Protection of Data from Discovery & Admission into Evidence

23 U.S.C. 148(h)(4) states “Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for any purpose relating to this section [HSIP], shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location identified or addressed in the reports, surveys, schedules, lists, or other data.”

23 U.S.C. 409 states “Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or railway-highway crossings, pursuant to sections 130, 144, and 148 of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.”
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Executive Summary

The Pennsylvania Department of Transportation is pleased to present this Annual Report of our progress with the Highway Safety Improvement Program.

In 2014, 1,195 people lost their lives on Pennsylvania’s roadways - a new low since record keeping began in the 1920s. But we have miles to go to reach our ultimate goal of zero deaths on our roads, and our journey includes ongoing work on both the behavioral side of crash causations as well as continuing to improve our highway infrastructure.

Since the last Annual Report, we have maintained our progress on several key initiatives. We have released updates to several publications that incorporate the concepts of the Highway Safety Manual into our policies and practices. We have also piloted a Highway Safety Manual training course and have begun sessions open to Department personnel at large. As shown later in this report, many of our engineering districts are planning and completing projects associated with the Intersection Safety Implementation and Roadway Departure Safety Implementation Plans. There has also been a significant improvement in the quality of applications for Highway Safety Improvement Program funding from the engineering districts as a result of our regional meetings in 2013.

While there remains much work required to reach our goal of reducing highway fatalities by half in the next two decades - a stepping stone on our way to zero deaths - we remain encouraged by the progress that has been made and the opportunities for the future.
Introduction

The Highway Safety Improvement Program (HSIP) is a core Federal-aid program with the purpose of achieving a significant reduction in fatalities and serious injuries on all public roads. As per 23 U.S.C. 148(h) and 23 CFR 924.15, States are required to report annually on the progress being made to advance HSIP implementation and evaluation efforts. The format of this report is consistent with the HSIP MAP-21 Reporting Guidance dated February 13, 2013 and consists of four sections: program structure, progress in implementing HSIP projects, progress in achieving safety performance targets, and assessment of the effectiveness of the improvements.

Program Structure

Program Administration

How are Highway Safety Improvement Program funds allocated in a State?

☐ Central

☐ District

☒ Other Central and District

Describe how local roads are addressed as part of Highway Safety Improvement Program.

Previously, we had incorporated a new funding formula in response to the increased funding from the MAP-21 legislation:

1) $500,000 base funding for each planning organization

2) $35 million reserved for statewide initiatives, such as the Intersection Safety and Roadway Departure Safety Implementation Plans
3) The remaining amount - approximately $45.5 million - is to be distributed to the planning organizations by a weighted formula. This formula places 50% weight on fatalities and serious injuries and 50% on reportable crashes.

The funds from all three of these categories are applicable to local road problems.

Local road issues are also directly addressed through our Local Technical Assistance Program (LTAP) reports. Upon a request from a municipality, LTAP engineers will perform an engineering study free of charge and recommend safety countermeasures based on their findings. The Walkable Communities Program focuses on pedestrian safety, while the Local Safe Roads Communities Program focuses on local road safety in general. The safety improvements suggested by these two program reports are eligible for HSIP funding. To encourage implementation of the countermeasures, we are advancing a State Transportation Innovation Council (STIC) initiative to combine some of these completed municipalities into regional groups and emplace the countermeasures in a single project. This initiative is currently on-going.

Finally, we will continue to incorporate local road locations onto our Statewide High Crash Location Lists. An updated list has been published for 2015 that includes state road locations; this list will be updated shortly after publication of this Annual Report to include local roads. These high crash locations are typically among the highest priorities for safety funding.

Identify which internal partners are involved with Highway Safety Improvement Program planning.

- Design
- Planning
- Maintenance
- Operations
- Governors Highway Safety Office
- Other: Other-Engineering Districts, Planning Organizations, Program Center

Briefly describe coordination with internal partners.
PennDOT Engineering Districts utilize a data-driven analysis process to identify eligible projects and collaborate with local Planning Organizations to develop a program of safety infrastructure projects. This process was designed to improve highway safety using data-driving project development methods and to fulfill the requirements of Section 148 of MAP-21. Each District, in coordination with area planning partners, is required to utilize the following three step selection process in programming Section 148 (HSIP) projects:

1. Select projects that contain locations listed on the Statewide High Crash Locations (SHCL) priority ranking. Low cost improvements at these locations can be considered.

2. Deployment of systematic implementation of proven low cost countermeasures.

   - OR -

   A project location listed in the Intersection Safety Implementation Plan (ISIP) or Roadway Departure Safety Implementation Plan (RDIP)

   - OR -

   A District may program locations identified on the Planning Organization lists. The Planning Organization Lists are developed from the same methodology as the Statewide High Crash Location Lists but with lower crash thresholds to allow for the identification of 25 locations overall in each Planning Organization.

3. Projects not meeting the above criteria may be programmed, but first must be approved by the Deputy Secretary for Highway Administration. Such approval requests must include the following information:
   1) General Project Information, including scope, costs and estimated completion dates.
   2) District strategy for exceeding its fatality goal, with the consideration of this project.
   3) Justification and safety benefit of programming a non-SHCL/Systematic project, related to fatality goals.

**Identify which external partners are involved with Highway Safety Improvement Program planning.**

- [x] Metropolitan Planning Organizations
- [x] Governors Highway Safety Office
- [ ] Local Government Association
- [x] Other: Other-MAST Team - See Question 8 for description
Identify any program administration practices used to implement the HSIP that have changed since the last reporting period.

☐ Multi-disciplinary HSIP steering committee

☒ Other: Other-MAST meets quarterly to track SHSP implementation and discuss highway safety related topics including the HSIP. MAST includes PennDOT, FHWA, State Police, Liquor Control Board, Dept of Health, Dept of Education and Dept of Drug-Alcohol Programs.

Describe any other aspects of Highway Safety Improvement Program Administration on which you would like to elaborate.

The HSIP Program fully aligns with the 2012 Pennsylvania Strategic Highway Safety Plan (SHSP). Within this Plan, Infrastructure Improvements are identified as the third of seven "Vital Safety Focus Areas". Key components of this effort are to:

• Reduce Head-On and Cross-Median Crashes

• Improve Intersection Safety

• Reduce Run-Off-Road Crashes

• Reduce the Severity and Frequency of Hit Fixed Object Crashes

Note that the SHSP is scheduled for a revision in 2016. The results of the planning process and the impacts of the revised document will be discussed in the 2016 Annual Report.
Program Methodology
Select the programs that are administered under the HSIP.

- Median Barrier
- Horizontal Curve
- Skid Hazard
- Roadway Departure
- Local Safety
- Left Turn Crash
- Other:

- Intersection
- Bicycle Safety
- Crash Data
- Low-Cost Spot Improvements
- Pedestrian Safety
- Shoulder Improvement
- Right Angle Crash
- Segments

Program: Median Barrier
Date of Program Methodology: 2/1/2009

What data types were used in the program methodology?

