



PENNSYLVANIA

**HIGHWAY SAFETY
IMPROVEMENT PROGRAM**
2021 ANNUAL REPORT



U.S. Department of Transportation
Federal Highway Administration

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Division

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Disclaimer

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. 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.”

Executive Summary

The Pennsylvania Department of Transportation is pleased to present this 2021 Annual Report of our progress with the Highway Safety Improvement Program. In 2021, 1,129 people lost their lives on Pennsylvania's roadways. This was an increase of 70 fatalities from the 1,059 fatalities in 2019. While overall fatalities went up there were some areas where fatal crashes decreased from the previous year. Those crash types included pedestrians, alcohol related, stop controlled intersections, heavy truck crashes, crashes involving 65-year-old drivers, and crashes involving 16 or 17-year-old drivers. Some specific areas that fatal crashes increased were unrestrained, motorcyclist, speeding, signalized intersections, and lane departures. To reach our ultimate goal of zero deaths on our roads, 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. Pennsylvania is still using HSM based network screening to identify locations for safety improvement projects in all 67 counties. To increase our evaluation abilities PennDOT worked with Penn State University and several consultants to develop a new Highway Safety Network Screening (HSNS). The new network screening was completed in June 2021. HSIP funds were utilized to complete the new network screening. PennDOT is currently in the process of having the new HSNS input into color coded GIS maps. The new network screening added many new aspects and updated some others. The changes or enhancements in PennDOT's latest HSNS include:

- Urban and rural are now identified by US census data urban and rural area maps with some MPO adjustments. In the past PennDOT used the municipality's classification as urban or rural. Some municipalities classified as rural actually fell into urban areas based on the US Census maps. This change to urban and rural data allowed the screening process to correctly select the best fitting SPF.
- New SPFs for urban/suburban Collector roads were included. In the past we used Urban Arterial SPFs. While this method is commonly used across the country, the introduction of Pennsylvania specific SPFs for urban-suburban collectors contributed to a better screening.
- Thousands of additional sites were added for our conventional highways and all previously screened locations were updated with current data
- All freeway segments, speed change lanes, ramp segments, and ramp terminals were added to the statewide network screening. This was possible since the AASHTO 2014 SPFs for freeways and ramps were calibrated for Pennsylvania.

PennDOT has also completed calibration for roundabout SPFs based on the research in NCHRP Research Report 888. These calibrated SPFs will be used to screen and evaluate the roundabouts across the state. With PennDOT only have several dozen roundabouts built with many more in planning and design, we will revisit the calibration effort in a few years.

Next PennDOT updated our safety analysis tools. PennDOT's Tool A & B HSM Analysis tools were completely updated. To provide clarity in benefit cost analysis PennDOT adopted the FHWA's Countermeasure Service Life Guide that was just published in March 2021.

This was PennDOT's second year under the FAST Act where the Department had to complete a HSIP Implementation Plan. The updated data was submitted to the FHWA on June 30, 2020. PennDOT once again hired a consultant team to help review the HSIP program's 2016 and 2017 projects. This update reviewed the similar statistics from the first Implementation Plan and updated the charts, graphs and tables with the new data. The finding if the updated Implementation plan really didn't change in the second edition. We did act on some of the action points from the first Implementation plan. One of those areas was creating a force account policy for municipalities to perform low cost safety improvements on their own roads with their own road crews. This should greatly enable systemic based safety improvements to thousands of locations across the Commonwealth. This policy, which will be located in PennDOT Publication 638, is currently going through

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PennDOT Clearance Transmittal process for approval. We hope to start some low cost safety projects on local streets in 2022.

PennDOT is currently in the process of updating our State's Strategic Highway Safety Plan (SHSP). We are reviewing data to measure the success of the 2017 SHSP and to determine what new strategies we should add, what existing strategies should continue, need modified, what strategies and actions have been implemented, and if any current strategies should be removed. Several steering committees made up of a diverse group of individuals from different aspects of transportation are working to develop a new SHSP that will push Pennsylvania forward in reducing fatal and injury crashes.

Finally, with the changes in traffic patterns and volumes due to the COVID-19 pandemic and quarantine measures the transportation industry has likely seen a major change. Teleworking for many office type jobs has become a normal practice for many businesses. What were once congested roadways to large office centers now have major traffic volume decreases, the need for large parking complexes has diminished in many urban centers, and some business centers have closed or downsized with no intention to have business return. We have also seen an increase in the home delivery service sector. This typically means there is a need for more commercial traffic to deliver goods from large warehouse facilities directly to a person's home. The long-term effects of this change in traffic on highway safety are not know but will be monitored and studied by the Department and its partners to determine how to move forward and still work toward a safer transportation system in the Commonwealth. While a lot of work remains to reach our goal of reducing highway fatalities to zero by 2050, we remain encouraged by the progress that has been made in certain areas 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 Reporting Guidance dated December 29, 2016 and consists of five sections: program structure, progress in implementing highway safety improvement projects, progress in achieving safety outcomes and performance targets, effectiveness of the improvements and compliance assessment.

Program Structure

Program Administration

Describe the general structure of the HSIP in the State.

HSIP projects are identified by using data driven safety analysis which includes crash data, predictive analysis methods, or by implementing known systemic safety improvements identified by the Highway Safety & Traffic Operations Division. Project locations and systemic project scopes are developed by the Engineering Districts and /or the regional planning partners. These project proposals are then sent to PennDOT's Highway Safety & Traffic Operations Division (HSTOD) for a technical review and then to the Center for Program Development and Management for funding and fiscal review. Then the FHWA Division office finance team reviews the financial documents for completeness. Projects are selected for implementation based on the projected safety benefit of the safety countermeasures and the allowable funding. Projects are then developed and designed by the Engineering Districts. The Engineering Districts let the construction projects (Letting is the day construction project bids are received for the project and the lowest bidder is shown), provide construction inspection and oversight. As part of the annual HSIP report, HSTOD evaluates projects before and after the project was constructed to determine a perceived net benefit based the reduction of fatal, injury, and property damage only crashes. PennDOT also tracks the implementation of systemic improvements like rumble strips, High Friction Surface treatments, and High Tension Cable Median Barrier. (PennDOT also reviews the effect of common location specific projects like adaptive traffic signal controllers.) A network analysis of these systemic improvements is completed when there is enough data in a given time span. Currently PennDOT is short on staff to do these evaluations, so we have a backlog of research projects. PennDOT has also implemented a minimum BCR of 1.0 for spot location safety projects. Districts and MPOs are supposed to select locations that have a safety need either by using excess crash values or excess crash cost values.

PennDOT also has a biennial set aside program. Every odd numbered year PennDOT allows the eleven engineering Districts and regional planning partners apply for HSIP funds to complete safety projects. The projects must use a systemic safety approach and include a HSM analysis and benefit cost analysis. Every year \$35 million is set aside and every competitive set aside period covers \$70 million HSIP funds. Pennsylvania's local municipalities may apply for a project through their MPO/RPO. This set aside program is now a policy in PennDOT Publication 638.

PennDOT is currently in the process of creating a policy for force account HSIP projects on local roads using local municipalities' work forces to complete low cost safety improvements. We are hopeful the new Local Force Account Guidelines can be completed by the end of 2021. This new policy will be incorporated into PennDOT's Publication 638 chapter 6.

Where is HSIP staff located within the State DOT?

Other-Engineering and Planning

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Staff for the Pennsylvania HSIP are located in PennDOT's Central office in the Highway Safety Section, The Center for Program Development and Management (CPDM), the eleven Engineering Districts, and our various MPOs and RPOs.

How are HSIP funds allocated in a State?

- Central Office via Statewide Competitive Application Process
- Formula via MPOs

\$35 Million per year is set aside for competitive funding awards. The remaining amount of yearly HSIP funds are divided among the MPOs and RPOs based on the weighted distribution of fatal and injury crash and the number of PDO crashes. The MPO that receives the most regionally allocated funds every year is the DVRPC (Greater Philadelphia Area) and the area(s) that receive the least yearly HSIP funds are Wayne County (Northeast corner) and Adams County (Gettysburg Area).

Describe how local and tribal roads are addressed as part of HSIP.

Local highways (those not owned and maintained by the Commonwealth) make up two-thirds of the approximately 120,000 miles of highways in Pennsylvania. These roads are owned by the 2,561 municipalities across the state. In 2020 19.8% of highway fatalities occurred on the local road network. Local highway fatalities increased from 186 in 2019 to 224 in 2020. Local road fatalities have hovered above or below 200/year over the past two decades with the highest total of 290 in the year 2001 and the lowest count of 163 in the year 2002.

To more accurately determine local roads safety needs, PennDOT was able to create local road cluster lists for each municipality. Each list has the street name and how many fatal and injury crashes occurred on that local road within that municipality. Specific locations on local roads could not be provided on the list since segmenting local roads has not been completed yet. PennDOT does have plans to collect more traffic data on local roads using HSIP funds. Soon local roads will be segmented to help pinpoint crash locations through ARNOLD. PennDOT has already collected more local road traffic volumes to help expand HSM based network screening efforts. Also, the PennDOT PCIT tool allows the public to see where crashes occurred on a local road through a map feature. These new local cluster lists were provided to the PA LTAP and the PennDOT Engineering districts to determine better locations for local safety improvements.

PennDOT along with LTAP and the Pennsylvania State Association of Township Supervisors (PSATS) conducted technical reviews on local roads which suggested low-cost safety projects. PennDOT provided direction for the studies which are conducted by LTAP consultant staff. The studies resulted in dozens of safety analysis reports that have an itemized list of safety countermeasures ready for a construction contract or force account work. LTAP also provides training to municipalities for a variety of subjects including highway safety.

PennDOT is actively working on policy changes to implement force account safety work on local roads using HSIP funds. PennDOT will update their Publication 638 to include the new HSIP local force account guidelines. The policy updated should be completed by late 2021.

Local municipalities remain engaged in the enforcement, education and emergency response side of highway safety through NHTSA grants. These behavioral safety efforts are detailed in the Pennsylvania HSP report submitted to NHTSA every year.

Identify which internal partners (e.g., State departments of transportation (DOTs) Bureaus, Divisions) are involved with HSIP planning.

- Design
- Districts/Regions
- Maintenance
- Operations
- Planning
- Traffic Engineering/Safety
- Other-Engineering Districts, Planning Organizations, Program Center

Describe coordination with internal partners.

Design – Designers manage safety projects through the design contract process out to construction

Districts – Districts implement highway safety projects selected for construction

Governors Highway Safety Office- In Pennsylvania this falls under PennDOT and combines its behavioral efforts with Safety Engineering efforts (Doesn't use HSIP funds)

Maintenance – Maintenance helps to select projects and then has the task to maintain the projects. In Pennsylvania Highway Safety falls under the Bureau of Maintenance and Operations

Operations – Highway Safety is part of the Bureau of Maintenance and Operations. As we move forward with autonomous vehicles and vehicle to infrastructure technologies this group will play a bigger role in safety.

Planning – Programs funding for safety projects and manages the obligation of safety funds.

Highway Safety & Traffic Operations – Lead Division that manages the HSIP program across the state (HSTOD). All highway safety activities and policies are managed by the Highway Safety Section within the HSTOD. Updates PennDOT Publication 638 to reflect the regulations and policies of the HSIP and SHSP.

Identify which external partners are involved with HSIP planning.

- Academia/University
- FHWA
- Governors Highway Safety Office
- Law Enforcement Agency
- Local Government Agency
- Local Technical Assistance Program
- Regional Planning Organizations (e.g. MPOs, RPOs, COGs)

Describe coordination with external partners.

PennDOT works with Universities (Academia) to produce research into safety programs. PennDOT routinely uses university support to develop and update SPFS, CMFs, and evaluate countermeasure effectiveness.

FHWA is involved in the HSIP program in all aspects. They provide final approval on HSIP funded projects, national guidance for the HSIP funding program, and participate in monthly coordination for all safety related topics.

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Gov. Highway Safety Office deals with driver behavior and research aspects of highway safety. This office supports the NHTSA grant funded programs. (No HSIP funds.)

Law enforcement & public education partners are involved in many Behavioral safety programs such as reducing Impaired driving, increasing seatbelt use, speed enforcement, aggressive driving enforcement, reducing distracted driving, mature driver safety, motorcycle safety training, young & inexperienced driver training, enhancing safety on local roads, and several other topics.

Local Government Agencies like PSATS and PSABS help provide safety training to municipalities. This is done through the Pennsylvania LTAP which uses consultant staff. The LTAP program is administered through a contract with PSATS.

Regional Planning Organizations help to implement HSIP funded projects.

Describe HSIP program administration practices that have changed since the last reporting period.

Allocation of HSIP funds to Regional Planning patterns was updated based on the new 2020 data. Several new options were proposed for distribution of regional funds. The CPDM chose to keep with existing distribution method only changing the proportional allocation based on the new 2020 crash data severity distributions.

Describe other aspects of HSIP Administration on which the State would like to elaborate.

The HSIP Program fully aligns with the 2017 Pennsylvania Strategic Highway Safety Plan (SHSP). The Pennsylvania SHSP is currently in the revision process for the 5-year update.

PennDOT has updated its network screening in all 67 counties expanding to urban collector roadways and Freeways and Ramps. The network screening is discussed in more detail in other parts of this report. The network screening used HSIP funds from District safety projects that have fallen behind on their delivery schedules and now require funds in later years.

Program Methodology

Does the State have an HSIP manual or similar that clearly describes HSIP planning, implementation and evaluation processes?

Yes
PennDOT Publication 638 chapter 6 covers the HSIP for Pennsylvania. You can view the publication from PennDOT's website. PennDOT is currently in the process of updating Chapter 6 to include local road force account projects and to also clarify benefit cost analysis by fixing countermeasure service life. Countermeasure service life for HSIP application BCAs will refer to the countermeasure life provided in the FHWA's Countermeasure Service Life Guide (FHWA-SA-21-021). When the updates are completed a new version will be added to the PennDOT website.

<http://www.dot.state.pa.us/public/pubsforms/Publications/PUB%20638.pdf>

Select the programs that are administered under the HSIP.

- Bicycle Safety
- Horizontal Curve
- HRRR

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- HSIP (no subprograms)
- Intersection
- Left Turn Crash
- Local Safety
- Low-Cost Spot Improvements
- Median Barrier
- Pedestrian Safety
- Roadway Departure
- Rural State Highways
- Safe Corridor
- Shoulder Improvement
- Skid Hazard
- Wrong Way Driving
- Other-Older Drivers

Program: Bicycle Safety

Date of Program Methodology:5/13/2020

What is the justification for this program?

- Addresses SHSP priority or emphasis area

What is the funding approach for this program?

Competes with all projects

What data types were used in the program methodology?

Crashes

- All crashes

Exposure

Roadway

- Horizontal curvature
- Roadside features

What project identification methodology was used for this program?

- Crash frequency
- EPDO crash frequency with EB adjustment
- Expected crash frequency with EB adjustment

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

Yes

Are local road projects identified using the same methodology as state roads?

No

Describe the methodology used to identify local road projects as part of this program.

Local roads do not have as much detail as state owned roads.

How are projects under this program advanced for implementation?

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- 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).

Rank of Priority Consideration

Available funding:2

Other-Potential for Improvement based on Crash History:1

Program: Horizontal Curve

Date of Program Methodology:6/19/2019

What is the justification for this program?

- Addresses SHSP priority or emphasis area
- FHWA focused approach to safety

What is the funding approach for this program?

Other-HSIP regional, HSIP set Aside, and State 715 Safety Funds

What data types were used in the program methodology?

Crashes

- All crashes

Exposure

Roadway

- Horizontal curvature
- Roadside features

What project identification methodology was used for this program?

- Crash frequency
- EPDO crash frequency with EB adjustment
- Expected crash frequency with EB adjustment

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

Yes

Are local road projects identified using the same methodology as state roads?

Yes

How are projects under this program advanced for implementation?

- Competitive application process

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- 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).

Rank of Priority Consideration

Available funding:2

Other-Potential for Improvement based on Crash History:1

Program: HRRR

Date of Program Methodology:6/26/2017

What is the justification for this program?

- Other-Old Surface Transportation Act requirement no longer required by FAST Act

What is the funding approach for this program?

Other-FAST Act Penalty

What data types were used in the program methodology?

Crashes

- All crashes

Exposure

Roadway

- Functional classification

What project identification methodology was used for this program?

- Crash frequency
- EPDO crash frequency with EB adjustment
- Expected crash frequency with EB adjustment
- Other-Number of crashes

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

Yes

Are local road projects identified using the same methodology as state roads?

Yes

How are projects under this program 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).

Rank of Priority Consideration

Available funding:2

Other-Potential for Improvement based on Crash History:1

Program: HSIP (no subprograms)

Date of Program Methodology:7/11/2019

What is the justification for this program?

- Addresses SHSP priority or emphasis area
- FHWA focused approach to safety

What is the funding approach for this program?

Other-HSIP

What data types were used in the program methodology?

Crashes

Exposure

Roadway

- All crashes

What project identification methodology was used for this program?

- Crash frequency
- EPDO crash frequency with EB adjustment
- Expected crash frequency with EB adjustment

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

Yes

Are local road projects identified using the same methodology as state roads?

Yes

How are projects under this program 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).

Rank of Priority Consideration

Available funding:1

Program: Intersection

Date of Program Methodology:5/13/2020

What is the justification for this program?

- Addresses SHSP priority or emphasis area
- FHWA focused approach to safety

What is the funding approach for this program?

Other-HSIP regional, HSIP set Aside, and State 715 Safety Funds

What data types were used in the program methodology?

Crashes

- All crashes

Exposure

- Traffic
- Volume

Roadway

- Functional classification
- Roadside features

What project identification methodology was used for this program?

- Crash frequency
- Crash rate
- EPDO crash frequency with EB adjustment
- Excess expected crash frequency using SPFs
- Excess expected crash frequency with the EB adjustment
- Expected crash frequency with EB adjustment

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

Yes

Are local road projects identified using the same methodology as state roads?

Yes

How are projects under this program 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).

Rank of Priority Consideration

Ranking based on B/C:1

Available funding:3

Other-Potential for Improvement based on Crash History:2

Program: Left Turn Crash

Date of Program Methodology:5/13/2020

What is the justification for this program?

- Other-ISIP

What is the funding approach for this program?

Competes with all projects

What data types were used in the program methodology?

