less than the baseline performance. For these measures, it was determined that the actual performance was better than the baseline performance. Lastly, the Number of Non-Motorized Measure was not met and the actual performance was not better than the baseline performance. Therefore, for this example, FHWA would determine that the State DOT has met or made significant progress towards meeting the PY2018 performance targets since four of the five targets were either met or better than the baseline performance.
### Acronyms Table

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANSI</td>
<td>American National Standards Institute</td>
</tr>
<tr>
<td>FARS ARF</td>
<td>Fatality Analysis Reporting System Annual Report File</td>
</tr>
<tr>
<td>CFR</td>
<td>Code of Federal Regulation</td>
</tr>
<tr>
<td>CY</td>
<td>Calendar Year</td>
</tr>
<tr>
<td>FARS</td>
<td>Fatality Analysis Reporting System</td>
</tr>
<tr>
<td>FHWA</td>
<td>Federal Highway Administration</td>
</tr>
<tr>
<td>HPMS</td>
<td>Highway Performance Monitoring System</td>
</tr>
<tr>
<td>HSIP</td>
<td>Highway Safety Improvement Program</td>
</tr>
<tr>
<td>HSP</td>
<td>Highway Safety Plan</td>
</tr>
<tr>
<td>NHTSA</td>
<td>National Highway Traffic Safety Administration</td>
</tr>
<tr>
<td>PM</td>
<td>Performance Management</td>
</tr>
<tr>
<td>PY</td>
<td>Performance Year</td>
</tr>
<tr>
<td>State DOT</td>
<td>State Department of Transportation</td>
</tr>
<tr>
<td>TPM</td>
<td>Transportation Performance Management</td>
</tr>
<tr>
<td>USC</td>
<td>United States Code</td>
</tr>
<tr>
<td>VMT</td>
<td>Vehicle miles traveled</td>
</tr>
</tbody>
</table>