Crashes
- All crashes
- Fatal crashes only
- Fatal and serious injury crashes only
- Other

Exposure
- Traffic
- Volume
- Population
- Other

Roadway
- Median width
- Horizontal curvature
- Functional classification
- Roadside features
- Other
What project identification methodology was used for this program?

- Crash frequency
- Expected crash frequency with EB adjustment
- Equivalent property damage only (EPDO Crash frequency)
- EPDO crash frequency with EB adjustment
- Relative severity index
- Crash rate
- Critical rate
- Level of service of safety (LOSS)
- Excess expected crash frequency using SPF
- Excess expected crash frequency with the EB adjustment
- Excess expected crash frequency using method of moments
- Probability of specific crash types
- Excess proportions of specific crash types
- Other

Are local roads (non-state owned and operated) included or addressed in this program?

- Yes
- No

How are highway safety improvement projects advanced for implementation?

- Competitive application process
- Selection committee
- Other
Select the processes used to prioritize projects for implementation. For the methods selected, indicate
the relative importance of each process in project prioritization. Enter either the weights or numerical
rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving
both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).

☐ Relative Weight in Scoring
☒ Rank of Priority Consideration

☐ Ranking based on B/C
☒ Available funding  2
☐ Incremental B/C
☐ Ranking based on net benefit
☐ Other
☒ Potential for Improvement  1
   based on Crash History

Program: Intersection
Date of Program Methodology: 9/1/2009

What data types were used in the program methodology?

Crashes
☒ All crashes
☐ Fatal crashes only
☐ Fatal and serious injury crashes only

Exposure
☐ Traffic
☐ Volume
☐ Population

Roadway
☐ Median width
☐ Horizontal curvature
☐ Functional classification
What project identification methodology was used for this program?

- Crash frequency
- Expected crash frequency with EB adjustment
- Equivalent property damage only (EPDO Crash frequency)
- EPDO crash frequency with EB adjustment
- Relative severity index
- Crash rate
- Critical rate
- Level of service of safety (LOSS)
- Excess expected crash frequency using SPF
- Excess expected crash frequency with the EB adjustment
- Excess expected crash frequency using method of moments
- Probability of specific crash types
- Excess proportions of specific crash types
- Other

Are local roads (non-state owned and operated) included or addressed in this program?

- Yes
- No

If yes, are local road projects identified using the same methodology as state roads?

- Yes
- No
How are highway safety improvement projects advanced for implementation?

- Competitive application process
- Selection committee
- Other

Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).

- Relative Weight in Scoring
- Rank of Priority Consideration

- Ranking based on B/C
- Available funding 2
- Incremental B/C
- Ranking based on net benefit
- Other
- Potential for Improvement based on Crash History 1

Program: Horizontal Curve

Date of Program Methodology: 2/1/2009

What data types were used in the program methodology?
### Crashes
- ☑ All crashes
- ☐ Fatal crashes only
- ☐ Fatal and serious injury crashes only
- ☐ Other

### Exposure
- ☐ Traffic
- ☐ Volume
- ☐ Population
- ☐ Lane miles
- ☐ Other

### Roadway
- ☐ Median width
- ☐ Horizontal curvature
- ☐ Functional classification
- ☑ Roadside features
- ☐ Other

---

**What project identification methodology was used for this program?**

- ☑ Crash frequency
- ☐ Expected crash frequency with EB adjustment
- ☐ Equivalent property damage only (EPDO Crash frequency)
- ☐ EPDO crash frequency with EB adjustment
- ☐ Relative severity index
- ☐ Crash rate
- ☐ Critical rate
- ☐ Level of service of safety (LOSS)
- ☐ Excess expected crash frequency using SPFs
- ☐ Excess expected crash frequency with the EB adjustment
- ☐ Excess expected crash frequency using method of moments
- ☐ Probability of specific crash types
- ☐ Excess proportions of specific crash types
- ☐ Other

---

**Are local roads (non-state owned and operated) included or addressed in this program?**
Yes

No

If yes, are local road projects identified using the same methodology as state roads?

Yes

No

How are highway safety improvement projects advanced for implementation?

☐ Competitive application process

☒ Selection committee

☐ Other

Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).

☐ Relative Weight in Scoring

☒ Rank of Priority Consideration

☐ Ranking based on B/C

☒ Available funding 2

☐ Incremental B/C

☐ Ranking based on net benefit

☐ Other

☒ Potential for Improvement based on Crash History 1
Program: Bicycle Safety
Date of Program Methodology: 2/1/2009

What data types were used in the program methodology?

**Crashes**
- ☒ All crashes
- ☐ Fatal crashes only
- ☐ Fatal and serious injury crashes only
- ☐ Other

**Exposure**
- ☐ Traffic
- ☐ Volume
- ☐ Population
- ☐ Lane miles
- ☐ Other

**Roadway**
- ☐ Median width
- ☐ Horizontal curvature
- ☐ Functional classification
- ☐ Roadside features
- ☐ Other

What project identification methodology was used for this program?

- ☒ Crash frequency
- ☐ Expected crash frequency with EB adjustment
- ☐ Equivalent property damage only (EPDO Crash frequency)
- ☐ EPDO crash frequency with EB adjustment
- ☐ Relative severity index
- ☐ Crash rate
- ☐ Critical rate
- ☐ Level of service of safety (LOSS)
- ☐ Excess expected crash frequency using SPFs
- ☐ Excess expected crash frequency with the EB adjustment
- ☐ Excess expected crash frequency using method of moments
Probability of specific crash types  
Excess proportions of specific crash types  
Other

Are local roads (non-state owned and operated) included or addressed in this program?

- Yes  
- No

If yes, are local road projects identified using the same methodology as state roads?

- Yes  
- No

How are highway safety improvement projects advanced for implementation?

- Competitive application process  
- Selection committee  
- Other

Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).

- Relative Weight in Scoring  
- Rank of Priority Consideration

- Ranking based on B/C  
- Available funding: 2  
- Incremental B/C
Ranking based on net benefit

Other

Potential for Improvement based on Crash History

Program: Skid Hazard

Date of Program Methodology: 2/1/2009

What data types were used in the program methodology?

- **Crashes**
  - All crashes
  - Fatal crashes only
  - Fatal and serious injury crashes only
  - Other

- **Exposure**
  - Traffic
  - Volume
  - Population

- **Roadway**
  - Median width
  - Horizontal curvature
  - Functional classification
  - Lane miles
  - Other

What project identification methodology was used for this program?

- Crash frequency
- Expected crash frequency with EB adjustment
- Equivalent property damage only (EPDO Crash frequency)
- EPDO crash frequency with EB adjustment
- Relative severity index
Crash rate

Critical rate

Level of service of safety (LOSS)

Excess expected crash frequency using SPF

Excess expected crash frequency with the EB adjustment

Excess expected crash frequency using method of moments

Probability of specific crash types

Excess proportions of specific crash types

Other

Are local roads (non-state owned and operated) included or addressed in this program?