Crashes

Exposure

Roadway

- All crashes

What project identification methodology was used for this program?

- Crash frequency
- EPDO crash frequency with EB adjustment
- Expected crash frequency with EB adjustment

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

Yes

Are local road projects identified using the same methodology as state roads?

Yes

How are projects under this program 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).

Rank of Priority Consideration

Available funding:2

Other-Potential for Improvement based on Crash History:1

Program: Local Safety

Date of Program Methodology:5/13/2020

What is the justification for this program?

- Addresses SHSP priority or emphasis area

What is the funding approach for this program?

What data types were used in the program methodology?

Crashes

- All crashes

Exposure

Roadway

- Functional classification

What project identification methodology was used for this program?

- Crash frequency
- EPDO crash frequency with EB adjustment
- Expected crash frequency with EB adjustment

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

Yes

Are local road projects identified using the same methodology as state roads?

No

Describe the methodology used to identify local road projects as part of this program.

We have establish local road high crash locations from ranking each street name by fatal/injury crashes. Spreadsheets were completed for every municipality using 5 year crash data.

How are projects under this program advanced for implementation?

- 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).

Rank of Priority Consideration

Available funding:2

Other-Potential for Improvement based on Crash History:1

Program: Low-Cost Spot Improvements

Date of Program Methodology:3/2/2020

What is the justification for this program?

- Addresses SHSP priority or emphasis area

What is the funding approach for this program?

What data types were used in the program methodology?

Crashes

Exposure

Roadway

- All crashes

What project identification methodology was used for this program?

- Crash frequency
- EPDO crash frequency with EB adjustment
- Excess expected crash frequency with the EB adjustment
- Expected crash frequency with EB adjustment

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

Yes

Are local road projects identified using the same methodology as state roads?

Yes

How are projects under this program advanced for implementation?

- 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).

Rank of Priority Consideration

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Ranking based on B/C:1

Available funding:3

Other-Potential for Improvement based on Crash History:2

Program: Median Barrier

Date of Program Methodology:5/29/2020

What is the justification for this program?

- Addresses SHSP priority or emphasis area
- FHWA focused approach to safety

What is the funding approach for this program?

Competes with all projects

What data types were used in the program methodology?

Crashes

- All crashes

Exposure

Roadway

- Median width
- Functional classification
- Roadside features
- Other-median slopes/cross-section

What project identification methodology was used for this program?

- Crash frequency
- EPDO crash frequency with EB adjustment
- Expected crash frequency with EB adjustment

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

No

Are local road projects identified using the same methodology as state roads?

How are projects under this program advanced for implementation?

- 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).

Rank of Priority Consideration

Available funding:2

Other-Potential for Improvement based on Crash History:1

Program: Pedestrian Safety

Date of Program Methodology:5/13/2020

What is the justification for this program?

- Addresses SHSP priority or emphasis area

What is the funding approach for this program?

Competes with all projects

What data types were used in the program methodology?

Crashes

Exposure

Roadway

- All crashes

What project identification methodology was used for this program?

- Crash frequency
- EPDO crash frequency with EB adjustment
- Expected crash frequency with EB adjustment

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

Yes

Are local road projects identified using the same methodology as state roads?

Yes

How are projects under this program 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).

Rank of Priority Consideration

Available funding:2

Other-Potential for Improvement based on Crash History:1

Program: Roadway Departure

Date of Program Methodology:5/13/2020

What is the justification for this program?

- Addresses SHSP priority or emphasis area
- FHWA focused approach to safety

What is the funding approach for this program?

Other-HSIP funds and State 715 safety funds

What data types were used in the program methodology?

Crashes

- All crashes

Exposure

- Volume

Roadway

- Horizontal curvature
- Functional classification
- Roadside features

What project identification methodology was used for this program?

- Crash frequency
- Crash rate
- EPDO crash frequency with EB adjustment
- Expected crash frequency with EB adjustment
- Other-Exhibit 3-15 from AASHTO's 2004, A Policy on Geometric Design of Highways and Streets.
- Other-MUTCD Table 2C.05

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

Yes

Are local road projects identified using the same methodology as state roads?

Yes

How are projects under this program 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).

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Rank of Priority Consideration

Available funding:2

Other-Potential for Improvement based on Crash History:1

Program: Rural State Highways

Date of Program Methodology:5/13/2020

What is the justification for this program?

- Other-Old surface Transportation Act

What is the funding approach for this program?

What data types were used in the program methodology?

Crashes

Exposure

Roadway

- All crashes

What project identification methodology was used for this program?

- Crash frequency
- EPDO crash frequency with EB adjustment
- Expected crash frequency with EB adjustment

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

Yes

Are local road projects identified using the same methodology as state roads?

Yes

How are projects under this program advanced for implementation?

- 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).

Rank of Priority Consideration

Available funding:2

Other-Potential for Improvement based on Crash History:1

Program: Safe Corridor

Date of Program Methodology:8/6/2021

What is the justification for this program?

- Addresses SHSP priority or emphasis area

What is the funding approach for this program?

Other-Program set up by PA Act 229

What data types were used in the program methodology?

Crashes

- All crashes

Exposure

Roadway

- Functional classification

What project identification methodology was used for this program?

- Crash frequency
- EPDO crash frequency with EB adjustment
- Expected crash frequency with EB adjustment
- Other-Process to identify these locations is in PennDOT Publication 638 Chapter 5

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

Yes

Are local road projects identified using the same methodology as state roads?

No

Describe the methodology used to identify local road projects as part of this program.

We have established local road high crash locations from ranking each street name by fatal/injury crashes. Spreadsheets were completed for every municipality using 5 year crash data.

How are projects under this program 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).

Rank of Priority Consideration

Cost Effectiveness:2

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Other-Potential for Improvement based on Crash History:1

Program: Shoulder Improvement

Date of Program Methodology:5/13/2020

What is the justification for this program?

- Other-Maintenance and Highway Safety

What is the funding approach for this program?

Competes with all projects

What data types were used in the program methodology?

Crashes

- All crashes

Exposure

Roadway

- Roadside features

What project identification methodology was used for this program?

- Crash frequency
- EPDO crash frequency with EB adjustment
- Expected crash frequency with EB adjustment

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

No

Are local road projects identified using the same methodology as state roads?

How are projects under this program 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).

Rank of Priority Consideration

Available funding:2

Other-Potential for Improvement based on Crash History:1

Program: Skid Hazard

Date of Program Methodology:5/13/2020

What is the justification for this program?

- Addresses SHSP priority or emphasis area
- FHWA focused approach to safety

What is the funding approach for this program?

Competes with all projects

What data types were used in the program methodology?

Crashes

- All crashes
- Other-Wet road, SVROR and HFO

Exposure

Roadway

- Roadside features
- Other-Skid testing

What project identification methodology was used for this program?

- Crash frequency
- EPDO crash frequency with EB adjustment
- Expected crash frequency with EB adjustment

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

No

Are local road projects identified using the same methodology as state roads?

How are projects under this program 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).

Rank of Priority Consideration

Available funding:2

Other-Potential for Improvement based on Crash History:1

Program: Wrong Way Driving

Date of Program Methodology:5/27/2020

What is the justification for this program?

- Addresses SHSP priority or emphasis area
- FHWA focused approach to safety

What is the funding approach for this program?

Other-HSIP regional allocations, HSIP set aside, and state 715 safety funds

What data types were used in the program methodology?

Crashes

- All crashes
- Fatal crashes only

Exposure

- Other-none

Roadway

- Functional classification

What project identification methodology was used for this program?

- Crash frequency

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

No

Are local road projects identified using the same methodology as state roads?

How are projects under this program 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).

Rank of Priority Consideration

Available funding:1

Program: Other-Older Drivers

Date of Program Methodology:5/13/2020

What is the justification for this program?

- Addresses SHSP priority or emphasis area

What is the funding approach for this program?

Other-(FAST) Act Special Rule

What data types were used in the program methodology?

Crashes

Exposure

Roadway

- Fatal and serious injury crashes only

What project identification methodology was used for this program?

- Crash frequency

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

Yes

Are local road projects identified using the same methodology as state roads?

Yes

How are projects under this program 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).

Rank of Priority Consideration

Available funding:2

Other-Potential for Improvement based on Crash History:1

What percentage of HSIP funds address systemic improvements?

30

HSIP funds are used to address which of the following systemic improvements?

- Add/Upgrade/Modify/Remove Traffic Signal
- Cable Median Barriers

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- High friction surface treatment
- Horizontal curve signs
- Install/Improve Pavement Marking and/or Delineation
- Install/Improve Signing
- Rumble Strips
- Wrong way driving treatments

What process is used to identify potential countermeasures?

- Crash data analysis
- Data-driven safety analysis tools (HSM, CMF Clearinghouse, SafetyAnalyst, usRAP)
- Engineering Study
- Road Safety Assessment
- SHSP/Local road safety plan
- Stakeholder input
- Other-RDIP, ISIP, and other specific countermeasure crash lists that include high tension cable median barriers and wrong way crash lists
- Other-Speed Management Action Plan (SMAP)

Does the State HSIP consider connected vehicles and ITS technologies?

Yes

Describe how the State HSIP considers connected vehicles and ITS technologies.

As a state that has always been at the forefront of innovation and industry, it should come as no surprise that Pennsylvania is at the very epicenter of the rise in Automated Vehicles (AVs). Pennsylvania's world-class research universities have continually served as a breeding ground for technological advances, with Carnegie Mellon University known as the "birthplace of self driving vehicles." Since 2011, Pennsylvania has emerged as a leading location for on-road testing of AVs as they steadily advance toward practical use. As of August 2021, there are nine authorized AV testers in Pennsylvania – Aptiv, Argo AI, Aurora, Carnegie Mellon University, Locomotion, Nvidia, Plus AI, and Qualcomm. Base on the information the testers provided PennDOT, testing is expected to occur in 56 of our 67 counties, with 42% of counties expected to have two or more active testers.

The Pennsylvania Department of Transportation (PennDOT) supports the advancement of automation through various ways including the deployment of Dedicated Short-Range Communication (DSRC) and Cellular Vehicle-to-Everything (C-V2X) Roadside Units (RSUs) at select signalized intersections to enable communications between the vehicles and the infrastructure. Currently, there are 54 connected intersections, including 8 in Harrisburg and 24 in Pittsburgh, with plans to install an additional 200 in the coming years. In 2016, PennDOT formed both the Pennsylvania AV Policy Task Force and the Smart Belt Coalition, to ensure Pennsylvania aligns with industry and national best practices. The Task Force is made up of a diverse and comprehensive set of stakeholders, including representatives from federal, state and local government, law enforcement, technology companies, higher education, manufacturers, motorists and trucking groups, and academic research institutions. The Smart Belt Coalition is a first-of-its-kind collaboration between PennDOT, PTC, Ohio DOT, the Ohio Turnpike, and Michigan DOT and universities in Pennsylvania, Ohio, and Michigan with a focus on automated and connected vehicle initiatives across jurisdictional borders.

In 2020, the Smart Belt Coalition conducted a demonstration of interstate platooning operations to test the administrative and procedural requirements necessary for a truck platooning system to operate continuously through a multi-jurisdictional environment. The lessons learned from the demonstration will allow for Coalition members to align processes with best practices to the extent allowable by existing state regulations.

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PennDOT has also been active in national efforts to develop uniform standards and practices for automated vehicles. With the pace of automated vehicle innovation accelerating, Transportation Secretary Yassmin Gramian, P.E. is challenging PennDOT to take action to sustain Pennsylvania's leadership in automated vehicle research, while simultaneously ensuring that public safety remains the paramount priority as AVs are tested on the roadways. PennDOT recently completed a 7-month effort to update Pennsylvania's Highly Automated Vehicle Testing Guidance. This nationally recognized guidance focuses on the human safety driver, training, and safety culture of a tester rather than the technical aspects of the vehicle.

In Spring 2018, PennDOT, the Pennsylvania Turnpike Commission, and Penn State University have partnered to develop PennSTART, a state-of-the-art training and testing facility to address the transportation safety and operational needs of Pennsylvania and the Mid-Atlantic Region. PennSTART will address safety training and research needs in six key areas: traffic incident management (TIM); connected and automated vehicles; tolling and intelligent transportation systems (ITS) technology; work zones; commercial vehicles; and transit vehicles. The PennSTART team completed the systems engineering, including Concept of Operations, Facility Requirements, Business Plan, and Market Analysis Study, in summer 2020.

In Fall 2019, PennDOT was awarded a \$8.4 million Automated Driving System (ADS) Demonstration Grant to explore the safe integration of automated vehicles in work zones. Through the department's oversight, it has become clear that AVs do not perform well in the work zones and routinely require human intervention. In many cases, testers try to avoid work zones altogether. Unlike other AV challenges, such as variable weather conditions, work zones offer a unique opportunity for industry and the public sector to collaborate to resolve this issue and safely advance ADS technology. Through the ADS grant, PennDOT plans to develop a consistent approach to allow for AVs to safely operate in work zones. Knowing that there is unlikely single solution, the PennDOT is looking as variety of methods including (i) Connectivity between AVs and work zone artifacts using connectivity equipment (DSRC and C-V2X radios), (ii) innovative coating for pavement marking and work zone artifacts, (iii) high definition work zone mapping using Radio Detection and Ranging (RADAR), Light Detection and Ranging (LIDAR) and cameras, and (iv) integration of simulation-based analysis of traffic impacts with data obtained from closed-track and live-traffic studies.

Since Winter 2020, Personal Delivery Devices have been allowed to operate on sidewalks and roadways in the Commonwealth. PennDOT developed a policy with outlines the operational guidelines for PDDs and the information which must be submitted to ensure safe operations on public infrastructure. As of August 2021, there is one PDD operator authorized in Pennsylvania – Kiwibot.

Connected and automated vehicle technologies will change the transportation decision-making process throughout Pennsylvania. To ensure Pennsylvania stays at the forefront, PennDOT is actively working to educate key stakeholders and the public about the impact and benefits of this emerging technology. PennDOT has arrange for connected and automated vehicle demonstrations to key transportation and Legislative officials. Over 200 riders had an opportunity to experience first-hand the capabilities of connected and automated vehicles, including Governor Tom Wolf, members of the Pennsylvania House and Senate Transportation Committees, several cabinet-level secretaries, and various local officials. The demonstration allowed participants to develop an understanding of how technological advances are being adapted and implemented in this rapidly advancing field here in Pennsylvania. PennDOT continues to organize the Pennsylvania Automated Vehicle Summit. The 2019 Summit had 400+ attendees and discussions focusing on a variety of themes including safety, infrastructure planning, workforce & economic development, equity, system validation, and data. The two overarching goals were to encourage interchange and collaboration between stakeholders and provide a foundational understanding of automate vehicles.

Does the State use the Highway Safety Manual to support HSIP efforts?

Yes

Please describe how the State uses the HSM to support HSIP efforts.

The Pennsylvania Department of Transportation updated Publication 638A, Pennsylvania Safety Predictive Analysis Methods Manual, (SPAMM) in May 2021. The updates greatly expanded the publication from its original edition released in 2017. The new edition added many new aspects to safety prediction analysis. These included adding three new chapters:

- Chapter 3: Freeway and Ramp PA Calibration Factors
- Chapter 4: PA Network Screening Process
- Chapter 5: HSM Part D CMF Methods
 - This chapter shows how to use the properly user the four methods to combine part D CMFs. The methods include Multiplicative, Additive, Common Dominate Residuals, and Dominate Effect.

So the definition changes were made along with two new examples on how to use predictive analysis from start to finish. References to Pennsylvania's outdated CMF guide were removed. The updates also added the new urban-suburban collector road SPFs along with the calibration factors for using the AASHTO 2014 Freeway and Ramps SPFs. The network screening chapter is specific to Pennsylvania's method of using predictive analysis methods to determine safety need at segments and intersections.

In June 2021 PennDOT completed its second edition of a statewide network screening using excess crash frequency method with cost weighting. The locations for each county are now ranked based on weighting the expected F&I crash frequency with the PDO crash frequency for a combined excess crash cost frequency. The costs used are based on those in PennDOT's yearly Crash Facts and Statistics Book . The new network screening added thousands of new conventional highway segments and intersections. The locations include 1,099 local roads that intersect with state roads. All of the previous screened locations were reevaluated to determine if any new SPFs are a better fit. All locations were also evaluated to determine if they met the new urban and rural criteria. In the previous network screening locations were determined to be urban or rural by the municipality designation. For the second edition PennDOT used census data maps to better identify if a location was urban or rural. There were several locations from pervious the previous network screening that changed to urban and thus were evaluated differently. The largest change to the network screening was the addition of evaluating all freeway segments, speed change lanes, ramp segments, and ramp terminals. The new screening is currently in the process of getting mapped into GIS. All 67 counties' top intersection and top segment locations were studied by a consultant engineer and a one-page study brief was developed to help each planning partner and Engineering District start the process of programming safety projects based on the new network screening.

PennDOT also completed comprehensive updates to our HSM analysis tools. The well known Tools A and B now include the SPFs for urban-suburban collector roads and part D CMFs were revised to remove CMFs that were no longer used replace them with newer CMFs that were more relevant to projects PennDOT has done in the past. These new tools were published to PennDOT's safety website located at:
<https://www.penndot.gov/TravelInPA/Safety/Pages/Safety-Infrastructure-Improvement-Programs.aspx> .

PennDOT has started the process to create new HSM practitioner-based training videos. The first of these short videos will cover the network screening process and what the network screening can be used for. PennDOT is currently working with consultants and Penn State University on these video projects. Other videos will be produced to cover other aspects practitioners commonly have questions about.

PennDOT is updating its PennDOT specific in-person HSM class. The class is 1 ½ days long. The class was taught by national experts from Kittelson Associates in the past. The class teaches both the national and state SPF models and provides an entire afternoon of hands on use of PennDOT's HSM analysis tool.

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Finally, PennDOT will incorporate more HSM based decisions into our design manuals. Work is underway to include these safety performance-based criteria and engineering methods.

Describe program methodology practices that have changed since the last reporting period.

PennDOT recently updated our network screening which is used to select HSIP projects. The network screening now includes F&I Excess Crashes along with PDO excess crashes which are used to calculate a locations excess yearly crash value. This is used to rank locations for safety need. Along with this we are requiring Districts to use a standardized countermeasure service life developed by the FHWA.

PennDOT is also in the process of updating our Publication 638 chapter 6 which is PennDOT's HSIP guidelines. The major changes to the publication include adding local force account guidelines so municipalities with roadcrews can install their own signs and pavement markings. These updates should be completed by October 2021.

Describe other aspects of the HSIP methodology on which the State would like to elaborate.

The following noteworthy practices have been identified in Pennsylvania's recently updated HSIP Implementation Plan:

Highway Safety Manual (HSM) Implementation - A decade ago, PennDOT recognized that there were significant shortfalls in only using site-specific historical crash data as the basis for evaluating highway safety issues. At the same time, AASHTO published the Highway Safety Manual (HSM) and provided new tools, techniques, and methodologies for predicting safety performance and determining appropriate responses that would reduce the frequency and severity of crashes. Pennsylvania was one of the early leaders in implementing the HSM and integrating it into PennDOT's project development processes. Some specific examples include:

- PennDOT now requires that the HSM be used in analysis of alternatives and in request for design exceptions if the design exceptions involves safety features adequately addressed in the HSM. It must also be used in preparing any HSIP application.
- To support these changes, PennDOT has provided multiple rounds of HSM training to their Headquarters and District offices. The training offers hands-on exercises that provide realistic examples of how to apply the HSM in Pennsylvania.
- PennDOT has made extensive efforts to fully "localize" the HSM tools. Models for rural two-lane roads, rural multilane highways, urban and suburban arterials, and collectors were developed specifically for Pennsylvania. Recognizing the wide variety of conditions in the state, SPFs in some Pennsylvania-specific models have been taken down to the County level. HSM models for freeways and ramps were recently calibrated for Pennsylvania conditions.

Data Analysis – Using a combination of HSM tools and Pennsylvania's own extensive crash data system, PennDOT has done network screening of potential safety issues in all 67 counties and has made those results available to the districts. In addition, Pennsylvania established a tracking system for any project receiving HSIP funds, including systemic projects, which includes before-and-after crash data for those locations. This allows PennDOT to continually evaluate the effectiveness of particular safety countermeasures and determine where they have the greatest impact.

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Innovative Safety Countermeasures – PennDOT has been one of the early adopters of proven safety countermeasures, including a broad application of high friction paving surfaces that have been deployed where risk factors indicate high value. These include implementing Safety-Edge as a default standard in resurfacing jobs, establishing a statewide roundabout coordinator to facilitate broader use of roundabouts, and coordinating the use of Central Office open-end contracts to help the districts implement these projects. PennDOT has also implemented systemic improvements to rapidly deploy countermeasures, like centerline and edge-of-road rumble strips, high friction surface treatments, and high-tension cable median barrier.

Institutionalizing Safety Processes - PennDOT recently updated its Publication 638, *The District Highway Safety Guidance Manual*, to incorporate changes in the HSIP program and updates to Pennsylvania's crash data reporting tools. They are also integrating the concepts of the HSM into the state's policies and practices and created *Publication 638A Pennsylvania Safety Predictive Analysis Methods Manual* for people to use when completing safety analysis (additional discussion of the changes to *Publication 638* follow).

Intersection Safety – As noted earlier, addressing intersection crashes is one of the Key Safety Priority Areas in Pennsylvania's SHSP, accounting for 21% of the annual fatalities and 30% of serious injuries. To improve safety and mobility at these crossings, PennDOT has developed an Intersection Control Evaluation (ICE) policy that enables users to consistently consider multiple proven geometry and traffic control strategies for either new intersections or modifications to existing intersections.

Supporting Local Road Safety - Although HSIP funds are not currently used on local roads in Pennsylvania, PennDOT has developed multiple tools and resources for local governments to improve roadway safety. PennDOT's PCIT tool allows the public and municipalities to see where fatal and serious injury (F+SSI) crashes occurred on their local roads through a new map feature. PennDOT has also worked with the state's Local Technical Assistance Program (LTAP) staff to conduct 23 technical safety reviews on local roads, which resulted in an itemized list of safety countermeasures ready for a construction contract or force account work.

Project Implementation

Funds Programmed

Reporting period for HSIP funding.

State Fiscal Year

The state fiscal year for the Commonwealth of Pennsylvania starts on July 1st every year and end on June 30th the following year. So for this reporting period of the HSIP annual report the dates are July 1, 2020 to June 30, 2021.

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

FUNDING CATEGORY	PROGRAMMED	OBLIGATED	% OBLIGATED/PROGRAMMED
HSIP (23 U.S.C. 148)	\$101,267,766	\$89,673,041	88.55%
HRRR Special Rule (23 U.S.C. 148(g)(1))	\$103,234	\$103,234	100%
Penalty Funds (23 U.S.C. 154)	\$0	\$0	0%
Penalty Funds (23 U.S.C. 164)	\$0	\$0	0%
RHCP (for HSIP purposes) (23 U.S.C. 130(e)(2))	\$0	\$0	0%
Other Federal-aid Funds (i.e. STBG, NHPP)	\$0	\$0	0%
State and Local Funds	\$10,000,000	\$10,000,000	100%
Totals	\$111,371,000	\$99,776,275	89.59%

HSIP/HRRR Programmed/Obligated amounts are reported by state fiscal year ending June 30th to match our Project Listing (question #29).

The NTSHA penalty funds and the RHCP funds are reported on in different reports. Those programmed and obligated fund numbers can be found in those respective reports.

We are unable to provide an answer for "other federal funds" for safety projects due to limitations of query tools.

Pennsylvania sets aside \$10 million dollars of State transportation maintenance funds every year for low cost safety improvements on state highways. Due to the pandemic and budget concerns, these funds were permitted to be used for regular maintenance activities in addition to safety improvements in 2020-21.

How much funding is programmed to local (non-state owned and operated) or tribal safety projects?

\$7,500,000

How much funding is obligated to local or tribal safety projects?

\$4,800,000

We have one large locally owned road HSIP project in the city of Pittsburgh. The project is on Liberty Avenue. We expect the bid for this project to have the bid opening in March 2022. The project is a road diet which will also implement signal upgrades and pedestrian upgrades.

PennDOT no longer provides HSIP set aside funding to the PA LTAP program.

The other local funds are for MIRE FDE collection on locally owned roads. The major cost in this is collecting traffic volume counts on thousands of roads each year to meet the Sept. 2026 deadline imposed by the FAST Act. The funding is \$1.5 million in FFY 2022. We anticipate providing \$1.0 Million for this effort in FFY 2023 and 2024.

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

\$1,500,000

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

\$1,500,000

As mentioned before we are providing HSIP funds to collect MIRE FDE data to meet the Sept. 2026 FAST Act deadline.

How much funding was transferred in to the HSIP from other core program areas during the reporting period under 23 U.S.C. 126?

\$0

How much funding was transferred out of the HSIP to other core program areas during the reporting period under 23 U.S.C. 126?

\$0

No funds are transferred to HSIP or from HSIP.

Discuss impediments to obligating HSIP funds and plans to overcome this challenge in the future.

There are a few Engineering Districts that have encountered project delivery challenges in the development of HSIP funded safety projects. This results in several projects missing let dates and HSIP funds not being used for those projects in the planned years. To overcome these project delivery issues, the Highway Safety Section is working with PennDOT's Bureau of Project Delivery to track the milestones of HSIP projects to ensure design project managers stay on schedule to deliver good safety improvement projects on time. A District's past project delivery track record has become part of a weighted criteria for HSIP set aside project selection. PennDOT may also pursue a different HSIP funding allocation based less on regional boundaries and more based on competitive safety needs.

Local projects using HSIP funds are difficult to deliver in Pennsylvania due to limited project delivery abilities in each municipality and legal agreements that need to be created to allow contracted construction work on local roads, designate maintenance responsibility, cover right to know laws, and the lack of a HSIP force account option. Many municipal governments also lack the ability to develop a project or construct safety projects. Implementing systemic projects on local levels usually results in very low cost projects that are hard to bid and requires adding several municipalities together that might cross Engineering District boundaries to have a large enough project that contractors will bid on and have a reasonable price. This adds to the difficulty in project development. PennDOT is exploring options to better address safety concerns on local roads where there are

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known fatal and serious injuries. Right now PennDOT is pursuing the option of using force account projects to have safety improvements completed on locally owned roads. This option will allow municipalities that have road crews capable of installing signs and pavement markings to receive some HSIP funds to buy signs and pavement markings and install them at intersections or curves to mitigate crashes. PennDOT is currently working with a consultant to update PennDOT's Publication 638 to include new HSIP force account guidelines for local roads.

Describe any other aspects of the State's progress in implementing HSIP projects on which the State would like to elaborate.

PennDOT is rating location specific projects based on the perceived benefit to cost ratio using a net present value calculation and benefit to cost ratio. This has led to more partially funded HSIP projects than was done several years ago. Any project applications submitted for a spot location must now have a BCA completed that show a 1:1 or better B/C ratio. This has allowed the use of HSIP funds on other projects where partial funding can be used to implement safety improvements. The HSIP project selection policy was updated in PennDOT's Publication 638 in May 2019. PennDOT is making another change to Publication 638 chapter 6 (HSIP policy) to allow for local road projects through force accounts with individual municipalities. The municipalities can work with the MPO or Engineering District to apply for HSIP funds to implement low-cost safety countermeasures that the municipal road crews can install themselves. This will help cut back on the legal agreements between the Commonwealth and the municipalities and will hopefully result in more locally owned roads implementing proven safety countermeasures.

The Department finished or second edition of network screening all 67 counties in Pennsylvania in June 2021. The highway safety network screenings were developed using the Highway Safety Manual's analysis method of Excess Expected Average Crash Frequency with Empirical Bayes (EB) adjustments also known as Potential for Safety Improvement (PSI) with a EPDO weighting based on the FHWA's **Crash Cost for Highway Safety Analysis** guide released in 2018 (FHWA-SA-17-071). This method uses the calculated Expected crashes for Fatal & Injury (F&I) and PDOs for a location and subtracts the Predicted crashes (F&I and PDO respectively) for that same location to produce excess yearly crash values. Then an annualized excess crash cost is calculated based on the F&I and PDO crash cost values and the excess crash values for F&I and PDOs. All locations will have that weighted annual excess crash cost ordered highest to lowest. Any value above zero shows a potential for safety improvement over the state's predicted annual crashes for that category of roadway or intersection. These locations are mapped in GIS and assigned color coding. Anything Green shows the lowest safety priority with higher priorities colored as yellow, then orange, and red as the highest priority safety locations.

In March 2020, PennDOT completed new calibration factors for Freeways, Speed Change Lanes, Ramps, and Ramp terminal SPFs. The new network screenings include these highway facility types. The initial network screenings only used SPFs for all crashes. This latest round of network screening includes fatal and injury crash excess values along with PDO excess values. These values are weighted based on crash costs for the crash severities.

This detailed network screening is used to help select the best locations for HSIP funded safety projects.

PennDOT has recognized the challenges of expanding the HSIP program to include safety projects on local roads. PennDOT has tried multiple approaches to implement such a program; however, sometimes institutional and jurisdictional challenges have kept those from moving forward. These challenges frequently arise in the programmatic aspects of the program, including the processes that are used to identify problem areas, develop applications for viable projects to address those problems, and administer the contracts to complete that work. Fortunately, many other states have found ways to deal with many of these issues that may offer options for PennDOT. The Noteworthy Practices have been grouped around the following issues:

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1. Funding for Local Road Projects
2. Increase Number of Local Applicants (Through MPOs and Districts)
3. Identifying Project Needs on Local Roads
4. Developing Viable HSIP Projects
5. Administering Work to Complete HSIP Projects

General Listing of Projects

List the projects obligated using HSIP funds for the reporting period.

PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST(\$)	TOTAL PROJECT COST(\$)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
2019 SHRP 2 Traff Incdnt Mgmt Responder Training	Miscellaneous	Training and workforce development	0	Miles	\$550	\$23200	HSIP (23 U.S.C. 148)	N/A	N/A	0	0	State Highway Agency	Training	Data	113174
SR 2040/Buttermilk Hollow Rd - Ceco Dr	Roadway	Roadway widening - add lane(s) along segment	5.17	Miles	\$1553365	\$10394361	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	13,386	45	State Highway Agency	Systemic	Lane Departure	26623
PA 232 & Swamp Rd(C)	Intersection traffic control	Modify control – new traffic signal	0.67	Miles	\$2234705	\$7721051	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	7,006	45	State Highway Agency	Spot	Intersections	57625
443 Roadway Improvements	Roadway	Roadway widening - add lane(s) along segment	2.4	Miles	\$9216297	\$33323999	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	16,777	45	State Highway Agency	Systemic	Lane Departure	66296
PA 68 Clarion Curve	Roadside	Slope Flattening	0.44	Miles	\$30700	\$5945857.69	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	9,010	40	State Highway Agency	Systemic	Lane Departure	88927
PA 28: Highland Park - RIDC	Roadway	Pavement surface - other	6.85	Miles	\$152900	\$17665240	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	35,105	55	State Highway Agency	Systemic	Lane Departure	92274
SR 3016 Lulay St to Demuth St	Intersection traffic control	Modify control – Modern Roundabout	4.22	Miles	\$638000	\$11996540	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	7,157	35	State Highway Agency	Spot	Intersections	94476
94 & 394 Intersection Imp	Intersection traffic control	Modify control – Modern Roundabout	1.04	Miles	\$116082	\$2876050	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	8,734	35	State Highway Agency	Spot	Intersections	94894
US422 Safety Project	Intersection geometry	Add/modify auxiliary lanes	2.27	Miles	\$124287.16	\$3152682.08	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	14,431	40	State Highway Agency	Spot	Intersections	94936
US6 & PA660 Intersection	Intersection geometry	Intersection realignment	0.24	Miles	\$135000	\$4535000	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	5,176	55	State Highway Agency	Spot	Intersections	101292
SR 2014 (Spring St) Corridor Improvements	Intersection traffic control	Modify traffic signal – modernization/replacement	1.13	Miles	\$136626	\$3099748	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	4,802	25	State Highway Agency	Systemic	Intersections	102162
Chambersburg Signal Imp.	Intersection traffic control	Systemic improvements – signal-controlled	24.27	Miles	\$1801100	\$3877809.05	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	7,718	55	State Highway Agency	Systemic	Intersections	102384

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PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST(\$)	TOTAL PROJECT COST(\$)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
Tivoli to Glen Mawr Curves	Roadway	Rumble strips – edge or shoulder	0.74	Miles	\$90000	\$2088000	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	3,239	50	State Highway Agency	Systemic	Lane Departure	102641
SR 54 Corridor Safety Improvement	Intersection geometry	Intersection realignment	1.95	Miles	\$1766797	\$22880000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	7,870	55	State Highway Agency	Spot	Intersections	103853
ISIP Open End Project (C)	Intersection traffic control	Systemic improvements – signal-controlled	0	Miles	\$400000	\$4500000	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	0	0	State Highway Agency	Systemic	Intersections	104363
209 -Schafer School House	Intersection traffic control	Modify traffic signal –other	4.3	Miles	\$1326330	\$8624363	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	11,410	55	State Highway Agency	Spot	Intersections	104432
SR 3023 State Hill Road Safety Improvements	Intersection traffic control	Modify traffic signal – modernization/replacement	1.93	Miles	\$267660	\$4007660	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	11,658	40	State Highway Agency	Systemic	Intersections	105954
Big "I" Roundabout	Intersection traffic control	Modify control – Modern Roundabout	0.08	Miles	\$60000	\$8314029	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	8,672	45	State Highway Agency	Spot	Intersections	106367
Paxton Street RSA	Roadway signs and traffic control	Roadway signs and traffic control - other	3.09	Miles	\$4687.31	\$30000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	7,931	35	State Highway Agency	Systemic	Lane Departure & Intersections	106547
Frankford Avenue Signal Improvements	Intersection traffic control	Modify traffic signal – modernization/replacement	14.49	Miles	\$477000	\$2325520	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	8,927	30	State Highway Agency	Spot	Intersections	106993
LCSIP 2021	Roadway signs and traffic control	Roadway signs and traffic control - other	0	Miles	\$1141685	\$1151211	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	0	0	State Highway Agency	Systemic	Lane Departure & Intersections	109513
Turnpike to Sproul/Claysburg	Roadway	Pavement surface - other	37.2	Miles	\$1600000	\$9500000	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	5,357	70	State Highway Agency	Systemic	Lane Departure	109816
US 6N & PA 99 Intersection Improvements	Intersection geometry	Modify lane assignment	0.49	Miles	\$775601	\$4008224	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	7,531	25	State Highway Agency	Spot	Intersections	109901
PA 8 and PA 77 Intersection	Intersection geometry	Intersection realignment	0.14	Miles	\$120000	\$2843672.11	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	2,572	55	State Highway Agency	Spot	Intersections	109996
SR 309 Signal Corridor	Roadway signs and traffic control	Roadway signs and traffic control - other	6.76	Miles	\$315000	\$4313553	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	21,764	35	State Highway Agency	Systemic	Lane Departure & Intersections	110327
10-2 SR 3021 Corridor Improvements	Roadway	Rumble strips – edge or shoulder	1.39	Miles	\$710000	\$11133696	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	7,478	35	State Highway Agency	Systemic	Lane Departure	110783