☑ Yes

☐ No

If yes, are local road projects identified using the same methodology as state roads?

☑ Yes

☐ No

How are highway safety improvement projects advanced for implementation?

☐ Competitive application process

☑ Selection committee

☐ Other

Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).
Program: Roadway Departure
Date of Program Methodology: 2/1/2009

What data types were used in the program methodology?

**Crashes**
- All crashes
- Fatal crashes only
- Fatal and serious injury crashes only
- Other

**Exposure**
- Traffic
- Volume
- Population

**Roadway**
- Median width
- Horizontal curvature
- Functional classification
- Roadside features
- Other

What project identification methodology was used for this program?
Crash frequency

☐ Expected crash frequency with EB adjustment

☐ Equivalent property damage only (EPDO Crash frequency)

☐ EPDO crash frequency with EB adjustment

☐ Relative severity index

☐ Crash rate

☐ Critical rate

☐ Level of service of safety (LOSS)

☐ Excess expected crash frequency using SPF

☐ Excess expected crash frequency with the EB adjustment

☐ Excess expected crash frequency using method of moments

☐ Probability of specific crash types

☐ Excess proportions of specific crash types

☐ Other

Are local roads (non-state owned and operated) included or addressed in this program?

☒ Yes

☐ No

If yes, are local road projects identified using the same methodology as state roads?

☒ Yes

☐ No

How are highway safety improvement projects advanced for implementation?

☐ Competitive application process

☒ selection committee
Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).

☐ Relative Weight in Scoring
☐ Rank of Priority Consideration

☐ Ranking based on B/C
☒ Available funding 2
☐ Incremental B/C
☐ Ranking based on net benefit
☐ Other
☒ Potential for Improvement 1
based on Crash History

Program: Low-Cost Spot Improvements
Date of Program Methodology: 2/1/2009

What data types were used in the program methodology?

Crashes
☒ All crashes
☐ Fatal crashes only

Exposure
☐ Traffic
☐ Volume

Roadway
☐ Median width
☐ Horizontal curvature
What project identification methodology was used for this program?

- Crash frequency
- Expected crash frequency with EB adjustment
- Equivalent property damage only (EPDO Crash frequency)
- EPDO crash frequency with EB adjustment
- Relative severity index
- Crash rate
- Critical rate
- Level of service of safety (LOSS)
- Excess expected crash frequency using SPFs
- Excess expected crash frequency with the EB adjustment
- Excess expected crash frequency using method of moments
- Probability of specific crash types
- Excess proportions of specific crash types
- Other

Are local roads (non-state owned and operated) included or addressed in this program?

- Yes
- No

If yes, are local road projects identified using the same methodology as state roads?
Yes
No

How are highway safety improvement projects advanced for implementation?

☐ Competitive application process
☒ selection committee
☐ Other

Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).

☐ Relative Weight in Scoring
☒ Rank of Priority Consideration

☐ Ranking based on B/C
☒ Available funding 2
☐ Incremental B/C
☐ Ranking based on net benefit
☐ Other
☒ Potential for Improvement 1 based on Crash History

Program: Local Safety
Date of Program Methodology: 2/1/2009

What data types were used in the program methodology?

<table>
<thead>
<tr>
<th>Crashes</th>
<th>Exposure</th>
<th>Roadway</th>
</tr>
</thead>
<tbody>
<tr>
<td>☒ All crashes</td>
<td>☐ Traffic</td>
<td>☐ Median width</td>
</tr>
<tr>
<td>☐ Fatal crashes only</td>
<td>☐ Volume</td>
<td>☐ Horizontal curvature</td>
</tr>
<tr>
<td>☐ Fatal and serious injury crashes</td>
<td>☑ Population</td>
<td>☒ Functional classification</td>
</tr>
<tr>
<td>☐ Other</td>
<td>☑ Lane miles</td>
<td>☐ Roadside features</td>
</tr>
<tr>
<td></td>
<td>☐ Other</td>
<td>☐ Other</td>
</tr>
</tbody>
</table>

What project identification methodology was used for this program?

- ☒ Crash frequency
- ☐ Expected crash frequency with EB adjustment
- ☐ Equivalent property damage only (EPDO Crash frequency)
- ☐ EPDO crash frequency with EB adjustment
- ☐ Relative severity index
- ☐ Crash rate
- ☐ Critical rate
- ☐ Level of service of safety (LOSS)
- ☐ Excess expected crash frequency using SPF
- ☐ Excess expected crash frequency with the EB adjustment
- ☐ Excess expected crash frequency using method of moments
- ☐ Probability of specific crash types
- ☐ Excess proportions of specific crash types
Are local roads (non-state owned and operated) included or addressed in this program?

☐ Yes
☐ No

If yes, are local road projects identified using the same methodology as state roads?

☐ Yes
☐ No

How are highway safety improvement projects advanced for implementation?

☐ Competitive application process
☐ Selection committee
☐ Other

Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).

☐ Relative Weight in Scoring
☐ Rank of Priority Consideration

☐ Ranking based on B/C
☐ Available funding 2
☐ Incremental B/C
☐ Ranking based on net benefit
☐ Other
Program: Pedestrian Safety

Date of Program Methodology: 2/1/2009

What data types were used in the program methodology?

Crashes
- All crashes
- Fatal crashes only
- Fatal and serious injury crashes only
- Other

Exposure
- Traffic
- Volume
- Population
- Lane miles
- Other

Roadway
- Median width
- Horizontal curvature
- Functional classification
- Roadside features
- Other

What project identification methodology was used for this program?

- Crash frequency
- Expected crash frequency with EB adjustment
- Equivalent property damage only (EPDO Crash frequency)
- EPDO crash frequency with EB adjustment
- Relative severity index
- Crash rate
- Critical rate
Are local roads (non-state owned and operated) included or addressed in this program?

☐ Yes
☐ No

If yes, are local road projects identified using the same methodology as state roads?

☐ Yes
☐ No

How are highway safety improvement projects advanced for implementation?

☐ Competitive application process
☐ Selection committee
☐ Other

Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).

☐ Relative Weight in Scoring
☐ Rank of Priority Consideration
<table>
<thead>
<tr>
<th>Ranking based on B/C</th>
<th>Available funding</th>
<th>Incremental B/C</th>
<th>Ranking based on net benefit</th>
<th>Other</th>
<th>Potential for Improvement based on Crash History</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

**Program:** Left Turn Crash

**Date of Program Methodology:** 2/1/2009

**What data types were used in the program methodology?**

<table>
<thead>
<tr>
<th>Crashes</th>
<th>Exposure</th>
<th>Roadway</th>
</tr>
</thead>
<tbody>
<tr>
<td>All crashes</td>
<td></td>
<td>Median width</td>
</tr>
<tr>
<td>Fatal crashes only</td>
<td></td>
<td>Horizontal curvature</td>
</tr>
<tr>
<td>Fatal and serious injury</td>
<td></td>
<td>Functional classification</td>
</tr>
<tr>
<td>crashes only</td>
<td></td>
<td>Roadside features</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td>Other</td>
</tr>
</tbody>
</table>

**What project identification methodology was used for this program?**

- Crash frequency
- Expected crash frequency with EB adjustment
Are local roads (non-state owned and operated) included or addressed in this program?

☑ Yes

☐ No

If yes, are local road projects identified using the same methodology as state roads?

☑ Yes

☐ No

How are highway safety improvement projects advanced for implementation?

☐ Competitive application process

☑ selection committee

☐ Other
Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).

☐ Relative Weight in Scoring
☒ Rank of Priority Consideration

☐ Ranking based on B/C
☒ Available funding  2
☐ Incremental B/C
☐ Ranking based on net benefit
☐ Other
☒ Potential for Improvement based on Crash History  1

Program: Shoulder Improvement
Date of Program Methodology: 2/1/2009

What data types were used in the program methodology?

Crashes
☒ All crashes
☐ Fatal crashes only
☐ Fatal and serious injury crashes only

Exposure
☐ Traffic
☐ Volume
☐ Population

Roadway
☐ Median width
☐ Horizontal curvature
☐ Functional classification
What project identification methodology was used for this program?

- Crash frequency
- Expected crash frequency with EB adjustment
- Equivalent property damage only (EPDO Crash frequency)
- EPDO crash frequency with EB adjustment
- Relative severity index
- Crash rate
- Critical rate
- Level of service of safety (LOSS)
- Excess expected crash frequency using SPFs
- Excess expected crash frequency with the EB adjustment
- Excess expected crash frequency using method of moments
- Probability of specific crash types
- Excess proportions of specific crash types
- Other

Are local roads (non-state owned and operated) included or addressed in this program?

- Yes
- No

If yes, are local road projects identified using the same methodology as state roads?

- Yes
- No
How are highway safety improvement projects advanced for implementation?

- [ ] Competitive application process
- [x] Selection committee
- [ ] Other

Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).

- [ ] Relative Weight in Scoring
- [ ] Rank of Priority Consideration

- [ ] Ranking based on B/C
- [x] Available funding 2
- [ ] Incremental B/C
- [ ] Ranking based on net benefit
- [ ] Other
- [x] Potential for Improvement based on Crash History 1

What proportion of highway safety improvement program funds address systemic improvements?

25

Highway safety improvement program funds are used to address which of the following systemic
improvements?

- Cable Median Barriers
- Traffic Control Device Rehabilitation
- Install/Improve Signing
- Upgrade Guard Rails
- Safety Edge
- Add/Upgrade/Modify/Remove Traffic Signal
- Rumble Strips
- Pavement/Shoulder Widening
- Install/Improve Pavement Marking and/or Delineation
- Clear Zone Improvements
- Install/Improve Lighting
- Other

What process is used to identify potential countermeasures?

- Engineering Study
- Road Safety Assessment
- Other:

Identify any program methodology practices used to implement the HSIP that have changed since the last reporting period.

- Highway Safety Manual
- Road Safety audits
- Systemic Approach
Describe any other aspects of the Highway Safety Improvement Program methodology on which you would like to elaborate.

Last year, we described the implementation efforts related to the Highway Safety Manual (HSM). All three of the initiatives have been advanced significantly:

1) Pennsylvania-specific SPFs were developed through a research contract with Penn State University. The next step of the process is to develop regionalized SPFs to account for the differences in driving habits and roadway characteristics across the Commonwealth - SPFs related to two lane rural roads in the farmlands of Lancaster County may not always be applicable to two lane rural roads in the mountains of Cameron County. The regionalized SPFs will therefore provide more accurate results. This project - also performed in conjunction with Penn State - has been initiated.

2) The Pennsylvania-specific HSM worksheet has been developed in draft format and has been introduced through the HSM training sessions. While not yet a formal requirement for projects, staff in the engineering districts have been using the worksheet and providing feedback.

3) Several publications have been revised to include language related to the HSM. The most important of these is our Publication 638, the District Highway Safety Guidance Manual.

While the HSM initiatives have not yet reached the level of implementation that will allow us to realize direct results, we are optimistic that in the coming years we will begin to see an improvement in safety numbers and the types and quality of safety projects coming through the programs.
## Progress in Implementing Projects

### Funds Programmed

Reporting period for Highway Safety Improvement Program funding.

- [ ] Calendar Year
- [x] State Fiscal Year
- [ ] Federal Fiscal Year

Enter the programmed and obligated funding for each applicable funding category.

<table>
<thead>
<tr>
<th>Funding Category</th>
<th>Programmed*</th>
<th>Obligated</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HSIP (Section 148)</strong></td>
<td>92485000</td>
<td>43091467</td>
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<tr>
<td><strong>HRRRP (SAFETEA-LU)</strong></td>
<td>0</td>
<td>115130</td>
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<td>HRRR Special Rule</td>
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<td>Penalty Transfer - Section 154</td>
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<td>Penalty Transfer – Section 164</td>
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<td>Incentive Grants - Section 163</td>
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<td></td>
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<tr>
<td>Incentive Grants (Section 406)</td>
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<td></td>
</tr>
<tr>
<td>Other Federal-aid Funds (i.e. STP, NHPP)</td>
<td>10000000</td>
<td>9070059.58</td>
</tr>
<tr>
<td>State and Local Funds</td>
<td>10 %</td>
<td>17 %</td>
</tr>
</tbody>
</table>
2015 Pennsylvania Highway Safety Improvement Program

| Totals       | 102485000 | 100% | 52276656.58 | 100% |

How much funding is programmed to local (non-state owned and maintained) safety projects?
0 %

How much funding is obligated to local safety projects?
0 %

How much funding is programmed to non-infrastructure safety projects?
0 %

How much funding is obligated to non-infrastructure safety projects?
0 %

How much funding was transferred in to the HSIP from other core program areas during the reporting period?
0 %
How much funding was transferred out of the HSIP to other core program areas during the reporting period?

0 %

Discuss impediments to obligating Highway Safety Improvement Program funds and plans to overcome this in the future.

A continuing concern from the previous HSIP Annual Reports is the difficulty ensuring that funds are being properly obligated towards safety projects with the greatest potential of improving safety conditions. As will be seen later in this report (in the section related to the benefit-cost ratio), there are many projects still coming through the project design and construction funnel that have been grandfathered into the HSIP program. These projects would not meet current selection criteria for a variety of reasons - limited numbers of fatal or serious injury crashes, countermeasures not directly related to crash history, maintenance-type improvements, etc - but due to historic obligations are still eligible for HSIP funds. We encourage our engineering districts to find other sources of funding for these projects, but this is a request rather than a requirement. It will take some time for the remaining projects to progress through to completion.