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PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST(\$)	TOTAL PROJECT COST(\$)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
Bayfront Parkway at 6th Street Intersection Impr.	Pedestrians and bicyclists	Medians and pedestrian refuge areas	1.83	Miles	\$250000	\$2587000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	6,490	45	State Highway Agency	Systemic	Pedestrians	110836
Safety Improvements HighFriction SurfaceTreatment	Roadway	Pavement surface – high friction surface	1.18	Miles	\$487063	\$585000	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	2,025	55	State Highway Agency	Systemic	Lane Departure	110903
PA 10 Shoulder Widening	Shoulder treatments	Widen shoulder – paved or other (includes add shoulder)	10.78	Miles	\$200000	\$700000	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	6,351	45	State Highway Agency	Systemic	Lane Departure	110954
Marshall Rd. Safety Improv (C)	Roadway signs and traffic control	Roadway signs and traffic control - other	1.71	Miles	\$4946776	\$5431776	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	6,969	25	State Highway Agency	Systemic	Lane Departure & Intersections	110965
Lansdowne Ave. Safety Imp (C)	Roadway	Roadway narrowing (road diet, roadway reconfiguration)	3.23	Miles	\$3261000	\$5222000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	15,597	35	State Highway Agency	Systemic	Lane Departure & Intersections	111167
Castor Ave:Comly to Rhawn	Roadway	Roadway narrowing (road diet, roadway reconfiguration)	4.7	Miles	\$192000	\$2558403	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	3,987	25	State Highway Agency	Systemic	Lane Departure & Intersections	111194
East Church Street Streetscape	Pedestrians and bicyclists	Install sidewalk	0.35	Miles	\$8000	\$1028000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	5,419	25	State Highway Agency	Spot	Pedestrians	111459
12th St Corridor Signals	Advanced technology and ITS	Advanced technology and ITS - other	7.2	Miles	\$775000	\$8455000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	10,975	40	State Highway Agency	Systemic	Improving Incident Influence Time	111839
Lighted Chevrons	Roadway signs and traffic control	Curve-related warning signs and flashers	0	Miles	\$1165850	\$1171958	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	0	0	State Highway Agency	Systemic	Lane Departure	111999
SR 136/SR 1055 Flashing Beacon	Roadway	Roadway narrowing (road diet, roadway reconfiguration)	0	Miles	\$112095	\$97473.53	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	3,805	45	State Highway Agency	Spot	Intersections	113757
Wynnewood Rd HSIP	Roadway	Pavement surface – high friction surface	0.96	Miles	\$1392527	\$1518134	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	5,892	35	State Highway Agency	Systemic	Lane Departure & Intersections	114270
NEPA High Friction Surface-2021	Roadway	Pavement surface – high friction surface	0.75	Miles	\$232591	\$232592	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	10,113	55	State Highway Agency	Systemic	Lane Departure	114328
LVTS High Friction Surface 2021	Roadway	Pavement surface – high friction surface	1.33	Miles	\$405005	\$400001	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	3,422	40	State Highway Agency	Systemic	Lane Departure	114343

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PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST(\$)	TOTAL PROJECT COST(\$)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
RATS High Friction Surface 2021	Roadway	Pavement surface – high friction surface	1.38	Miles	\$400000	\$400001	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	8,795	45	State Highway Agency	Systemic	Lane Departure	114388
I-180 HTCMB UPGRADE	Roadside	Barrier – cable	7.55	Miles	\$1015864	\$1090864	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Interstate	19,109	55	State Highway Agency	Systemic	Lane Departure	114727
D9 2020 HSIP Milled Rumble Strips	Roadway	Rumble strips – center	44.31	Miles	\$184888	\$350000	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	3,434	55	State Highway Agency	Systemic	Lane Departure	114780
NTIER HFST HSIP	Roadway	Pavement surface – high friction surface	2.46	Miles	\$950000	\$950000	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	3,303	55	State Highway Agency	Systemic	Lane Departure	114791
Interstate 84 Cable Median Barrier	Roadside	Barrier – cable	19.99	Miles	\$350000	\$2060801	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Interstate	14,883	55	State Highway Agency	Systemic	Lane Departure	114917
Interstate 81 Cable Median Barrier	Roadside	Barrier – cable	15.5	Miles	\$350000	\$2505103	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Interstate	18,116	65	State Highway Agency	Systemic	Lane Departure	114919
Route 113 and Minsi Trail Rd Roundabout	Intersection traffic control	Modify control – Modern Roundabout	0.35	Miles	\$590000	\$2093800	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	6,169	45	State Highway Agency	Spot	Intersections	115418
High Street Pedestrian Safety Improvements	Pedestrians and bicyclists	Pedestrian signal	0.35	Miles	\$226000	\$1811194	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	7,664	25	State Highway Agency	Systemic	Pedestrians	115425
SR 309 and SR 2045 Safety Improvement	Roadway signs and traffic control	Roadway signs and traffic control - other	0.16	Miles	\$50000	\$3000000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	4,570	45	State Highway Agency	Systemic	Lane Departure & Intersections	115571
SR 6 and Maple Street Safety Improvement	Intersection geometry	Intersection geometry - other	0.16	Miles	\$300000	\$1500000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	7,946	40	State Highway Agency	Spot	Intersections	115572
SR 307 and Winola Road Safety Improvement	Intersection traffic control	Intersection traffic control - other	0.71	Miles	\$50000	\$3000000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	5,174	45	State Highway Agency	Spot	Intersections	115573
SR 247 and SR 106 Safety Improvement	Intersection geometry	Intersection geometry - other	0.22	Miles	\$50000	\$3000000	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	1,790	40	State Highway Agency	Spot	Intersections	115580
Smart Intersections Research Project	Miscellaneous	Data collection	0	Miles	\$362000	\$637000	HSIP (23 U.S.C. 148)	N/A	N/A	0	0	State Highway Agency	Research Project	Pedestrians	115705

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Highway Safety Network Screening (2015-2019 Data)	Miscellaneous	Data analysis	0	Miles	\$1800000	\$1800000	HSIP (23 U.S.C. 148)	N/A	N/A	0	0	State Highway Agency	Network Screening	Lane Departure & Intersections	115752
SR 3028 Shoulder Widening/ELRS	Shoulder treatments	Widen shoulder – paved or other (includes add shoulder)	1.96	Miles	\$50000	\$2175000	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	2,657	40	State Highway Agency	Systemic	Lane Departure	115946
SR 0590/3028 Intersection Safety Improvement	Intersection traffic control	Intersection traffic control - other	0.17	Miles	\$50000	\$2150000	HSIP (23 U.S.C. 148)	Rural	Multiple/Varies	5,390	45	State Highway Agency	Spot	Intersections	116098
Mount Hope Intrscn Improv	Intersection traffic control	Intersection traffic control - other	0.51	Miles	\$264766.1	\$4384533	HRRR Special Rule (23 U.S.C. 148(g)(1))	Rural	Major Collector	1,788	40	State Highway Agency	Spot	Intersections	96506
D9 2021 HSIP HFST	Roadway	Pavement surface – high friction surface	2.91	Miles	\$53000	\$1306104	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	2,271	55	State Highway Agency	Systemic	Lane Departure	114781
Port Allegany Safety Improvement	Intersection traffic control	Modify traffic signal – modernization/replacement	0.86	Miles	\$82550	\$2192490	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	2,628	45	State Highway Agency	Spot	Intersections	106371
Constitution Boulevard - B51	Roadway	Pavement surface - other	7.47	Miles	\$41805	\$13144471	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	4,503	45	State Highway Agency	Spot	Lane Departure	105454
PA 21 Fayette Co Corridor HSIP	Miscellaneous	Transportation safety planning	0.81	Miles	\$71800	\$2679652.87	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	4,764	45	State Highway Agency	Study	Infrastructure Improvements	106559
PA56/SR4028 Intersection	Intersection geometry	Intersection geometry - other	0.84	Miles	\$280800	\$7345500	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	5,247	55	State Highway Agency	Spot	Intersections	88524
PA 68 Zelenople Curve	Roadway	Roadway widening - curve	0.23	Miles	\$97100	\$1655932	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	5,307	35	State Highway Agency	Spot	Lane Departure	110826
Hamot Rd/Oliver Rd Intersection	Intersection traffic control	Modify control – Modern Roundabout	0.22	Miles	\$2279000	\$6160842	HSIP (23 U.S.C. 148)	Urban	Major Collector	5,369	40	State Highway Agency	Spot	Intersections	102069
SR 8/SR 62 Intersection Safety Audit - Venango	Miscellaneous	Road safety audits	2.41	Miles	\$60000	\$210000	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	5,783	45	State Highway Agency	Road Safety Audit	Infrastructure Improvements	114909
Castor Ave. Roundabout	Intersection traffic control	Modify control – Modern Roundabout	0.2	Miles	\$209000	\$7155435	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	5,870	35	State Highway Agency	Spot	Intersections	110958

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PA997 & SR2015 Intersection	Intersection geometry	Intersection geometry - other	1.68	Miles	\$14366	\$4775000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	6,617	40	State Highway Agency	Spot	Intersections	106709
Manor Rd. Roundabout	Intersection traffic control	Modify control – Modern Roundabout	1.29	Miles	\$203000	\$3163000	HSIP (23 U.S.C. 148)	Urban	Multiple/Varies	6,692	45	State Highway Agency	Spot	Intersections	110963
PA 28/US 322 Brookville Intersection	Intersection geometry	Intersection geometry - other	0.53	Miles	\$356000	\$9629728	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	7,319	35	State Highway Agency	Spot	Intersections	26064
CMB I-70 Town Hill to Tpike Ramps	Roadside	Barrier – cable	15.01	Miles	\$17191.41	\$2650000	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Interstate	7,823	55	State Highway Agency	Systemic	Lane Departure	110863
SR 29 - Shimersville Hill Safety Imprv	Roadway	Rumble strips – edge or shoulder	1.78	Miles	\$672885	\$8923650	HSIP (23 U.S.C. 148)	Urban	Major Collector	7,974	35	State Highway Agency	Systemic	Lane Departure	110183
SR 64/550 Intersection Improvement	Intersection geometry	Intersection geometry - other	1.04	Miles	\$2409121	\$6367612	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	8,037	50	State Highway Agency	Spot	Intersections	106034
SR4022 ov US220	Intersection geometry	Intersection geometry - other	0.04	Miles	\$50000	\$2110000	HSIP (23 U.S.C. 148)	Rural	Major Collector	8,109	45	State Highway Agency	Spot	Intersections	99076
SR 2005 Two-Way Left Turn Lane	Roadway	Roadway widening - add lane(s) along segment	0.48	Miles	\$75000	\$2400000	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	8,573	45	State Highway Agency	Systemic	Lane Departure	108985
Colebrook Road Improvemnt	Roadway signs and traffic control	Sign sheeting - upgrade or replacement	3.55	Miles	\$2672780	\$5696123.62	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	9,155	45	State Highway Agency	Systemic	Infrastructure Improvements	96783
PA 68/Dolby Street Intersection	Intersection geometry	Intersection geometry - other	1.79	Miles	\$130500	\$17107453.54	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Other	10,316	40	State Highway Agency	Spot	Intersections	24890
SR61 / 209 Intersection	Roadway delineation	Roadway delineation - other	3.65	Miles	\$1245000	\$3384826	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	10,561	50	State Highway Agency	Systemic	Lane Departure	72466
I-180 HTCMB	Roadside	Barrier- metal	11.53	Miles	\$236000	\$1798000	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Interstate	10,936	55	State Highway Agency	Systemic	Lane Departure	114725
Nyes/Dvnshre Hts Safety	Intersection geometry	Intersection geometry - other	0.23	Miles	\$256869	\$5202118.38	HSIP (23 U.S.C. 148)	Urban	Major Collector	10,978	35	State Highway Agency	Spot	Intersections	47521
2020 District 12 HFS Contract	Roadway	Pavement surface – high friction surface	2.71	Miles	\$125000	\$1165000	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	10,978	35	State Highway Agency	Systemic	Lane Departure	109965

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SR 222_73 & Genesis Dr	Intersection traffic control	Modify control – Modern Roundabout	2.61	Miles	\$462044	\$43016015	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	11,309	55	State Highway Agency	Spot	Intersections	92414
209/115 Int. Imp - Phase2	Intersection traffic control	Modify control – Modern Roundabout	1.52	Miles	\$5408650	\$34200420	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	11,348	40	State Highway Agency	Spot	Intersections	88935
PA 34 & PA 850 Intersect.	Intersection traffic control	Modify control – Modern Roundabout	0.37	Miles	\$1713126	\$5277581.3	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	12,225	40	State Highway Agency	Spot	Intersections	85655
Main St. Safety Improv	Intersection geometry	Add/modify auxiliary lanes	1.45	Miles	\$281888	\$5403198	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	12,647	40	State Highway Agency	Spot	Intersections	110971
SR 255 Signal/ITS Project	Intersection traffic control	Modify traffic signal –other	6.88	Miles	\$217727	\$2273060	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	13,069	25	State Highway Agency	Spot	Intersections	114189
PA 287 to West Fourth Street	Intersection traffic control	Intersection traffic control - other	12.14	Miles	\$492752	\$56127000	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	13,367	40	State Highway Agency	Systemic	Intersections	93732
Henry Ave Congested Corr1 (C)	Pedestrians and bicyclists	Install sidewalk	7.94	Miles	\$14184433	\$9713000	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	13,551	35	State Highway Agency	Systemic	Pedestrians	80104
Interstate 80 Roadside Safety Audit - Mercer Count	Miscellaneous	Road safety audits	29.49	Miles	\$10000	\$60000	HSIP (23 U.S.C. 148)	Rural	Principal Arterial-Interstate	15,631	70	State Highway Agency	Road Safety Audit	Infrastructure Improvements	114908
SR 150 Lock Haven Signals	Intersection traffic control	Modify traffic signal timing – signal coordination	1.9	Miles	\$1356910	\$4515982	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	15,654	35	State Highway Agency	Spot	Intersections and Pedestrians	109872
Philipsburg Add Center Ln	Roadway	Roadway widening - add lane(s) along segment	1.47	Miles	\$5405259	\$12744596	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	16,121	45	State Highway Agency	Systemic	Lane Departure	93329
SR 6 Safety Improvement	Roadway signs and traffic control	Roadway signs and traffic control - other	2.17	Miles	\$18026	\$535000	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	17,565	45	State Highway Agency	Systemic	Infrastructure Improvements	101991
Route 145 Safety Improvements	Intersection geometry	Add/modify auxiliary lanes	1.26	Miles	\$27036	\$9184380	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	18,512	40	State Highway Agency	Spot	Intersections	109971
SR 12 Elizabeth Avenue	Shoulder treatments	Widen shoulder – paved or other (includes add shoulder)	1.66	Miles	\$54625	\$12071625	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	18,939	40	State Highway Agency	Spot	Lane Departure	79467

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US222/322 Interchange Imp	Interchange design	Interchange design - other	5.12	Miles	\$2736000	\$14041326.82	HSIP (23 U.S.C. 148)	Multiple/Varies	Multiple/Varies	27,985	65	State Highway Agency	Spot	Intersections	90491

"Mount Hope Intrscn Improv" (#96506) was the only project to obligate HRRR Funds (\$103,234). The HSIP Project Cost dollar amount listed above was for HSIP (23 U.S.C. 148) funds only. The HRRR funds obligated for this project was \$103,234.

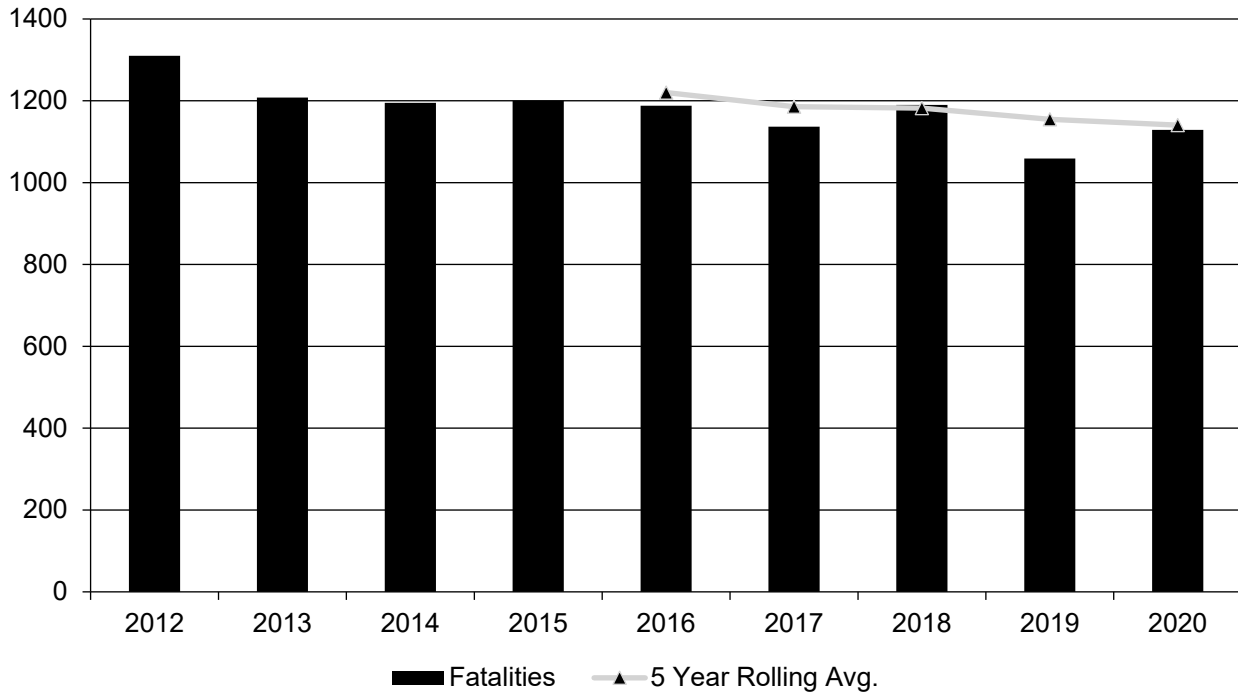
Safety Performance

General Highway Safety Trends

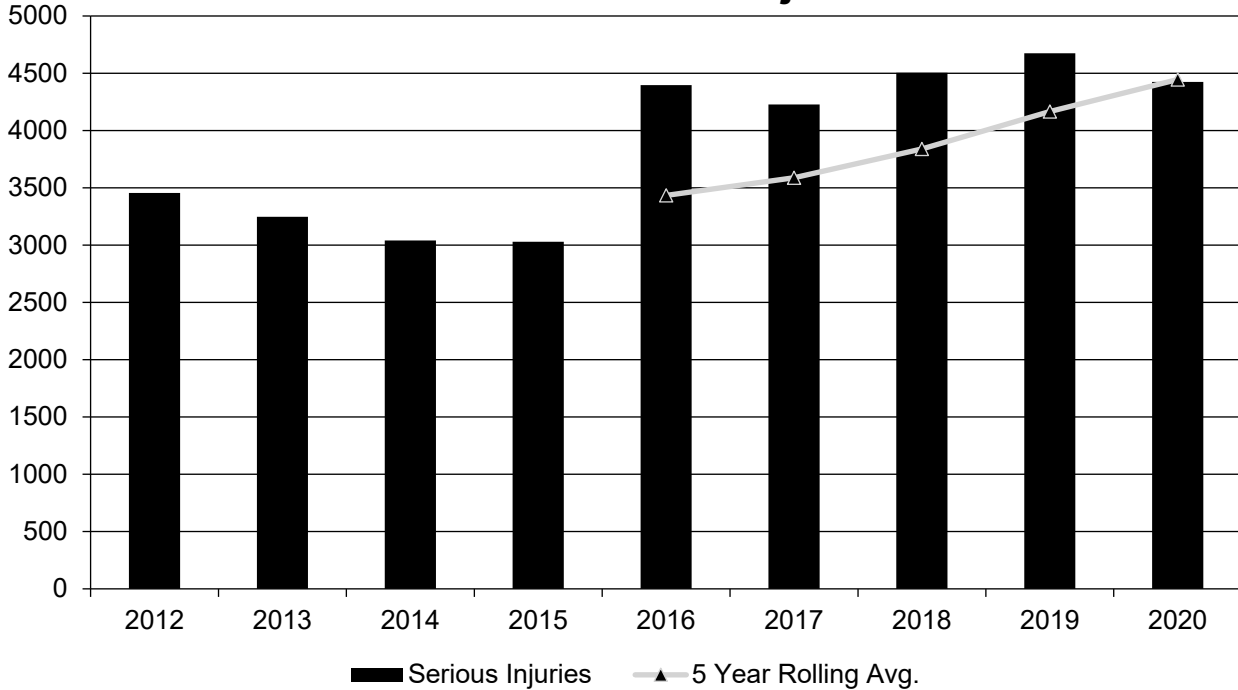
Present data showing the general highway safety trends in the State for the past five years.

PERFORMANCE MEASURES	2012	2013	2014	2015	2016	2017	2018	2019	2020
Fatalities	1,310	1,208	1,195	1,200	1,188	1,137	1,190	1,059	1,129
Serious Injuries	3,455	3,248	3,040	3,030	4,397	4,227	4,504	4,675	4,425
Fatality rate (per HMVMT)	1.316	1.225	1.196	1.189	1.175	1.119	1.165	1.031	1.324
Serious injury rate (per HMVMT)	3.471	3.293	3.044	3.002	4.349	4.160	4.411	4.549	5.188
Number non-motorized fatalities	184	166	187	172	192	176	221	170	174
Number of non-motorized serious injuries	432	408	341	406	556	573	596	646	502

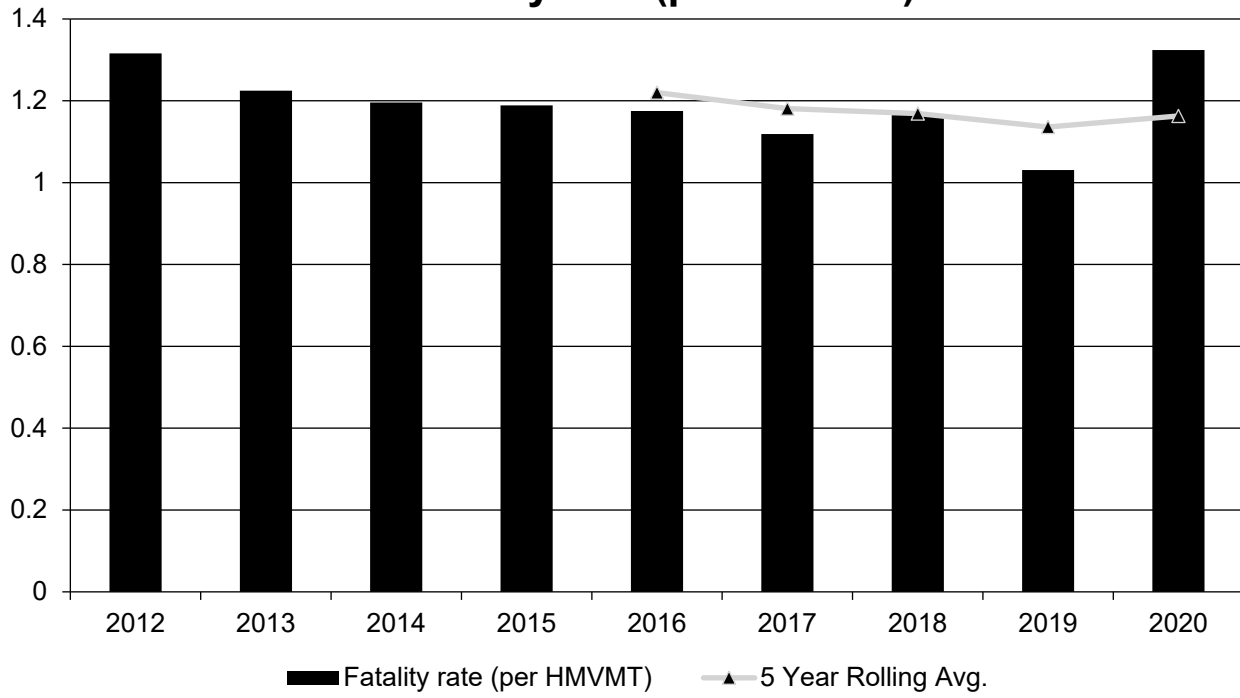
Annual Fatalities



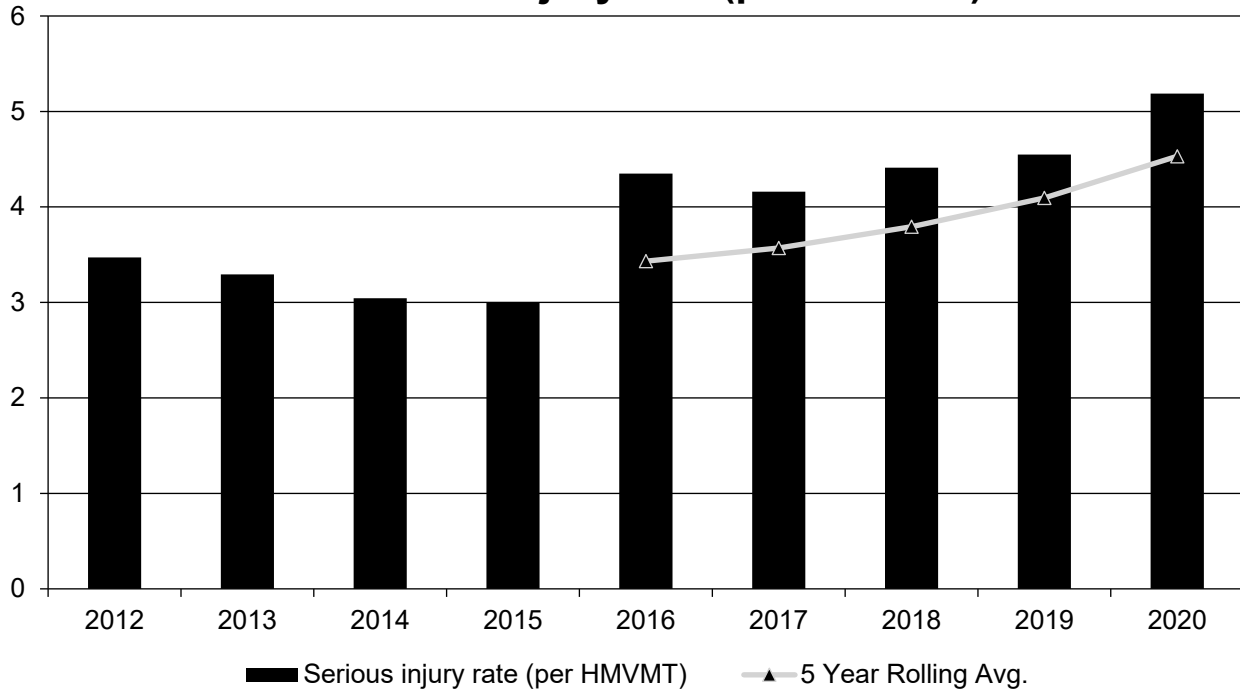
Annual Serious Injuries



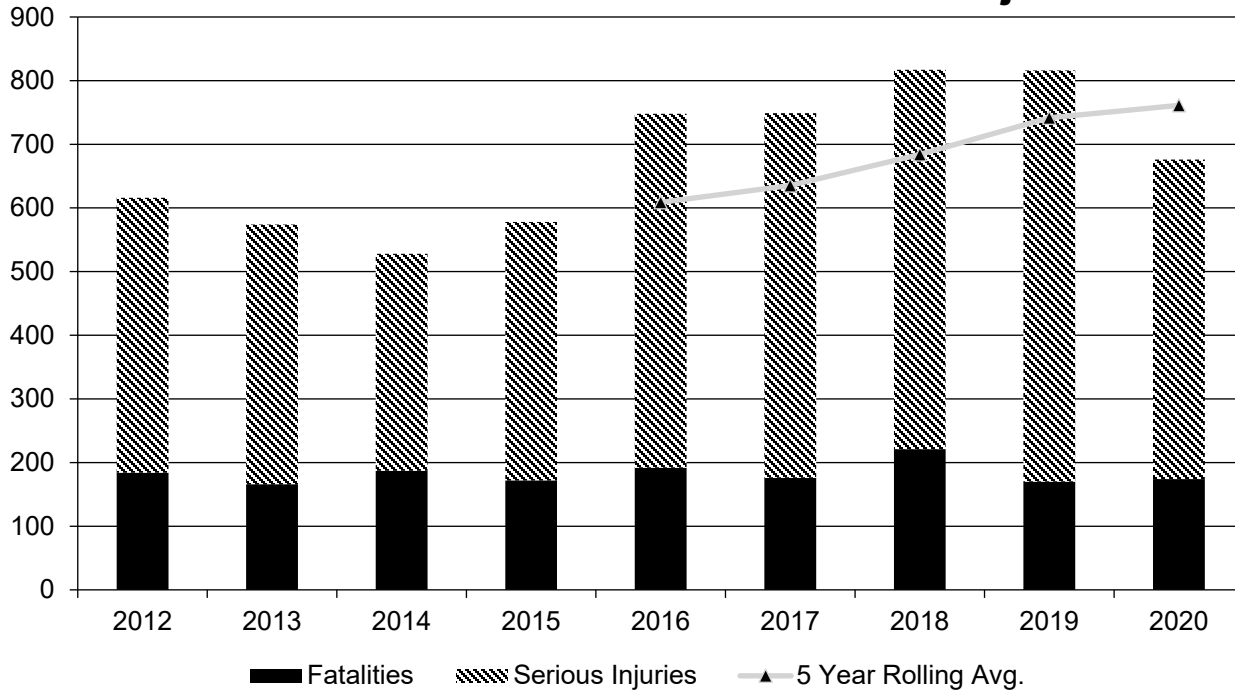
Fatality rate (per HMVMT)



Serious injury rate (per HMVMT)



Non Motorized Fatalities and Serious Injuries



The number of serious injuries increased significantly after 2015 due to the change in definition/title from "Major Injury" to the MMUCC compliant "Suspected Serious Injury". This change also had a significant impact on the serious injury rate and non-motorized serious injury performance measures above.

Describe fatality data source.

State Motor Vehicle Crash Database

To the maximum extent possible, present this data by functional classification and ownership.

Year 2020

Functional Classification	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
Rural Principal Arterial (RPA) - Interstate	45.4	123	0.44	1.17
Rural Principal Arterial (RPA) - Other Freeways and Expressways	0	0	0	0
Rural Principal Arterial (RPA) - Other	80.2	210.6	1.97	5.18
Rural Minor Arterial	130.2	357.6	2.12	5.86
Rural Minor Collector	45	159.2	2.54	8.95

2021 Pennsylvania Highway Safety Improvement Program

Functional Classification	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
Rural Major Collector	92.6	302.2	2.35	7.67
Rural Local Road or Street	109.8	452.4	2.11	8.68
Urban Principal Arterial (UPA) - Interstate	61.8	186.6	0.41	1.22
Urban Principal Arterial (UPA) - Other Freeways and Expressways	37.2	116	0.52	1.62
Urban Principal Arterial (UPA) - Other	236.8	910.6	1.52	5.84
Urban Minor Arterial	127.2	593	1.11	5.16
Urban Minor Collector	0	0	0	0
Urban Major Collector	57	283	0.78	3.86
Urban Local Road or Street	98.8	668.8	1.39	9.29

2021 Pennsylvania Highway Safety Improvement Program

Year 2020

Roadways	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
State Highway Agency	937.4	3,358.8	1.24	4.43
County Highway Agency	5.6	21.4	0.04	0.14
Town or Township Highway Agency	0	0	0	0
City or Municipal Highway Agency	180	1,018.2	1.17	6.6
State Park, Forest, or Reservation Agency	0	0	0	0
Local Park, Forest or Reservation Agency	0	0	0	0
Other State Agency	0	0	0	0
Other Local Agency	0	0	0	0
Private (Other than Railroad)	1.8	12.2	0.02	0.08
Railroad	0	0	0	0
State Toll Authority	15.8	47	0.25	0.75
Local Toll Authority	0	0	0	0
Other Public Instrumentality (e.g. Airport, School, University)	0	0	0	0
Indian Tribe Nation	0	0	0	0

Pennsylvania does not classify crash data by "Rural Principal Arterial - Other Freeways and Expressways".

Also Urban Collector is not broken down by Major and Minor. Data for all Urban Collectors is reflected in the "Urban Major Collector" field

Roadway Ownership data includes High Occupancy Vehicle (HOV) routes excluded from the HPMS annual submittal, per FHWA

Provide additional discussion related to general highway safety trends.

2020 vehicle miles traveled decreased by 17% from the previous year due in large part to the pandemic. This major decrease was a significant factor in calculating the fatality rate and serious injury rate metrics as well as all of the other metrics which required VMT data in this report.

2021 Pennsylvania Highway Safety Improvement Program

The number of Pennsylvania licensed drivers ages 65 and over have increased consistently since 2010 peaking in 2020. This increase has a significant impact on the number of Older Driver and Pedestrian Fatalities/Serious Injuries (Question #39). 2018 saw a slight decrease in licensed drivers for this age group but still the 4th highest number on record. This age group's highway fatalities decreased by 38 in 2020. People age 65 and older account for approximately 18.7% of Pennsylvania's population based on US census data.

The number of serious injuries significantly increased after 2015 due to both the change in definition and the new title of this injury type. 2016 crash data included the change from "Major Injury" to the MMUCC compliant "Suspected Serious Injury". Based on this we would expect this trend to continue for the next year. Some crashes that had injury severities less than serious (or major) based on the previous crash severity definitions are now considered suspected serious injuries.

Safety Performance Targets

Safety Performance Targets

Calendar Year 2022 Targets *

Number of Fatalities:1113.7

Describe the basis for established target, including how it supports SHSP goals.

Pennsylvania's current target is to reduce 2020 fatalities by two percent per year through 2022. The target shown above (1113.7) is the five-year rolling average for 2018-2022. This goal was established in conjunction with our Federal partners based on a combination of reviewing Pennsylvania's historical data and observations of national trends and reduction in fatalities over the next 30 years will not be linear. This is based on actual fatal crash data from 2018 to 2020 and estimated fatal crash data in 2021 and 2022 assuming a 2% reduction each year.

Number of Serious Injuries:4490.8

Describe the basis for established target, including how it supports SHSP goals.

Pennsylvania's current target is to hold 2020 serious injuries level through 2022. The target shown above (4490.8) is the five-year rolling average for 2018-2022. This goal was established in conjunction with our Federal partners based on a combination of reviewing Pennsylvania's historical data and observations of national trends and reduction in serious injuries over the next 30 years will not be linear.

Fatality Rate:1.205

Describe the basis for established target, including how it supports SHSP goals.

The target shown above (1.205) is calculated using the 2018-2022 five-year rolling average for fatalities shown in the first metric and applying an estimated growth rate of .5% for vehicle miles traveled in 2021 and 2022. The value of 1.113 in HSP performance target does not match what was submitted in the HSP (1.205).. **We do not understand where the value of 1.113 is coming from but the website will not accept any other number here. Each time we try to enter 1.205 and complete the question the HSP performance target populates back to 1.113.**

Serious Injury Rate:4.860

Describe the basis for established target, including how it supports SHSP goals.

2021 Pennsylvania Highway Safety Improvement Program

The target shown above (4.860) is calculated using the 2018-2022 five-year rolling average for serious injuries shown in the second metric and applying an estimated growth rate of .5% for vehicle miles traveled in 2021 and 2022.

Total Number of Non-Motorized Fatalities and Serious Injuries:730.1

Describe the basis for established target, including how it supports SHSP goals.

Pennsylvania's current target is to reduce 2020 non-motorized fatalities and serious injuries by reducing fatalities by two percent and holding serious injuries level each year through 2022. The target shown above (730.1) is the five-year rolling average for 2018-2022. This goal was established in conjunction with our Federal partners based on a combination of reviewing Pennsylvania's historical data and observations of national trends.

Describe efforts to coordinate with other stakeholders (e.g. MPOs, SHSO) to establish safety performance targets.

PennDOT is currently working with over 40 different public and private sector organizations including our SHSO and various different MPO/RPO's to update Pennsylvania's Strategic Highway Safety Plan (SHSP). Pennsylvania's comprehensive approach to improve highway safety started with engaging state and national experts at a Highway Safety Summit in April 2021 to collect input. After holding 8 separate Steering Committee meetings with our stakeholders to update the strategies and action items, we will develop the SHSP to include our Statewide goal for fatalities and serious injuries, as well as targets for PA's high level emphasis areas. The SHSP update's expected completion is December 2021.

Our statewide Safety Performance Targets (included in question #34) are established in conjunction with our FHWA Division Office. After statewide targets are set, PennDOT contacts the MPOs & RPOs about setting the planning partners' targets and goals. This is accomplished by having many different in person, webinar, and conference calls to explain the HSIP program and the federal target requirements. After these meetings there is a letter sent to every MPO and RPO that details the State goals and how that would break down to each planning partner. The planning partners are given a chance to adopt the statewide goals or develop their own goals.

The planning partners also work with PennDOT engineering districts to develop and deliver safety projects. The MPO/RPO can nominate locations for safety improvements and/or take a list the Districts develop and study options to improve safety. The projects are then entered into PennDOT's HSIP application portal and reviewed. Projects that meet safety merits are added to MPO/RPOs' transportation plans. The intention is that these projects will drive down the fatal and injury crashes and help the state and its planning partners reach our targets. The Pennsylvania SHSO is a unit within PennDOT's Highway Safety Section. So behavioral safety efforts are well known to the engineering side of safety. The behavioral side of safety and the engineering side of safety work with each other every day. The Highway Safety Section Chief directs the behavioral, crash data, and engineering/risk management units. The Highway Safety Section Chief ensures all three units are working toward the same goals.