A continuing impediment is the distribution of funds to the Planning Organizations by formula without maintaining a centralized control over the monies. While approval to use HSIP funds on a project is retained at a high level, the projects and funding proposals are all generated from the Planning Organizations. We have recently adjusted the funding distribution formula (in response to the increased funding levels through the MAP-21 legislation) to reserve $35 million for statewide initiatives, which will help provide additional high-level control of funding and project selection. Last year’s HSIP meetings were used to thoroughly educate Planning Organization staff about the intent and priorities of the HSIP program and should lead to more effective project and funding choices.

Describe any other aspects of the general Highway Safety Improvement Program implementation progress on which you would like to elaborate.

In the 2014 Annual Report, we mentioned that the engineering districts were beginning to release projects related to the FHWA Intersection Safety Implementation and Roadway Departure Safety Implementations Plans (ISIP and RDIP, respectively). As will be seen in the project listing later in this report, there are a large number of these projects being released for construction. We hope to continue this momentum and perhaps begin incorporating the countermeasures from these plans at other locations, as well.
**General Listing of Projects**

List each highway safety improvement project obligated during the reporting period.

<table>
<thead>
<tr>
<th>Project</th>
<th>Improvement Category</th>
<th>Output</th>
<th>HSIP Cost</th>
<th>Total Cost</th>
<th>Funding Category</th>
<th>Functional Classification</th>
<th>AADT</th>
<th>Speed</th>
<th>Roadway Ownership</th>
<th>Relationship to SHSP</th>
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<tr>
<td>Dunmore Signal Network</td>
<td>Intersection traffic control Modify traffic signal timing - general retiming</td>
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<td>7394090</td>
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<td>Rural Principal Arterial - Other</td>
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<td>Intersections</td>
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<td>Goshen @ Darby-PaoliRd(F)</td>
<td>Alignment Horizontal curve realignment</td>
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<td>3000</td>
<td>1522577</td>
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<td>Rural Major Collector</td>
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<td>25</td>
<td>State Highway Agency</td>
<td>Roadway Departure</td>
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<td>PA 68/Dolby Street Inters</td>
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<td>3750000</td>
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<td>Urban Principal Arterial - Other</td>
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<td>35</td>
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<td>Intersections</td>
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<td>Action</td>
<td>Length (Miles)</td>
<td>Cost (1000)</td>
<td>Treatment/Type</td>
<td>Date of Completion</td>
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<td>West Carson St. Viaduct</td>
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<td>Non-infrastructure; Road safety audits</td>
<td>15.09</td>
<td>18000</td>
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<td><strong>Nyes/Dvnshre Hts Safety</strong></td>
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<td>10000</td>
<td>400000</td>
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<td>200000</td>
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<td>86284</td>
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<td>279</td>
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<td>Rural Principal Arterial - Other</td>
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<tr>
<td>Olney:Broad-Rising Sun(C)</td>
<td>Intersection traffic control Modify traffic signal - modernization/replace ment</td>
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<td>3842998</td>
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<td>Urban Principal Arterial - Other</td>
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<td>HSIP Section</td>
<td>Agency</td>
<td>Type</td>
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<td>Erie Av: Broad St. - K St</td>
<td>Pedestrians and bicyclists Pedestrian signal</td>
<td>2.47 Miles</td>
<td>475000 0</td>
<td>4500000</td>
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<td>Intersections</td>
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<td>RATS CableGuiderail Replc</td>
<td>Roadside Roadside - other</td>
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<td>Roadway Departure</td>
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<tr>
<td>US11 &amp; PA997 Intersection</td>
<td>Roadway widening - travel lanes</td>
<td>2.08 Miles</td>
<td>15322 6</td>
<td>2255384</td>
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<td>Rural Minor Arterial</td>
<td>993 6</td>
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<td>State Highway Agency</td>
<td>Lane Departure</td>
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<td>Weigh Scales to Paxinos</td>
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<td>Rural Principal Arterial - Other</td>
<td>119 50</td>
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<tr>
<td>PA31 W Somrst Corridor Imp</td>
<td>Intersection geometry Auxiliary lanes - add two-way left-turn lane</td>
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<td>4320000</td>
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<td>0.67</td>
<td>55000</td>
<td>HSIP (Section 148)</td>
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<td>45</td>
<td>State</td>
<td>Intersections</td>
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<td>Auxiliary lanes - add two-way left-turn lane</td>
<td></td>
<td></td>
<td>Principal Arterial - Other</td>
<td>Rural</td>
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<td>106</td>
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### Progress in Achieving Safety Performance Targets

**Overview of General Safety Trends**

Present data showing the general highway safety trends in the state for the past five years.

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<th>Performance Measures*</th>
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<th>2012</th>
<th>2013</th>
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</table>

*Performance measure data is presented using a five-year rolling average.*
Number of Fatalities and Serious injuries for the Last Five Years

- **Years:** 2020, 2021, 2022, 2023, 2024
- **Fatalities:** 1413, 1365, 1329, 1277, 1265
- **Serious Injuries:** Consistent decrease from 4000 to 1450

Legend:
- # Fatalites
- # Serious Injuries
Rate of Fatalities and Serious injuries for the Last Five Years

![Graph showing rate of fatalities and serious injuries from 2010 to 2014.](image)

- Fatality Rate (per HMVMT)
- Serious Injuries Rate (per HMVMT)
To the maximum extent possible, present performance measure* data by functional classification and ownership.

**Year - 2014**

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<th>Function Classification</th>
<th>Number of fatalities</th>
<th>Number of serious injuries</th>
<th>Fatality rate (per HMVMT)</th>
<th>Serious injury rate (per HMVMT)</th>
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<td>URBAN MINOR COLLECTOR</td>
<td>65</td>
<td>189</td>
<td>0.07</td>
<td>0.19</td>
</tr>
<tr>
<td>URBAN MAJOR COLLECTOR</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>URBAN LOCAL ROAD OR STREET</td>
<td>7</td>
<td>31</td>
<td>0.01</td>
<td>0.03</td>
</tr>
<tr>
<td>OTHER</td>
<td>211</td>
<td>780</td>
<td>0.21</td>
<td>0.78</td>
</tr>
<tr>
<td>RAMP</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
# Fatalities by Roadway Functional Classification

![Bar Chart](chart.png)

- Roadway Functional Classification:
  - Major Collector (U)
  - Minor Collector (R)
  - Major Arterial (U)
  - Minor Arterial (R)
  - Local Road or Street (R)
  - Principal Arterial - Other (U)
  - Principal Arterial - Other Freeways and Expressways (R)
  - Principal Arterial - Interstate (R)

# Fatalities

0 - 300

Roadway Functional Classification
# Serious Injuries by Roadway Functional Classification