Does the State want to report additional optional targets?

No

Describe progress toward meeting the State’s 2020 Safety Performance Targets (based on data available at the time of reporting). For each target, include a discussion of any reasons for differences in the actual outcomes and targets.

PERFORMANCE MEASURES	TARGETS	ACTUALS
Number of Fatalities	1171.9	1140.6
Number of Serious Injuries	4400.3	4445.6
Fatality Rate	1.148	1.163
Serious Injury Rate	4.309	4.531
Non-Motorized Fatalities and Serious Injuries	781.7	761.2

The actual number for Fatality Rate is not populating correctly.. this value should be 1.157. The actual number for Serious Injury Rate is also not populating correctly.. this value should be 4.510. The values shown above are being calculated based on the average of the last 5 individual years for fatality/serious injury rate, NOT by taking the 5 year average (2016-2020) for fatality/serious injury rate multiplied by 100,000,000 divided by the 5 year VMT average (2016-2020) which is how we perform the calculation.. this leads to slightly different results.

Based on the 2016-2020 data, we made significant progress on two of the five targets (Number of Fatalities and Fatality Rate). For the three targets that did not make significant progress (Number of Serious Injuries, Serious Injury Rate, and Total Number of Non-Motorized Fatalities and Serious Injuries), please see question 34

Applicability of Special Rules

Does the HRRR special rule apply to the State for this reporting period?

No

Provide the number of older driver and pedestrian fatalities and serious injuries 65 years of age and older for the past seven years.

PERFORMANCE MEASURES	2014	2015	2016	2017	2018	2019	2020
Number of Older Driver and Pedestrian Fatalities	226	207	194	216	238	213	195
Number of Older Driver and Pedestrian Serious Injuries	284	252	420	422	475	501	366

These numbers reflect the count of drivers and pedestrians ages 65 and over and not all persons involved in the crash.

The number of Pennsylvania licensed drivers ages 65 and over have increased consistently since 2010 peaking in 2020. This increase has a significant impact on the number of Older Driver and Pedestrian Fatalities/Serious Injuries. 2018 saw a slight decrease in licensed drivers for this age group but still the 4th highest number on record. This age group’s highway fatalities decreased by 38 in 2020. People age 65 and older account for approximately 18.7% of Pennsylvania’s population based on US census data.

2021 Pennsylvania Highway Safety Improvement Program

The number of serious injuries significantly increased after 2015 due to both the change in definition and the new title of this injury type. 2016 crash data included the change from "Major Injury" to the MMUCC compliant "Suspected Serious Injury".

Evaluation

Program Effectiveness

How does the State measure effectiveness of the HSIP?

- Benefit/Cost Ratio
- Change in fatalities and serious injuries
- Lives saved
- Other-3 FHWA Implementation Plans (ISIP, RDIP, SMAP)
- Other-Implementing proven systemic safety countermeasures

Based on the measures of effectiveness selected previously, describe the results of the State's program level evaluations.

One-point worth noting here is the effectiveness of systemic projects vs. spot specific projects. Spot Specific projects account for 70% of Pennsylvania's HSIP funding. However systemic projects provide a much higher return in investment with reducing fatal and suspected serious injury crashes. It takes about \$14.44 million in spot specific location projects to reduce one fatal or suspected serious injuries. Systemic safety projects only require \$1.50 million in investments to reduce one fatal or suspected serious injury. So systemic projects are about 10 times more effective than spot specific locations.

For more details and additional information about PennDOT's HSIP see PennDOT's updated HSIP Implementation Plan submitted to the FHWA on June 30, 2021.

What other indicators of success does the State use to demonstrate effectiveness and success of the Highway Safety Improvement Program?

- # RSAs completed
- HSIP Obligations
- Increased awareness of safety and data-driven process
- Increased focus on local road safety
- More systemic programs
- Policy change
- Other-Reduced Fatal and serious injuries
- Other-Projects that result in a BCR over 1.0

Effectiveness of Groupings or Similar Types of Improvements

Present and describe trends in SHSP emphasis area performance measures.

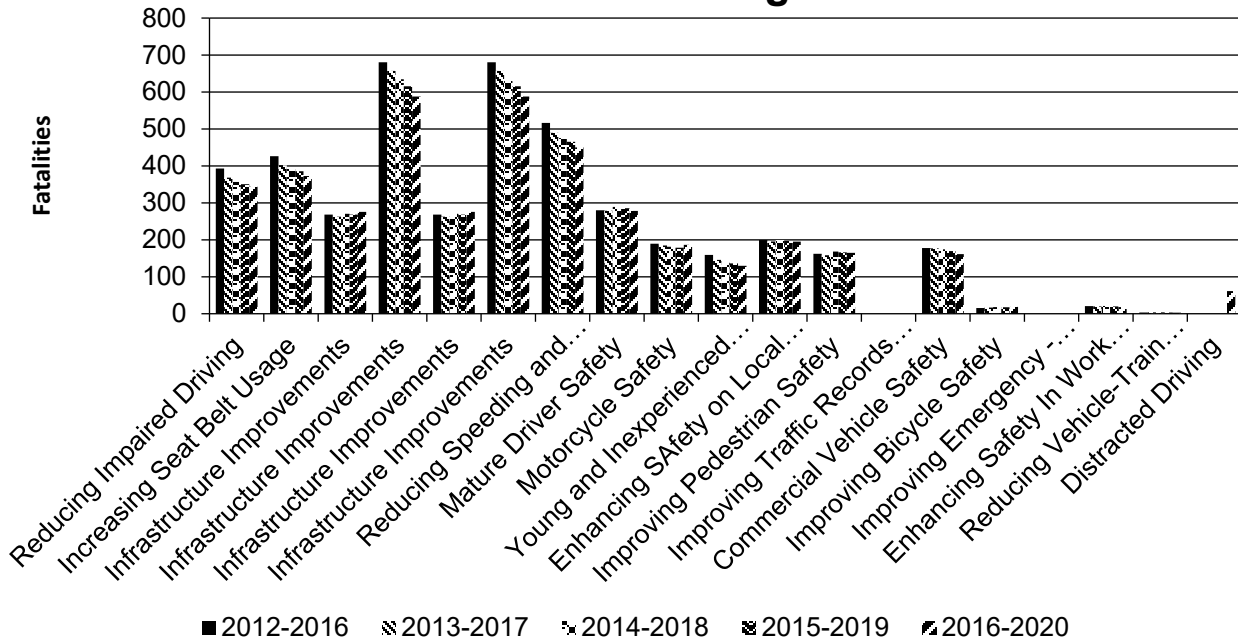
Year 2020

SHSP Emphasis Area	Targeted Crash Type	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
Reducing Impaired Driving	Impaired Driver	343.6	1,033.8	0.35	1.05

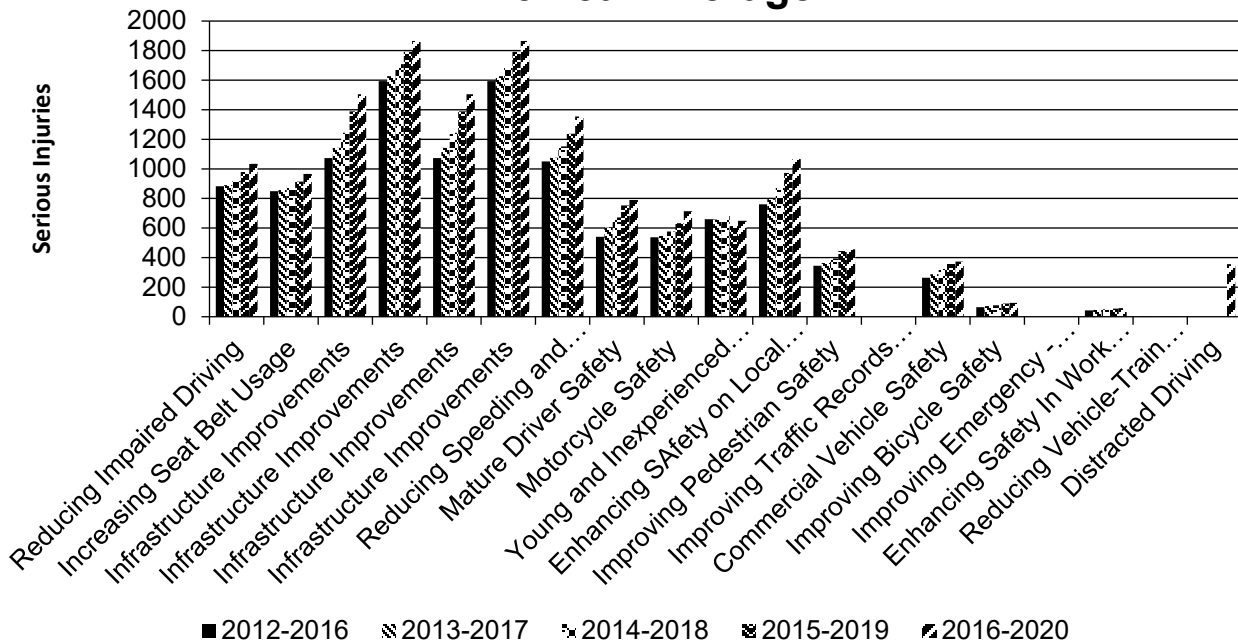
2021 Pennsylvania Highway Safety Improvement Program

SHSP Emphasis Area	Targeted Crash Type	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
Increasing Seat Belt Usage	Unbelted	372.4	965.6	0.38	0.99
Infrastructure Improvements	Lane Departure	587.8	1,865.4	0.6	1.9
Infrastructure Improvements	Intersections	275.8	1,505	0.28	1.53
Reducing Speeding and Aggressive Driving	Speed-related	450	1,355	0.46	1.38
Mature Driver Safety	Older Driver	278.2	789.6	0.28	0.8
Motorcycle Safety	Motorcycle	186.4	714.4	0.19	0.73
Young and Inexperienced Driver Safety	Teen Driver (ages 16-20)	129.8	648.6	0.13	0.66
Enhancing SAfety on Local roads	Local Road	195	1,066.6	0.2	1.09
Improving Pedestrian Safety	Vehicle/pedestrian	164.6	456.8	0.17	0.46
Improving Traffic Records Data`		0	0	0	0
Commercial Vehicle Safety	Commercial Vehicle	161.4	372.8	0.16	0.38
Improving Bicycle Safety	Vehicle/bicycle	18.6	93.8	0.02	0.09
Improving Emergency - Incident Influence Time		0	0	0	0
Enhancing Safety In Work Zones	Work Zone	17.8	58.4	0.02	0.06
Reducing Vehicle-Train Crashes	Vehicle-Train/Trolley	3	2.6	0	0
Distracted Driving	Distracted Driving	61.2	356	0.06	0.36

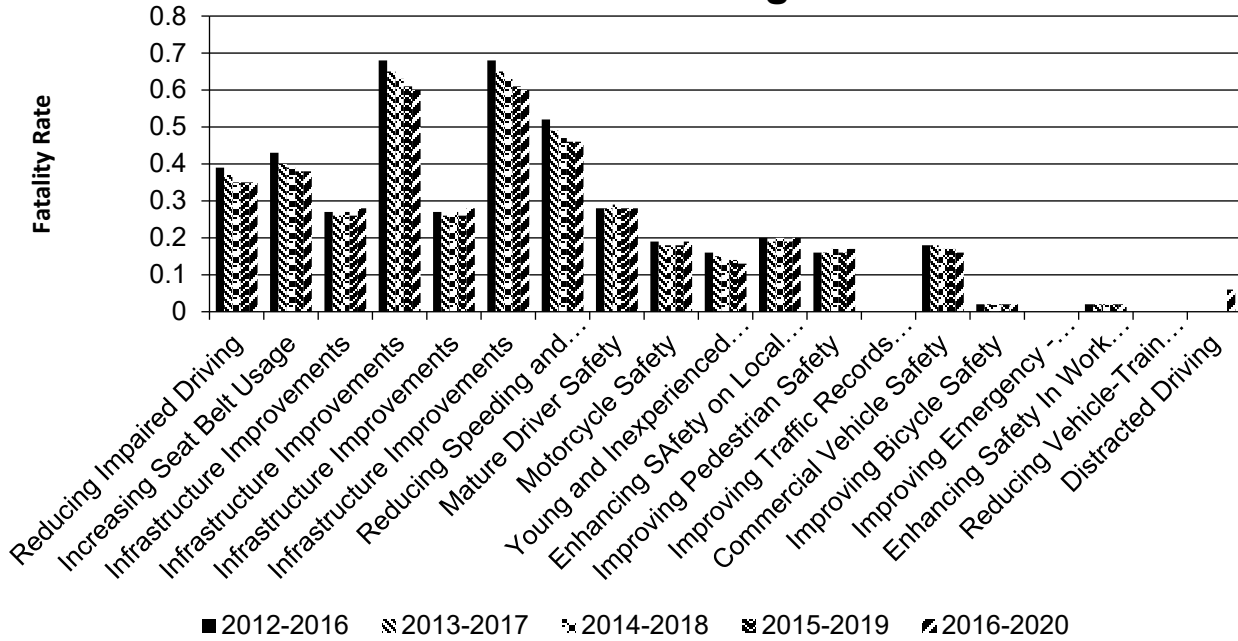
Number of Fatalities 5 Year Average



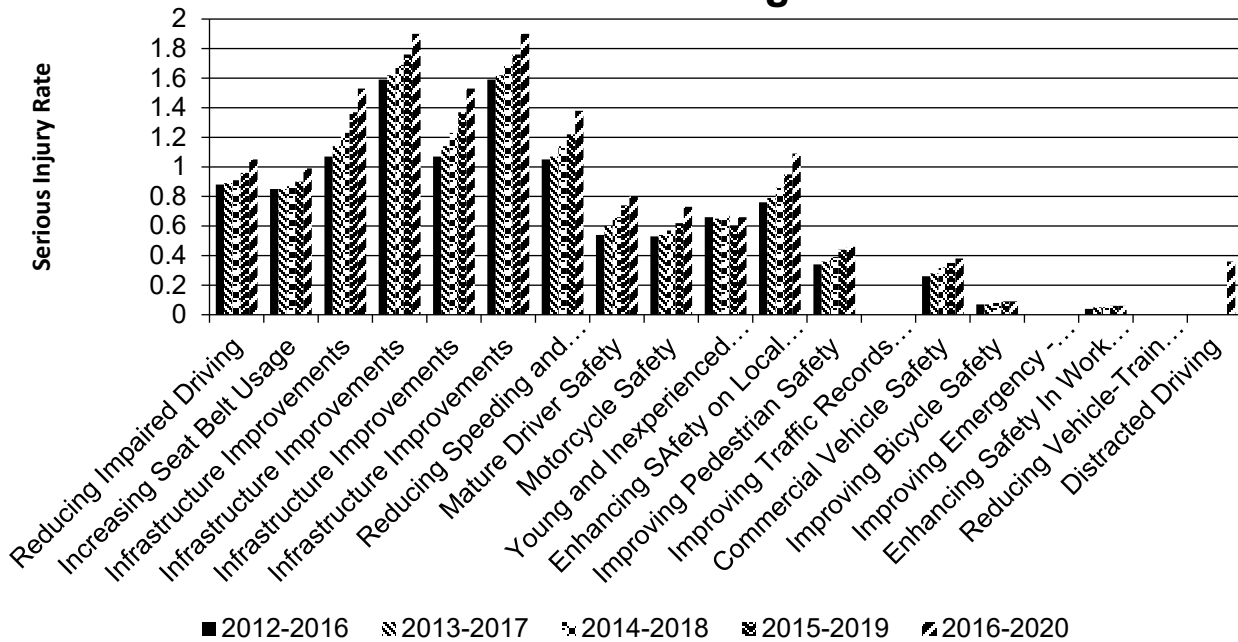
Number of Serious Injuries 5 Year Average



Fatality Rate (per HMVMT) 5 Year Average



Serious Injury Rate (per HMVMT) 5 Year Average



These numbers include all persons in the crash.

Starting in 2016 the terminology "Suspected Serious Injury" was adopted as per the Federal FAST Act. Noticeable differences from previous years appear for this injury severity although the definition did not drastically change.

2021 Pennsylvania Highway Safety Improvement Program

Starting in 2017, the Impaired Driver Crash flag began using drug test results in combination with alcohol and drug use suspicion to provide additional accuracy.

The numbers for "Older Drivers" reflect the count of all persons involved in a crash with a driver aged 65 or older. These numbers will differ from question #38. Young & Inexperienced Drivers includes drivers 16-20 years old. Speeding and Aggressive Driving includes numbers from Speeding Related (speeding, driving too fast for conditions, or police chase) crashes.

Has the State completed any countermeasure effectiveness evaluations during the reporting period?

Yes

Please provide the following summary information for each countermeasure effectiveness evaluation.

CounterMeasures:	See HSIP-IP
Description:	Several countermeasures were evaluated for the HSIP Implementation Plan. The results of the evaluations are listed in the HSIP-IP.
Target Crash Type:	All
Number of Installations:	500
Number of Installations:	500
Miles Treated:	
Years Before:	3
Years After:	3
Methodology:	Before/after using empirical Bayes or Full Bayes
Results:	The results for several different countermeasures are listed in the Pennsylvania HSIP-IP second edition that was submitted to the FHWA June 30, 2021.
File Name:	HSIP IP 2021 Presentation.pdf

Project Effectiveness

Provide the following information for previously implemented projects that the State evaluated this reporting period.