**Roadway Functional Classification**
Fatality Rate by Roadway Functional Classification

Roadway Functional Classification
Serious Injury Rate by Roadway Functional Classification

2010 2011 2012 2013 2014

Roadway Functional Classification
### Year - 2014

<table>
<thead>
<tr>
<th>Roadway Ownership</th>
<th>Number of fatalities</th>
<th>Number of serious injuries</th>
<th>Fatality rate (per HMVMT)</th>
<th>Serious injury rate (per HMVMT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>STATE HIGHWAY AGENCY</td>
<td>1045</td>
<td>2555</td>
<td>1.05</td>
<td>2.56</td>
</tr>
<tr>
<td>COUNTY HIGHWAY AGENCY</td>
<td>6</td>
<td>17</td>
<td>0.01</td>
<td>0.02</td>
</tr>
<tr>
<td>TOWN OR TOWNSHIP HIGHWAY AGENCY</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>CITY OF MUNICIPAL HIGHWAY AGENCY</td>
<td>196</td>
<td>719</td>
<td>0.2</td>
<td>0.72</td>
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<td>STATE PARK, FOREST, OR RESERVATION AGENCY</td>
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<td>0</td>
</tr>
<tr>
<td>LOCAL PARK, FOREST OR RESERVATION AGENCY</td>
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<td>0</td>
</tr>
<tr>
<td>OTHER STATE AGENCY</td>
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<td>OTHER LOCAL AGENCY</td>
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<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>PRIVATE (OTHER THAN RAILROAD)</td>
<td>0</td>
<td>7</td>
<td>0</td>
<td>0.07</td>
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<tr>
<td>RAILROAD</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>STATE TOLL AUTHORITY</td>
<td>17</td>
<td>49</td>
<td>0.02</td>
<td>0.05</td>
</tr>
<tr>
<td>LOCAL TOLL AUTHORITY</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>OTHER PUBLIC INSTRUMENTALITY (E.G. AIRPORT, SCHOOL, UNIVERSITY)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>INDIAN TRIBE NATION</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>OTHER</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Number of Fatalities by Roadway Ownership

Roadway Functional Classification

# of Fatalities

- State
- County
- Town
- City
- State Park
- Other State
- Private
- Railroad
- Other Toll
- Local Toll
- Other
Number of Serious Injuries by Roadway Ownership

2010 2011 2012 2013 2014

# of Serious Injuries

Roadway Functional Classification
Fatality Rate by Roadway Ownership

Roadway Functional Classification

Fatality Rate (per HMVMT)
Describe any other aspects of the general highway safety trends on which you would like to elaborate.

Please note that the 2014 Vehicle Miles Traveled data is not available at the time of publishing this report. The 2014 values have been estimated using the 2013 values.

**Application of Special Rules**

Present the rate of traffic fatalities and serious injuries per capita for drivers and pedestrians over the age of 65.

<table>
<thead>
<tr>
<th>Older Driver Performance Measures</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatality rate (per capita)</td>
<td>1.434</td>
<td>1.386</td>
<td>1.306</td>
<td>1.268</td>
<td>1.258</td>
</tr>
<tr>
<td>Serious injury rate (per capita)</td>
<td>1.722</td>
<td>1.624</td>
<td>1.54</td>
<td>1.552</td>
<td>1.572</td>
</tr>
<tr>
<td>Fatality and serious injury rate (per capita)</td>
<td>3.162</td>
<td>3.012</td>
<td>2.846</td>
<td>2.82</td>
<td>2.832</td>
</tr>
</tbody>
</table>

*Performance measure data is presented using a five-year rolling average.*

The methodology used is based upon the guidance provided by on the FHWA website under the heading Section 148: Older Drivers and Pedestrians Special Rule Interim Guidance

Older driver fatalities and older pedestrian fatalities were gathered from the NHTSA FARS database. Serious injury data was taken from our state records. The number of older persons per 1000 population was taken from the same FHWA website.

Fatality rate per capita was taken as the sum of older driver and older pedestrian fatalities divided by the number of older persons per 1000 population. Serious injury rate was calculated in a parallel operation. The fatality and serious injury rate was performed as a third calculation rather than a simple sum of the components; rounding therefore accounts for the 0.01 differences in the data presented.

Five year averages were calculated from the annual data.
Does the older driver special rule apply to your state?

No
Assessment of the Effectiveness of the Improvements (Program Evaluation)

What indicators of success can you use to demonstrate effectiveness and success in the Highway Safety Improvement Program?

☐ None
☒ Benefit/cost
☐ Policy change
☐ Other:

What significant programmatic changes have occurred since the last reporting period?

☐ Shift Focus to Fatalities and Serious Injuries
☐ Include Local Roads in Highway Safety Improvement Program
☐ Organizational Changes
☒ None
☐ Other:

Briefly describe significant program changes that have occurred since the last reporting period.

There have been no significant program changes since the last reporting period. Much of our work has been focused on advancing the initiatives and changes reported in the 2014 Annual Report. There was
also a small turnover in staffing in the Safety Section during the 2015 reporting period; we are hopeful that the experiences of the new personnel will lead to new ideas and new focus areas.
### SHSP Emphasis Areas
For each SHSP emphasis area that relates to the HSIP, present trends in emphasis area performance measures.

#### Year - 2014

<table>
<thead>
<tr>
<th>HSIP-related SHSP Emphasis Areas</th>
<th>Target Crash Type</th>
<th>Number of Fatalities</th>
<th>Number of Serious Injuries</th>
<th>Fatality Rate (per HMVMT)</th>
<th>Serious Injury Rate (per HMVMT)</th>
<th>Other-1</th>
<th>Other-2</th>
<th>Other-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roadway Departure</td>
<td>Run-off-road</td>
<td>612</td>
<td>1493</td>
<td>0.61</td>
<td>1.5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Intersections</td>
<td>Intersections</td>
<td>270</td>
<td>998</td>
<td>0.27</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pedestrians</td>
<td>Vehicle/pedestrian</td>
<td>156</td>
<td>329</td>
<td>0.16</td>
<td>0.33</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bicyclists</td>
<td>Vehicle/bicycle</td>
<td>16</td>
<td>60</td>
<td>0.02</td>
<td>0.06</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Older Drivers</td>
<td>Older Driver</td>
<td>273</td>
<td>476</td>
<td>0.27</td>
<td>0.48</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Motorcyclists</td>
<td>Motorcycle</td>
<td>200</td>
<td>535</td>
<td>0.2</td>
<td>0.54</td>
<td>0</td>
<td>0</td>
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</tr>
<tr>
<td>Work Zones</td>
<td>Work Zone</td>
<td>21</td>
<td>45</td>
<td>0.02</td>
<td>0.05</td>
<td>0</td>
<td>0</td>
<td>0</td>
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</tbody>
</table>
Number of Serious Injuries by SHSP Emphasis Area

Year 2010 to Year 2014

SHSP Emphasis Area
Fatality Rate by SHSP Emphasis Area

Year 2010 to Year 2014

SHSP Emphasis Area
Serious Injury Rate by SHSP Emphasis Area

Year 2010 to Year 2014

Rate of Serious Injury

SHSP Emphasis Area
Groups of similar project types
Present the overall effectiveness of groups of similar types of projects.