LOCATION	FUNCTIONAL CLASS	IMPROVEMENT CATEGORY	IMPROVEMENT TYPE	PDO BEFORE	PDO AFTER	FATALITY BEFORE	FATALITY AFTER	SERIOUS INJURY BEFORE	SERIOUS INJURY AFTER	ALL OTHER INJURY BEFORE	ALL OTHER INJURY AFTER	TOTAL BEFORE	TOTAL AFTER	EVALUATION RESULTS (BENEFIT/COST RATIO)
12613-3	Rural Principal Arterial (RPA) - Other	Intersection traffic control	Modify traffic signal – modernization/replacement	9.00	10.00		1.00			8.00	6.00	17.00	17.00	-62.4583524164161
28000-3	Urban Principal Arterial (UPA) - Other	Intersection geometry	Intersection geometry - other	20.00	8.00			1.00	1.00	27.00	1.00	48.00	10.00	1.6035312453941
28126-3	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal timing – signal coordination	15.00	9.00			3.00	1.00	12.00	16.00	30.00	26.00	0.334274937610427
28587-3	Urban Principal Arterial (UPA) - Interstate	Interchange design	Acceleration / deceleration / merge lane	388.00	267.00	3.00	4.00	5.00	8.00	294.00	201.00	690.00	480.00	-3.89248221574344
62960-3	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify control – new traffic signal	1.00	2.00					9.00	2.00	10.00	4.00	0.315493708009868
75776-3	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal timing – signal coordination	13.00	11.00	1.00		1.00		19.00	4.00	34.00	15.00	54.9919327742908
79450-3	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal timing – signal coordination	71.00	64.00			1.00	2.00	61.00	50.00	133.00	116.00	-0.3952506887943
82869-3	Rural Principal Arterial (RPA) - Other	Roadside	Barrier - other	4.00	9.00			1.00		1.00	2.00	6.00	11.00	0.341197875500692
85419-3	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal timing – signal coordination	14.00	18.00	1.00	2.00	7.00	5.00	116.00	118.00	138.00	143.00	-2.95337726783051
88927-3	Urban Principal Arterial (UPA) - Other	Roadway	Roadway widening - add lane(s) along segment	8.00	6.00			2.00	1.00	14.00	4.00	24.00	11.00	0.352035929069013

2021 Pennsylvania Highway Safety Improvement Program

LOCATION	FUNCTIONAL CLASS	IMPROVEMENT CATEGORY	IMPROVEMENT TYPE	PDO BEFORE	PDO AFTER	FATALITY BEFORE	FATALITY AFTER	SERIOUS INJURY BEFORE	SERIOUS INJURY AFTER	ALL OTHER INJURY BEFORE	ALL OTHER INJURY AFTER	TOTAL BEFORE	TOTAL AFTER	EVALUATION RESULTS (BENEFIT/COST RATIO)
89654-3	Urban Principal Arterial (UPA) - Other	Advanced technology and ITS	Adaptive Signal Control System	68.00	77.00			2.00	3.00	106.00	71.00	176.00	151.00	0.27677677963951
90194-3	Rural Minor Arterial	Alignment	Horizontal curve realignment	9.00	5.00		1.00	1.00		3.00	3.00	13.00	9.00	-1.16651600733706
93116-3	Rural Principal Arterial (RPA) - Other	Intersection geometry	Add/modify auxiliary lanes	8.00	7.00			3.00		8.00	5.00	19.00	12.00	1.2445494067299
93736-3	Rural Principal Arterial (RPA) - Other	Intersection traffic control	Intersection traffic control - other	9.00	3.00	1.00		2.00	1.00	10.00	5.00	22.00	9.00	3.91508872238567
94670-3	Urban Principal Arterial (UPA) - Other	Interchange design	Installation of new lane on ramp	72.00	79.00			3.00	2.00	77.00	70.00	152.00	151.00	-0.0799305598452704
97972-3	Rural Minor Arterial	Intersection traffic control	Intersection traffic control - other	4.00	8.00					2.00	4.00	6.00	12.00	-0.220217122014753
98362-3	Rural Minor Arterial	Roadside	Barrier end treatments (crash cushions, terminals)	9.00	9.00	1.00	1.00	1.00	1.00	6.00	15.00	17.00	26.00	-15.4145101243984
102002-3	Rural Minor Arterial	Shoulder treatments	Pave existing shoulders	10.00	8.00				2.00	11.00	7.00	21.00	17.00	-1.99414320463343
102084-3	Rural Minor Arterial	Roadway signs and traffic control	Roadway signs (including post) - new or updated	343.00	319.00	17.00	13.00	33.00	20.00	367.00	266.00	760.00	618.00	78.5762905237068
102118-3	Urban Minor Arterial	Intersection traffic control	Intersection signing -other	807.00	852.00	5.00	5.00	32.00	45.00	920.00	828.00	1764.00	1730.00	-8.8287521391348
102132-3	Urban Major Collector	Roadway signs and traffic control	Roadway signs (including post) - new or updated	1493.00	1528.00	19.00	24.00	70.00	84.00	1561.00	1303.00	3143.00	2939.00	-24.1762289352203
102133-3	Urban Minor Arterial	Intersection traffic control	Modify traffic signal - modernization/replacement	10.00	2.00					9.00	3.00	19.00	5.00	1.59184165592052
102150-3	Urban Minor Arterial	Intersection traffic control	Intersection signing -other	1545.00	1513.00	33.00	23.00	74.00	82.00	1554.00	1303.00	3206.00	2921.00	32.2151657802086
102168-3	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal - modernization/replacement	56.00	52.00			3.00	5.00	83.00	80.00	142.00	137.00	-0.853805628213675
102326-3	Rural Major Collector	Shoulder treatments	Pave existing shoulders	3.00	5.00	1.00				9.00	3.00	13.00	8.00	30.914614980604

2021 Pennsylvania Highway Safety Improvement Program

LOCATION	FUNCTIONAL CLASS	IMPROVEMENT CATEGORY	IMPROVEMENT TYPE	PDO BEFORE	PDO AFTER	FATALITY BEFORE	FATALITY AFTER	SERIOUS INJURY BEFORE	SERIOUS INJURY AFTER	ALL OTHER INJURY BEFORE	ALL OTHER INJURY AFTER	TOTAL BEFORE	TOTAL AFTER	EVALUATION RESULTS (BENEFIT/COST RATIO)
102506-3	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal – modernization/replacement	43.00	63.00	3.00	3.00	9.00	9.00	220.00	247.00	275.00	322.00	-4.45832079978021
102876-3	Rural Minor Collector	Roadside	Barrier- metal	1.00	2.00					2.00	1.00	3.00	3.00	0.509575572027212
102877-3	Rural Minor Collector	Roadside	Barrier- metal		1.00					2.00	2.00	2.00	3.00	0.148379148437791
104166-3	Rural Principal Arterial (RPA) - Other	Roadway	Pavement surface – high friction surface	5.00	2.00					5.00	1.00	10.00	3.00	1.84656989227529
104360-3	Rural Principal Arterial (RPA) - Other	Roadside	Barrier – cable	140.00	206.00	4.00	2.00	4.00	8.00	82.00	106.00	230.00	322.00	4.26828376399695
104370-3	Rural Principal Arterial (RPA) - Interstate	Roadside	Barrier – cable	173.00	313.00	7.00	6.00	12.00	9.00	98.00	158.00	290.00	486.00	-0.59618664033082
104372-3	Urban Principal Arterial (UPA) - Interstate	Roadway signs and traffic control	Roadway signs (including post) - new or updated			1.00		2.00		3.00	1.00	6.00	1.00	18.54
104375-3	Rural Local Road or Street	Roadside	Barrier- metal	11.00	10.00		1.00			4.00	3.00	15.00	14.00	-13.808293182736
104377-3	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal – modernization/replacement	131.00	123.00	1.00	1.00	3.00	10.00	125.00	88.00	260.00	222.00	-0.995104331399364
104439-3	Rural Principal Arterial (RPA) - Interstate	Roadside	Barrier end treatments (crash cushions, terminals)	15.00	33.00				1.00	14.00	20.00	29.00	54.00	-4.32508638336149
106385-3	Rural Major Collector	Roadside	Barrier- metal	20.00	20.00	1.00		1.00		11.00	19.00	33.00	39.00	20.847003708341
106446-3	Rural Minor Arterial	Intersection traffic control	Modify traffic signal – modernization/replacement	2.00	1.00				1.00	2.00		4.00	2.00	-1.02743832104278
106560-3	Urban Principal Arterial (UPA) - Other	Roadway	Pavement surface – high friction surface	22.00	11.00		1.00		1.00	13.00	8.00	35.00	21.00	-17.1545340528175
106566-3	Rural Principal Arterial (RPA) - Interstate	Roadway delineation	Delineators post-mounted or on barrier	728.00	693.00	12.00	12.00	22.00	28.00	357.00	369.00	1119.00	1102.00	-18.6070303873125

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106632-3	Rural Minor Arterial	Shoulder treatments	Pave existing shoulders	9.00	4.00					11.00	13.00	20.00	17.00	-0.610765183617997
106712-3	Rural Principal Arterial (RPA) - Interstate	Roadside	Barrier – cable	124.00	174.00	9.00	6.00	9.00	12.00	80.00	77.00	222.00	269.00	15.114323148703
106775-3	Rural Major Collector	Roadside	Barrier end treatments (crash cushions, terminals)	34.00	37.00					29.00	23.00	63.00	60.00	-1.05619828534356
106777-3	Rural Minor Arterial	Roadway	Pavement surface – high friction surface	7.00	1.00			1.00		8.00	1.00	16.00	2.00	4.97285957979524
106778-3	Urban Principal Arterial (UPA) - Interstate	Roadside	Barrier – cable	34.00	58.00		1.00	4.00	3.00	26.00	25.00	64.00	87.00	-3.32376677993933
106780-3	Rural Local Road or Street	Roadside	Barrier- metal		6.00		1.00			7.00		7.00	7.00	-20.3045123908916
107525-3	Urban Principal Arterial (UPA) - Other	Roadway signs and traffic control	Roadway signs (including post) - new or updated						1.00	1.00	1.00	1.00	2.00	-1.13
107891-3	Urban Minor Arterial	Roadway	Pavement surface – high friction surface	106.00	28.00	1.00		2.00	3.00	59.00	22.00	168.00	53.00	23.2269357668404
28397-4	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal timing – signal coordination	136.00	176.00	5.00	2.00	5.00	13.00	138.00	122.00	284.00	313.00	57.4166548837209
29949-4	Rural Major Collector	Intersection geometry	Intersection realignment	3.00	3.00					5.00	5.00	8.00	8.00	0
30949-4	Rural Minor Arterial	Intersection traffic control	Modify control – Modern Roundabout	5.00	12.00					10.00	5.00	15.00	17.00	0.0599384899227307
47081-4	Urban Principal Arterial (UPA) - Other	Access management	Raised island - install new	13.00	19.00	1.00	1.00	2.00	1.00	23.00	14.00	39.00	35.00	9.394446350822
62969-4	Urban Minor Arterial	Roadside	Fencing	48.00	66.00	2.00		3.00	2.00	60.00	39.00	113.00	107.00	6.50593193254407
75045-4	Urban Minor Arterial	Intersection traffic control	Modify traffic signal timing – signal coordination	6.00	10.00					14.00	6.00	20.00	16.00	0.154679185814025
78556-4	Rural Principal Arterial (RPA) - Other	Intersection traffic control	Intersection traffic control - other	23.00	22.00	1.00	1.00	1.00	1.00	19.00	16.00	44.00	40.00	1.75176336941011

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82887-4	Rural Major Collector	Alignment	Horizontal curve realignment	1.00	1.00					3.00	1.00	4.00	2.00	0.138991242239821
85652-4	Urban Principal Arterial (UPA) - Other	Intersection geometry	Add/modify auxiliary lanes	8.00	7.00					5.00	2.00	13.00	9.00	0.430418975125909
89102-4	Urban Principal Arterial (UPA) - Other	Advanced technology and ITS	Adaptive Signal Control System	580.00	557.00	5.00	9.00	10.00	30.00	545.00	463.00	1140.00	1059.00	-38.9127607509147
89231-4	Urban Major Collector	Roadside	Barrier- metal	24.00	24.00			3.00	2.00	16.00	14.00	43.00	40.00	0.107389279168557
93139-4	Urban Principal Arterial (UPA) - Other	Intersection geometry	Add/modify auxiliary lanes	13.00	15.00					15.00	11.00	28.00	26.00	0.292104949355558
93172-4	Urban Major Collector	Intersection geometry	Intersection realignment	9.00	7.00					6.00	3.00	15.00	10.00	0.34969111532376
94746-4	Rural Principal Arterial (RPA) - Other	Interchange design	Interchange design - other	10.00	7.00	3.00				9.00	2.00	22.00	9.00	20.789679342875
94759-4	Urban Principal Arterial (UPA) - Other	Advanced technology and ITS	Adaptive Signal Control System	51.00	34.00		1.00	1.00		63.00	41.00	115.00	76.00	-9.97970048512972
96593-4	Urban Principal Arterial (UPA) - Other Freeways and Expressways	Roadway	Roadway - other	6.00	5.00	1.00			1.00	4.00	6.00	11.00	12.00	189.230653266332
97030-4	Urban Principal Arterial (UPA) - Interstate	Roadway signs and traffic control	Roadway signs (including post) - new or updated	70.00	42.00	2.00	2.00	1.00	3.00	46.00	43.00	119.00	90.00	-2.42224849825191
97406-4	Rural Minor Arterial	Roadway	Pavement surface – high friction surface	140.00	147.00	3.00	2.00	8.00	18.00	123.00	114.00	274.00	281.00	0.736334589172479
98250-4	Urban Minor Arterial	Advanced technology and ITS	Adaptive Signal Control System	104.00	125.00	2.00	1.00	4.00	6.00	144.00	105.00	254.00	237.00	13.8358597787034

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102086-4	Rural Principal Arterial (RPA) - Interstate	Roadside	Removal of fixed objects (trees, poles, etc.)	35.00	33.00	3.00	1.00	1.00	1.00	20.00	19.00	59.00	54.00	73.2351533897998
102097-4	Rural Principal Arterial (RPA) - Interstate	Roadside	Removal of fixed objects (trees, poles, etc.)	79.00	73.00			2.00	4.00	50.00	37.00	131.00	114.00	-3.45305661361102
102098-4	Rural Principal Arterial (RPA) - Interstate	Roadside	Removal of fixed objects (trees, poles, etc.)	78.00	86.00			3.00	2.00	35.00	40.00	116.00	128.00	-4.64801608975962
102121-4	Urban Minor Arterial	Roadway	Pavement surface – high friction surface	175.00	93.00	3.00	1.00	5.00	4.00	121.00	82.00	304.00	180.00	39.8675854176798
102152-4	Rural Major Collector	Roadway	Pavement surface – high friction surface	40.00	10.00			2.00		23.00	10.00	65.00	20.00	9.98026135676744
102329-4	Rural Minor Arterial	Roadway	Pavement surface – high friction surface	7.00	10.00			1.00		8.00	6.00	16.00	16.00	2.65917991593038
104349-4	Rural Minor Arterial	Roadside	Barrier- metal	40.00	44.00	1.00		5.00	2.00	31.00	29.00	77.00	75.00	13.1893176470588
104378-4	Rural Principal Arterial (RPA) - Other	Roadway signs and traffic control	Roadway signs (including post) - new or updated	1490.00	1533.00	32.00	23.00	71.00	52.00	918.00	772.00	2511.00	2380.00	204.282907695299
104384-4	Rural Minor Collector	Roadside	Barrier- metal	3.00	4.00					3.00		6.00	4.00	0.476846498518465
104391-4	Urban Principal Arterial (UPA) - Other Freeways and Expressways	Roadside	Barrier – cable	56.00	76.00			2.00	4.00	23.00	27.00	81.00	107.00	-3.71084727308812
104392-4	Rural Principal Arterial (RPA) - Interstate	Roadway signs and traffic control	Roadway signs (including post) - new or updated	1.00					1.00	2.00	4.00	3.00	5.00	-2.53
104396-4	Rural Principal Arterial (RPA) - Interstate	Roadway delineation	Delineators post-mounted or on barrier	147.00	106.00	1.00	3.00	3.00	5.00	116.00	107.00	267.00	221.00	-58.9087007522357
104401-4	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal – modernization/replacement	74.00	68.00	1.00	1.00	7.00	3.00	90.00	65.00	172.00	137.00	18.176116
104404-4	Rural Minor Collector	Roadside	Barrier- metal	4.00	2.00					6.00	1.00	10.00	3.00	1.53380642709149

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104406-4	Rural Principal Arterial (RPA) - Other	Roadway signs and traffic control	Roadway signs (including post) - new or updated											0
104407-4	Rural Major Collector	Roadway signs and traffic control	Curve-related warning signs and flashers	87.00	55.00	4.00	2.00	4.00	1.00	72.00	53.00	167.00	111.00	108.436528567351
104421-4	Rural Principal Arterial (RPA) - Other	Roadside	Barrier- metal	95.00	105.00	5.00		12.00	7.00	110.00	106.00	222.00	218.00	145.736692401463
104422-4	Urban Minor Arterial	Roadway	Pavement surface – high friction surface	12.00	17.00	1.00	1.00	2.00		27.00	15.00	42.00	33.00	3.79466641099429
104423-4	Rural Major Collector	Roadside	Barrier- metal	23.00	17.00			1.00	1.00	16.00	12.00	40.00	30.00	0.421667926886141
104426-4	Rural Principal Arterial (RPA) - Interstate	Roadside	Barrier- metal	99.00	120.00	2.00	1.00	5.00	2.00	67.00	41.00	173.00	164.00	26.2261205847705
104440-4	Rural Principal Arterial (RPA) - Other	Roadside	Barrier – cable	34.00	63.00	2.00			1.00	18.00	17.00	54.00	81.00	26.567989212247
104441-4	Urban Minor Arterial	Shoulder treatments	Pave existing shoulders	66.00	69.00	4.00		2.00	6.00	66.00	71.00	138.00	146.00	101.966378138162
104679-4	Rural Major Collector	Roadside	Barrier- metal	48.00	74.00	1.00	2.00	9.00	6.00	57.00	49.00	115.00	131.00	-14.2106365131815
106599-4	Rural Principal Arterial (RPA) - Other	Roadway	Rumble strips – center	168.00	170.00	5.00	9.00	20.00	8.00	150.00	115.00	343.00	302.00	-187.741865540303
88875-4	Rural Principal Arterial (RPA) - Other	Intersection traffic control	Intersection traffic control - other	5.00	6.00					8.00	8.00	13.00	14.00	-0.0599912696931393
90196-4	Rural Principal Arterial (RPA) - Other	Intersection geometry	Add/modify auxiliary lanes	3.00	5.00					1.00		4.00	5.00	0.0307101197142091
93171-4	Urban Principal Arterial (UPA) - Other Freeways and Expressways	Interchange design	Acceleration / deceleration / merge lane	15.00	6.00			1.00		17.00	5.00	33.00	11.00	2.39982114045826
94894-4	Rural Principal Arterial (RPA) - Other	Intersection traffic control	Modify traffic signal – modernization/replacement	7.00	2.00			1.00	2.00	7.00	3.00	15.00	7.00	-0.174673267891793