Year - 2014

<table>
<thead>
<tr>
<th>HSIP Sub-program Types</th>
<th>Target Crash Type</th>
<th>Number of Fatalities</th>
<th>Number of Serious Injuries</th>
<th>Fatality rate (per HMVMT)</th>
<th>Serious injury rate (per HMVMT)</th>
<th>Other-1</th>
<th>Other-2</th>
<th>Other-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intersection</td>
<td>Intersections</td>
<td>270</td>
<td>998</td>
<td>0.27</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Median Barrier</td>
<td>Cross median</td>
<td>44</td>
<td>67</td>
<td>0.04</td>
<td>0.07</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Shoulder Improvement</td>
<td>Run-off-road</td>
<td>612</td>
<td>1493</td>
<td>0.61</td>
<td>1.5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Low-Cost Spot Improvements</td>
<td>All</td>
<td>1265</td>
<td>3340</td>
<td>1.27</td>
<td>3.35</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Horizontal Curve</td>
<td>Curve Driver Error</td>
<td>170</td>
<td>306</td>
<td>0.17</td>
<td>0.31</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Local Safety</td>
<td>Local Road (Only)</td>
<td>204</td>
<td>749</td>
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<td>0.75</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Roadway Departure</td>
<td>Run-off-road</td>
<td>612</td>
<td>1493</td>
<td>0.61</td>
<td>1.5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bicycle Safety</td>
<td>Vehicle/bicycle</td>
<td>16</td>
<td>60</td>
<td>0.02</td>
<td>0.06</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pedestrian Safety</td>
<td>Vehicle/pedestrian</td>
<td>156</td>
<td>329</td>
<td>0.16</td>
<td>0.33</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
# Fatalities by Target Crash Type for Groups of Similar Projects

Year 2010 to Year 2014

[Bar chart showing fatalities by target crash type for the years 2010 to 2014.]
# Serious Injuries by Target Crash Type for Groups of Similar Projects

Year 2010 to Year 2014

<table>
<thead>
<tr>
<th>Target Crash Type</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>5000</td>
<td>4500</td>
<td>4000</td>
<td>3500</td>
<td>3000</td>
</tr>
<tr>
<td>Angle</td>
<td>1000</td>
<td>1500</td>
<td>2000</td>
<td>2500</td>
<td>3000</td>
</tr>
<tr>
<td>Cross median</td>
<td>500</td>
<td>750</td>
<td>1000</td>
<td>1250</td>
<td>1500</td>
</tr>
<tr>
<td>Fixed object</td>
<td>200</td>
<td>300</td>
<td>400</td>
<td>500</td>
<td>600</td>
</tr>
<tr>
<td>Head on</td>
<td>100</td>
<td>150</td>
<td>200</td>
<td>250</td>
<td>300</td>
</tr>
<tr>
<td>Left-turn</td>
<td>50</td>
<td>75</td>
<td>100</td>
<td>125</td>
<td>150</td>
</tr>
<tr>
<td>Night-time</td>
<td>100</td>
<td>150</td>
<td>200</td>
<td>250</td>
<td>300</td>
</tr>
<tr>
<td>Intersections</td>
<td>500</td>
<td>750</td>
<td>1000</td>
<td>1250</td>
<td>1500</td>
</tr>
<tr>
<td>Non-intersection</td>
<td>200</td>
<td>300</td>
<td>400</td>
<td>500</td>
<td>600</td>
</tr>
<tr>
<td>Rear-end</td>
<td>100</td>
<td>150</td>
<td>200</td>
<td>250</td>
<td>300</td>
</tr>
<tr>
<td>Right-turn</td>
<td>50</td>
<td>75</td>
<td>100</td>
<td>125</td>
<td>150</td>
</tr>
<tr>
<td>Run-off-road</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>Speed-related</td>
<td>20</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>Vehicle/animal</td>
<td>50</td>
<td>75</td>
<td>100</td>
<td>125</td>
<td>150</td>
</tr>
<tr>
<td>Vehicle/bicycle</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
</tr>
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<td>Wet road</td>
<td>50</td>
<td>75</td>
<td>100</td>
<td>125</td>
<td>150</td>
</tr>
</tbody>
</table>
Fatality Rate by Target Crash Type for Groups of Similar Projects

Year 2010 to Year 2014

Target Crash Type

Rate of Fatalities

- All
- Angle
- Cross-median
- Fixed object
- Side-swipe
- Head-on
- Left-turn
- Night-time
- Intersections
- Non-intersection
- Rear-end
- Right-turn
- Run-off-road
- Speed-related
- Truck-related
- Vehicle/animal
- Vehicle/bicycle
- Vehicle/pedestrian

2010 2012 2012 2013 2014
Serious Injury Rate by Target Crash Type for Groups of Similar Projects

Year 2010 to Year 2014

Target Crash Type
## Systemic Treatments

Present the overall effectiveness of systemic treatments.

### Year - 2014

<table>
<thead>
<tr>
<th>Systemic improvement</th>
<th>Target Crash Type</th>
<th>Number of fatalities</th>
<th>Number of serious injuries</th>
<th>Fatality rate (per HMVMT)</th>
<th>Serious injury rate (per HMVMT)</th>
<th>Other-1</th>
<th>Other-2</th>
<th>Other-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pavement/Shoulder Widening</td>
<td>Run-off-road</td>
<td>612</td>
<td>1493</td>
<td>0.61</td>
<td>1.5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Traffic Control Device Rehabilitation</td>
<td>Intersections</td>
<td>270</td>
<td>998</td>
<td>0.27</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Install/Improve Signing</td>
<td>All</td>
<td>1265</td>
<td>3340</td>
<td>1.27</td>
<td>3.35</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rumble Strips</td>
<td>All</td>
<td>1265</td>
<td>3340</td>
<td>1.27</td>
<td>3.35</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Add/Upgrade/Modify/Remove Traffic Signal</td>
<td>Intersections</td>
<td>270</td>
<td>998</td>
<td>0.27</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Cable Median Barriers</td>
<td>Cross median</td>
<td>44</td>
<td>67</td>
<td>0.04</td>
<td>0.07</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Upgrade Guard Rails</td>
<td>Hit Guide Rail</td>
<td>132</td>
<td>244</td>
<td>0.13</td>
<td>0.24</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Install/Improve Pavement Marking and/or Delineation</td>
<td>All</td>
<td>1265</td>
<td>3340</td>
<td>1.27</td>
<td>3.35</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
# Serious Injuries by Target Crash Type for Systemic Safety Improvements

Year 2010 to Year 2014

![Bar chart showing the number of serious injuries by target crash type for the years 2010 to 2014. The chart includes categories such as All, Angle, Cross median, and various types of crashes. Each year is represented by a different color.](chart.png)
Fatality Rate by Target Crash Type for Systemic Safety Improvements

Year 2010 to Year 2014

Target Crash Type

Rate of Fatalities

2010 2012 2012 2013 2014
Serious Injury Rate by Target Crash Type for Systemic Safety Improvements

Year 2010 to Year 2014

Target Crash Type

Rate of Serious Injuries

- All
- Angle
- Cross median
- Fixed object
- Sideswipe
- Head on
- Left-turn
- Night-time
- Intersections
- Non-intersection
- Rear end
- Right-turn
- Run-off-road
- Speed-related
- Truck-related
- Vehicle/animal
- Vehicle/bicycle
- Vehicle/pedestrian

12
10
8
6
4
2
0
2010 2011 2012 2013 2014
Describe any other aspects of the overall Highway Safety Improvement Program effectiveness on which you would like to elaborate.

Please note that the 2014 Vehicle Miles Traveled data is unavailable at this time; 2013 data has been used for this reporting.

The overall HSIP benefit cost ratio for projects completed in 2011 – the most recent set for which we have three years of complete before and after data – is -0.96:1. This indicates that for each dollar we invested in the HSIP program, we lost that dollar and an additional $0.96. Our overall HSIP benefit-cost ratio has been reduced to 0.73:1.

While these results are outwardly negative, they are not entirely in line with our overall statewide fatality statistics. 2011 lies in the middle of a recent decline in fatalities; the 25% decline since 2005 has resulted in record lows in highway deaths not seen since the 1920s.

Similar to the previous annual report, a closer examination of the data was performed to identify the cause for the negative ratio. Several key examples were identified:

Project 70367 was a corridor safety improvement project near Sunbury. A $861,000 HSIP investment went towards signal upgrades, ADA-compliant ramps and sidewalks, and pedestrian signals. There was a 7% reduction in crashes the after project was completed, but the fatalities and serious injuries both increased from 0 to 2. An analysis of the individual crashes revealed that 2 fatalities occurred in a head-on crash on a bridge, 1 serious injury was a pedestrian running into the street mid-block and being struck by a slow-moving vehicle, and 1 serious injury was a pedestrian struck by an ambulance making a careless turn. None of these events were impacted by the HSIP-funded improvements in the corridor.

Project 84566 was a signing replacement project along various interstates and arterials in Lackawanna and Luzerne counties. $190,000 on HSIP funds were spent. Fatalities did not change (from 1 to 1) but there was an increase in serious injuries from 0 to 3. All of the fatalities and major injuries after construction were the result of vehicles operating on slippery roads in winter conditions and hitting fixed objects, and would not have been prevented by the signing replacements.

Project 80103 was a roadway betterment project in Philadelphia. $4.4 million in HSIP funds were expended for pavement overlays, barrier reconstruction, guide rail upgrades, and crashworthy end treatments. Shoulder rumble strips and new pavement markings were also included. In the three years after completion, there was a small reduction in crashes, but an increase in fatalities from 1 to 3 and an increase in serious injuries from 2 to 5. Two of the fatalities were from a motorcycle losing control at high speed; the third was similarly the result of a driver losing control of their vehicle at an excessive speed. The serious injury crashes had a variety of causations including wrong way and rear end events. The vast majority of the fatalities and injuries would have occurred regardless of the project’s improvements.
Project 73468 was a bridge replacement and intersection improvement project in Columbia County. $4.6 million in HSIP funds were used on the project, but there were no fatal, serious, or moderate injuries in the three years before the completion date. This project would not meet our current selection criteria for HSIP projects and was likely grandfathered through a previous approval.

If these four projects were eliminated from the calculation, the HSIP benefit-cost ratio for the projects completed in 2011 would be 1:1. It is likely that further analysis of the crash histories would yield further adjustments to the final result. However, a thorough examination of all 3,400 crashes that occurred in the project areas would be a difficult proposition for the annual report given the current timeframes for analysis and submittal. We are further limited by some of the location data provided: our engineering districts often provide locations in entire roadway segments (typically 2000-3000 feet long) rather than the actual locations of improvements. Therefore, it is possible that we are providing analysis on sections of roadway that are not impacted by our HSIP projects. Correcting this issue will require coordination with our district personnel and implementation of more standardized reporting.
**Project Evaluation**
Provide project evaluation data for completed projects (optional).

<table>
<thead>
<tr>
<th>Location</th>
<th>Functional Class</th>
<th>Improvement Category</th>
<th>Improvement Type</th>
<th>Bef-Fatal</th>
<th>Bef-Serious Injury</th>
<th>Bef-All Injuries</th>
<th>Bef-PDO</th>
<th>Bef-Total</th>
<th>Aft-Fatal</th>
<th>Aft-Serious Injury</th>
<th>Aft-All Injuries</th>
<th>Aft-PDO</th>
<th>Aft-Total</th>
<th>Evaluation Results (Benefit/Cost Ratio)</th>
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<tbody>
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## Optional Attachments

<table>
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<tr>
<th>Sections</th>
<th>Files Attached</th>
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</thead>
</table>

Glossary

5 year rolling average means the average of five individual, consecutive annual points of data (e.g. annual fatality rate).

Emphasis area means a highway safety priority in a State’s SHSP, identified through a data-driven, collaborative process.

Highway safety improvement project means strategies, activities and projects on a public road that are consistent with a State strategic highway safety plan and corrects or improves a hazardous road location or feature or addresses a highway safety problem.

HMVMT means hundred million vehicle miles traveled.

Non-infrastructure projects are projects that do not result in construction. Examples of non-infrastructure projects include road safety audits, transportation safety planning activities, improvements in the collection and analysis of data, education and outreach, and enforcement activities.

Older driver special rule applies if traffic fatalities and serious injuries per capita for drivers and pedestrians over the age of 65 in a State increases during the most recent 2-year period for which data are available, as defined in the Older Driver and Pedestrian Special Rule Interim Guidance dated February 13, 2013.

Performance measure means indicators that enable decision-makers and other stakeholders to monitor changes in system condition and performance against established visions, goals, and objectives.

Programmed funds mean those funds that have been programmed in the Statewide Transportation Improvement Program (STIP) to be expended on highway safety improvement projects.

Roadway Functional Classification means the process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide.

Strategic Highway Safety Plan (SHSP) means a comprehensive, multi-disciplinary plan, based on safety data developed by a State Department of Transportation in accordance with 23 U.S.C. 148.

Systemic safety improvement means an improvement that is widely implemented based on high risk roadway features that are correlated with specific severe crash types.

Transfer means, in accordance with provisions of 23 U.S.C. 126, a State may transfer from an apportionment under section 104(b) not to exceed 50 percent of the amount apportioned for the fiscal year to any other apportionment of the State under that section.