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97407-4	Urban Principal Arterial (UPA) - Other Freeways and Expressways	Intersection traffic control	Modify traffic signal – modernization/replacement	96.00	135.00	5.00	2.00	12.00	12.00	177.00	136.00	290.00	285.00	62.7942948568784
98020-4	Urban Principal Arterial (UPA) - Other Freeways and Expressways	Roadway	Pavement surface - other	86.00	140.00	3.00	1.00	13.00	15.00	164.00	178.00	266.00	334.00	13.3874600666713
104373-4	Rural Minor Collector	Roadside	Barrier- metal	6.00	4.00		1.00	2.00	1.00	9.00	7.00	17.00	13.00	-23.3614834455428
104403-4	Rural Principal Arterial (RPA) - Other	Roadside	Barrier – cable	51.00	119.00	2.00	2.00	2.00	4.00	27.00	36.00	82.00	161.00	-4.47362719263651
104668-4	Urban Minor Arterial	Pedestrians and bicyclists	ADA curb ramps	3.00							1.00	3.00	1.00	-1.14727621483376
105289-4	Rural Principal Arterial (RPA) - Other	Roadside	Barrier – cable	29.00	37.00					5.00	10.00	34.00	47.00	-2.45782798409774
89104-5 (0140-0173)	Rural Minor Arterial	Intersection geometry	Intersection geometry - other	3.00	4.00			1.00		2.00		6.00	4.00	1.23924126033713
95568-5 (0140-INT)	Rural Minor Arterial	Intersection traffic control	Modify traffic signal timing – signal coordination	9.00	15.00			1.00	1.00	17.00	9.00	27.00	25.00	0.527916912857424
96355-5 (0120-0197)	Rural Minor Arterial	Roadway signs and traffic control	Curve-related warning signs and flashers	5.00	5.00		1.00	1.00		9.00	4.00	15.00	10.00	-29.1798505929794
102176-5 (0120-0090)	Urban Principal Arterial (UPA) - Interstate	Roadside	Barrier – cable	140.00	176.00	1.00	3.00	5.00	3.00	107.00	92.00	253.00	274.00	-19.8190097560976
78994-5 (0210-0322)	Rural Principal Arterial (RPA) - Other	Roadway	Roadway widening - add lane(s) along segment	20.00	9.00				2.00	11.00	3.00	31.00	14.00	0.0303947294385992
104380-5 (0220-0080)	Rural Principal Arterial (RPA) - Interstate	Roadway	Pavement surface – high friction surface	11.00	8.00	1.00			1.00	6.00	3.00	18.00	12.00	45.9957153846154
104382-5 (0230-0080)	Rural Principal Arterial (RPA) - Interstate	Roadway	Pavement surface – high friction surface	38.00	18.00		2.00	3.00		28.00	13.00	69.00	33.00	-45.6436555307454

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104387-5 (0230-0220)	Urban Principal Arterial (UPA) - Other Freeways and Expressways	Roadside	Barrier – cable	6.00	6.00					7.00	4.00	13.00	10.00	2.17841025641026
104389-5 (0270-0322)	Urban Principal Arterial (UPA) - Other Freeways and Expressways	Roadside	Barrier – cable	9.00	6.00		1.00		2.00	6.00	4.00	15.00	13.00	-107.186384615385
82203-5 (0370-INT)	Rural Principal Arterial (RPA) - Other	Intersection geometry	Intersection realignment	5.00	3.00					8.00		13.00	3.00	0.901187304075235
87670-5 (0320-0015A)	Rural Principal Arterial (RPA) - Other	Roadside	Barrier – concrete	5.00	5.00					5.00	4.00	10.00	9.00	-0.0145274508604382
87905-5 (0340-0061)	Rural Principal Arterial (RPA) - Other	Roadway	Pavement surface - other	15.00	30.00	2.00		3.00	2.00	17.00	21.00	37.00	53.00	103.974305084746
88623-5 (0380-1004)	Rural Major Collector	Alignment	Horizontal realignment curve	4.00	2.00					6.00	2.00	10.00	4.00	0.201171796482412
98240-5 (0320-0015B)	Rural Principal Arterial (RPA) - Other	Roadside	Roadside - other	1.00								1.00		0.0584341166166632
104405-5 (0320-0015C)	Rural Principal Arterial (RPA) - Other	Roadside	Barrier – cable	112.00	123.00	1.00			1.00	65.00	58.00	178.00	182.00	15.2023637681159
80694-5 (0840-0074)	Urban Minor Arterial	Intersection geometry	Add/modify auxiliary lanes	7.00	1.00			1.00	1.00	5.00	4.00	13.00	6.00	0.0610304687707427
93168-5 (0840-0425)	Rural Minor Collector	Roadway	Roadway widening - travel lanes	3.00	2.00	1.00					2.00	4.00	4.00	8.7495606142955
21630-5 (0920-2007)	Urban Major Collector	Alignment	Horizontal and vertical alignment	8.00	9.00			1.00		13.00	6.00	22.00	15.00	0.451647113709897
102063-5 (1240-GDRL)	Rural Minor Arterial	Roadside	Barrier- metal	190.00	170.00	7.00	4.00	15.00	8.00	159.00	103.00	371.00	285.00	24.2768085
91643-5 (0330-INT)	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal timing – signal coordination	8.00	8.00		1.00		1.00	8.00	9.00	16.00	19.00	-19.7297313984025

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98251-5 (0800-RMBL)	Urban Principal Arterial (UPA) - Other Freeways and Expressways	Roadway	Rumble strips – center	101.00	137.00	5.00	1.00	4.00	6.00	72.00	91.00	182.00	235.00	41.675214494177
98253-5 (0800-HFST)	Urban Major Collector	Roadway	Pavement surface – high friction surface	140.00	69.00	2.00	2.00		5.00	103.00	52.00	245.00	128.00	4.19687649209755
99375-5 (0300-HTCB)	Urban Principal Arterial (UPA) - Other Freeways and Expressways	Roadside	Barrier – cable	164.00	191.00	4.00		1.00	3.00	88.00	82.00	257.00	276.00	52.4587155858931
102078-5 (0300-HFST)	Rural Minor Arterial	Roadway	Pavement surface – high friction surface	24.00	12.00			1.00	1.00	26.00	16.00	51.00	29.00	1.12481245378098
102081-5 (0900-RDIP)	Rural Major Collector	Roadway signs and traffic control	Curve-related warning signs and flashers	409.00	299.00	12.00	7.00	23.00	25.00	420.00	298.00	864.00	629.00	89.1107619474184
102120-5 (0600-HTCB)	Urban Principal Arterial (UPA) - Other Freeways and Expressways	Roadside	Barrier – cable	218.00	385.00	5.00	7.00	9.00	8.00	95.00	137.00	327.00	537.00	-20.1105709561937
102572-5 (0600-HFST)	Urban Major Collector	Roadway	Pavement surface – high friction surface	240.00	182.00	1.00	1.00	9.00	7.00	290.00	232.00	540.00	422.00	1.93761042552869
104361-5 (0900-HFST)	Rural Major Collector	Roadway	Pavement surface – high friction surface	37.00	20.00		1.00	2.00	1.00	47.00	5.00	86.00	27.00	-10.3096527935066
102122-5 (0210-HSIP)	Rural Principal Arterial (RPA) - Other	Roadway signs and traffic control	Curve-related warning signs and flashers	151.00	121.00	11.00	4.00	9.00	12.00	168.00	83.00	339.00	220.00	218.734744292237
102128-5 (0280-RMBL)	Rural Minor Arterial	Roadway	Rumble strips – edge or shoulder	1649.00	1628.00	63.00	54.00	119.00	123.00	1573.00	1217.00	3404.00	3022.00	162.88021
104362-5 (0920-INT)	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Modify traffic signal – modernization/replacement	22.00	17.00			2.00	2.00	22.00	7.00	46.00	26.00	6.91835607321131
69056-5 (1100-RAMP)	Urban Principal Arterial (UPA) - Interstate	Roadway signs and traffic control	Roadway signs (including post) - new or updated			2.00		1.00		2.00	1.00	5.00	1.00	20.68

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LOCATION	FUNCTIONAL CLASS	IMPROVEMENT CATEGORY	IMPROVEMENT TYPE	PDO BEFORE	PDO AFTER	FATALITY BEFORE	FATALITY AFTER	SERIOUS INJURY BEFORE	SERIOUS INJURY AFTER	ALL OTHER INJURY BEFORE	ALL OTHER INJURY AFTER	TOTAL BEFORE	TOTAL AFTER	EVALUATION RESULTS (BENEFIT/COST RATIO)
10951-5	Urban Principal Arterial (UPA) - Other	Intersection geometry	Intersection geometry - other	17.00	24.00	1.00				18.00	14.00	36.00	38.00	14.0750375487913
31067-5	Rural Minor Arterial	Intersection geometry	Intersection realignment	7.00	2.00					4.00	3.00	11.00	5.00	0.071700663251621
76191-5	Rural Minor Arterial	Intersection traffic control	Modify control – Modern Roundabout	15.00	11.00					14.00	8.00	29.00	19.00	0.811591462432837
79405-5	Urban Minor Arterial	Intersection traffic control	Modify traffic signal – modernization/replacement	15.00	6.00		1.00		1.00	10.00	8.00	25.00	16.00	-11.5400647653816
89177-5	Urban Principal Arterial (UPA) - Other	Interchange design	Acceleration / deceleration / merge lane	168.00	243.00	2.00	1.00	7.00	3.00	133.00	167.00	310.00	414.00	1.10233355660097
94831-5	Urban Minor Arterial	Roadway	Pavement surface – high friction surface	90.00	41.00	2.00	2.00	4.00	1.00	88.00	66.00	184.00	110.00	6.24104471133294
98252-5	Rural Minor Arterial	Roadway signs and traffic control	Curve-related warning signs and flashers	521.00	339.00	17.00	6.00	19.00	22.00	387.00	205.00	944.00	572.00	205.002371544536
102079-5	Rural Principal Arterial (RPA) - Interstate	Roadside	Barrier – cable	86.00	161.00	1.00	3.00	4.00	3.00	39.00	43.00	130.00	210.00	-21.7725332122051
102135-5	Urban Principal Arterial (UPA) - Other	Intersection traffic control	Intersection signing – add basic advance warning	207.00	176.00	2.00	6.00	7.00	9.00	246.00	189.00	462.00	380.00	-174.102609337105
102136-5	Rural Principal Arterial (RPA) - Other	Roadway signs and traffic control	Curve-related warning signs and flashers	485.00	344.00	23.00	7.00	45.00	22.00	415.00	253.00	968.00	626.00	245.287368195881
104355-5	Rural Major Collector	Roadside	Barrier- metal	1.00						3.00		4.00		0.975443791639928
104388-5	Rural Principal Arterial (RPA) - Other	Roadside	Barrier – cable	2.00	2.00							2.00	2.00	0
104402-5	Rural Principal Arterial (RPA) - Other	Roadside	Barrier- metal	88.00	98.00	5.00	6.00	6.00	8.00	90.00	80.00	189.00	192.00	-11.1732029459794

Compliance Assessment

What date was the State’s current SHSP approved by the Governor or designated State representative?

02/17/2017

What are the years being covered by the current SHSP?

From: 2017 To: 2021

When does the State anticipate completing it’s next SHSP update?

2022

Pennsylvania is currently developing our 5th edition of our Strategic Highway Safety Plan that will be completed by February 2022.

Provide the current status (percent complete) of MIRE fundamental data elements collection efforts using the table below.

*Based on Functional Classification (MIRE 1.0 Element Number) [MIRE 2.0 Element Number]

ROAD TYPE	*MIRE NAME (MIRE NO.)	NON LOCAL PAVED ROADS - SEGMENT		NON LOCAL PAVED ROADS - INTERSECTION		NON LOCAL PAVED ROADS - RAMPS		LOCAL PAVED ROADS		UNPAVED ROADS	
		STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE
ROADWAY SEGMENT	Segment Identifier (12) [12]	100						100	85	100	100
	Route Number (8) [8]	100									
	Route/Street Name (9) [9]	100									
	Federal Aid/Route Type (21) [21]	100									
	Rural/Urban Designation (20) [20]	100						100	100		
	Surface Type (23) [24]	100						100	85		
	Begin Point Segment Descriptor (10) [10]	100						100	85	100	100
	End Point Segment Descriptor (11) [11]	100						100	85	100	100
	Segment Length (13) [13]	100									
	Direction of Inventory (18) [18]	100									
Functional Class (19) [19]	100						100	100	100	100	

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ROAD TYPE	*MIRE NAME (MIRE NO.)	NON LOCAL PAVED ROADS - SEGMENT		NON LOCAL PAVED ROADS - INTERSECTION		NON LOCAL PAVED ROADS - RAMPS		LOCAL PAVED ROADS		UNPAVED ROADS	
		STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE
	Median Type (54) [55]	100									
	Access Control (22) [23]	100									
	One/Two Way Operations (91) [93]	100									
	Number of Through Lanes (31) [32]	100						100	74		
	Average Annual Daily Traffic (79) [81]	100						100	10		
	AADT Year (80) [82]	100									
	Type of Governmental Ownership (4) [4]	100						100	100	100	100
	INTERSECTION	Unique Junction Identifier (120) [110]			100						
	Location Identifier for Road 1 Crossing Point (122) [112]			100							
	Location Identifier for Road 2 Crossing Point (123) [113]			100							
	Intersection/Junction Geometry (126) [116]			100							
	Intersection/Junction Traffic Control (131) [131]			100							
	AADT for Each Intersecting Road (79) [81]			100							
	AADT Year (80) [82]			100							
	Unique Approach Identifier (139) [129]										
INTERCHANGE/RAMP	Unique Interchange Identifier (178) [168]					100					
	Location Identifier for Roadway at					100					

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ROAD TYPE	*MIRE NAME (MIRE NO.)	NON LOCAL PAVED ROADS - SEGMENT		NON LOCAL PAVED ROADS - INTERSECTION		NON LOCAL PAVED ROADS - RAMPS		LOCAL PAVED ROADS		UNPAVED ROADS	
		STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE
	Beginning of Ramp Terminal (197) [187]										
	Location Identifier for Roadway at Ending Ramp Terminal (201) [191]					100					
	Ramp Length (187) [177]					100					
	Roadway Type at Beginning of Ramp Terminal (195) [185]					100					
	Roadway Type at End Ramp Terminal (199) [189]					100					
	Interchange Type (182) [172]										
	Ramp AADT (191) [181]					100					
	Year of Ramp AADT (192) [182]					100					
	Functional Class (19) [19]					100					
	Type of Governmental Ownership (4) [4]					100					
Totals (Average Percent Complete):		100.00	0.00	87.50	0.00	90.91	0.00	100.00	80.44	100.00	100.00

*Based on Functional Classification (MIRE 1.0 Element Number) [MIRE 2.0 Element Number]
 These percentages are reflected by Function Class and not Jurisdiction.

Pennsylvania has no segments, intersections or ramps classified as Non Local Paved, Non-State.

The percentages under Local Paved Roads are Federal-Aid roads with route #'s for "State Owned" and non-Federal-Aid municipal owned roads for "Non State Owned"

Segment Identifier - We have defined segments for 100% of Liquid Fuels local roads. We are working on QA/QC for all 67 counties; as the QA/QC process is completed for a county, we are segmenting the non-liquid fuels roads. As of August 2021, 29 counties are complete through segmentation. There are currently 11 counties in the QA/QC process.

Urban Rural designation - This is collected for every state road segment. Local roads determine urban/rural based on the municipality code.

Intersection/Junction Traffic Control - LRS locations are known but accuracy is not 100% and QA efforts will take place once the inventory is established. PennDOT's Traffic Signal Asset Management System (TSAMS) currently stores all signalized intersections in PA including the city of Philadelphia.

AADT/AADT Year - This is collected for 100% of the state roads. We have collected approximately 10% of this information for local roads.

Ramp AADT (191) – The majority of PA ramps are categorized as 8,000 routes (100% ADT collected). The remaining are 9,000 routes (approx 55% complete).

Describe actions the State will take moving forward to meet the requirement to have complete access to the MIRE fundamental data elements on all public roads by September 30, 2026.

PennDOT has used HSIP set-aside funds and consultant support to help meet the requirement including the collection of traffic volumes at approximately 5,100 local-state road intersections.

PennDOT is also progressing towards a linear referencing system for local roads. PennDOT's local road network is complete for all 77,718 miles of liquid fuel payment eligible roads and has been linked to our oracle database. We are continuing to work on integrating the local roads that are ineligible for liquid fuel payments. We have 67 counties integrated within the database and are in process of QA/QC for the entire state.

PennDOT plans on completing this by September 2026. BOMO handles collection and BIO is responsible for data management of state-maintained roadways. Traffic data are collected by BPR for all public roadways. Non-local roadway data are collected and maintained through the current legacy systems. Data are collected by the District as changes are made, or as discovered during the LRS QA process. Some data are collected using Videolog. BPR is responsible for data collection and data management for local roads. BPR also collects traffic data for all roadways. Collection of traffic data is handled through use of pneumatic tubes and portable traffic counters. For non-traffic, data collectors utilized tablets in the field and aerial photography or LIDAR when they were cost reasonable. This work has been completed. No update cycle is planned now that the data have been collected.

The cost for liquid-fuels roadways is estimated at \$6 million. Traffic data for non-liquid fuels data collection has not been estimated. Collection of remaining non-traffic data for both local and non-local roads is estimated to be at least \$2 million. These costs do not include ongoing maintenance of data after initial collection. The source of all the funding needed to meet goals has not been established. HSIP funds will bear the burden of many of these costs. Research, LTAP and TRCC funding will be considered. Additional funding will likely be needed to accelerate the schedule to meet the deadline.

Optional Attachments

Program Structure:

Pub638_Final_signed.pdf

Project Implementation:

Safety Performance:

Evaluation:

HSIP IP 2021 Presentation.pdf

Compliance Assessment:

Glossary

5 year rolling average: means the average of five individuals, 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.

Systematic: refers to an approach where an agency deploys countermeasures at all locations across a system.

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.