

2024 ANNUAL REPORT

Automated Work Zone Speed Enforcement



pennsylvania
DEPARTMENT OF TRANSPORTATION





ACKNOWLEDGMENTS

775 P.A. C.S. §3369 originally authorized the development of a five-year pilot program, termed the Automated Work Zone Speed Enforcement (AWZSE) program. This program was a joint safety program supported by the Pennsylvania Department of Transportation (PennDOT), the Pennsylvania Turnpike Commission (PA Turnpike), and the Pennsylvania State Police (PSP). 75 Pa. C.S. §3369(h)(4) requires the following report of the program to the Senate and House Transportation Committee Chairs by no later than April 1, annually.

Throughout 2023, PennDOT, PA Turnpike, and PSP continued their close collaboration to administer and refine the pilot program. Executive staff from all three agencies actively participated in the program's Executive Committee, helping to steer the pilot program. Additionally, PennDOT's Bureau of Operations, PA Turnpike's Traffic Engineering and Operations division, and PSP's Bureau of Patrol lead daily activities for the pilot program. These groups were supported by a number of others at each agency during 2023, including PennDOT's Engineering Districts, Press Office, and Fiscal Services; PA Turnpike's Engineering, Construction, and Maintenance Divisions, Legal Department, Accounting/Finance, and Communications; and PSP's Fiscal Services. The efforts of these parties, along with the Program Administrator and System Administrator, have contributed to the success of the AWZSE pilot program in 2023.

While the pilot program continued operation throughout 2023, late in the year, Act 38 of 2023 was passed, which eliminated the sunset date of the pilot program. In addition to the typical annual duties of the aforementioned parties, each one played a role in preparing for and standing up the permanent program scheduled to start operation in March 2024. These efforts now ensure that the permanent program will be effective for years to come.

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GLOSSARY

AWZSE Automated Work Zone Speed Enforcement

PSP Pennsylvania State Police

PTC Pennsylvania Turnpike Commission

PennDOT Pennsylvania Department of Transportation

WZSSC Work Zone Speed Safety Cameras

EXECUTIVE SUMMARY



This program is geared towards improving safety by reducing speeding in work zones on select PennDOT-operated and all Commission-operated highways. The program uses portable automated speed enforcement systems to provide enforcement of excessive speeding (11+ MPH) in active work zones.

In 2023, the program continued to fulfill the stated goals of the program:

- **Reduce speeds in work zones.** During 2023's primary construction months (April – October), speeding in AWZSE enforced work zones has been reduced to 19% of all traffic, and excessive speeding (11+ MPH over the posted speed limit) has been reduced to 3.5% since the start of the program.
- **Promote work zone safety.** Pennsylvania has experienced a reduction in work zone crashes since the start of the program. National and overall Pennsylvania crash trends have increased over this same period. AWZSE has been a successful tool in helping to reduce crashes in work zones.
- **Improve driver behavior.** Measured, sustained speed reductions have been observed in AWZSE enforced work zones, with smaller (but measurable) reductions at times when AWZSE is not in effect in those zones.
- **Save worker and traveler lives.** Since the program began, fatalities in work zones have increased nationally while Pennsylvania work zones have had a slight decrease. AWZSE has been one of the contributing factors in those reductions.
- **Complement existing speed enforcement by the Pennsylvania State Police.** In 2023, Pennsylvania State Police supported 119 projects for \$6.45 million. This support was for work activities where PSP presence remains the most effective tool to enhance safety.

DEPLOYMENT/VIOLATION HISTORY

Since the start of enforcement in March 2020 through the end of the pilot period in February 2024, the program has completed 12,075 deployments and issued over 1.5 million notices of violation. Table 1 shows a breakdown of program statistics through the end of the pilot period in February 2024.

	2020 TOTALS	2021 TOTALS	2022 TOTALS	2023 – 2024 TOTALS*	PROGRAM TOTALS
Deployments	2,084	3,302	3,482	3,207	12,075
Violations per Deployment	105	129	128	175	129
Violations Issued	219,214	424,812	444,827	473,580	1,562,470
First Violations	191,584 (87.4%)	359,701 (84.7%)	362,260 (81.4%)	384,345 (81.2%)	1,297,922 (83.1%)
2 Violations	19,224 (8.8%)	45,982 (10.8%)	57,094 (12.8%)	61,033 (12.9%)	183,337 (11.73%)
3+ Violations	8,406 (3.8%)	19,129 (4.5%)	25,473 (5.8%)	28,202 (6.0%)	81,211 (5.20%)

*Through 2/3/2024

Table 1. Program Statistics by Year

The maturation of the AWZSE pilot program has provided benefits to the crews in work zones around the Commonwealth, as well as for those traveling through these work zones. The data has shown that AWZSE is an effective tool in improving work zone safety across the Commonwealth, counter to national trends of increasing work zone crashes.

WORK ZONE SAFETY

The onset of AWZSE enforcement in 2020 has coincided with reductions in work zone crashes across the Commonwealth. In the three years prior to AWZSE enforcement (2017-2019), the number of crashes in work zones was consistent, approximately 1,800 annually. In 2020, the first year of AWZSE program operation, the number of work zone crashes significantly decreased, to just over 1,400. This number can be attributed to the COVID-19 pandemic and associated stay-at-home orders. In 2021, as traffic volumes returned to normal after the pandemic and construction activities returned at close to pre-pandemic levels, the number of work zone crashes was 1,649, an increase from 2020, but still a reduction of over 100 crashes from pre-pandemic years. The number of work zone crashes in 2022 was 1,293, a reduction of roughly 350 crashes from the previous year. Work zone crash numbers for 2023 are anticipated to be close to 2022 numbers but are not yet finalized. These trends run counter to the trends of increasing work zone crashes nationwide.

WORK ZONE TRAVEL SPEEDS

Since the onset of AWZSE enforcement, travel speeds in work zones across the Commonwealth have reduced. During 2023's primary construction months (April – October), speeding in AWZSE-enforced work zones has been reduced to 19% of all traffic, and excessive speeding (11+ MPH over the posted speed limit) has been reduced to 3.5% of all traffic. These trends are most acute when active enforcement is occurring.

One significant trend that has continued to have been observed with the AWZSE program is that the work zones that have been most challenging to gain speed limit compliance are those work zones where the work area is protected by a barrier. Throughout the program, travel speeds adjacent to barrier protected work zones have been higher than travel speeds adjacent to work zones protected only by channelizers (devices such as barrels, cones, or vertical panels). Table 2 shows the percentage of vehicles traveling over the posted work zone speed limit and the percentage of vehicles excessively speeding (11 MPH or more over the posted speed limit) in each type of work zone.

	Deployments	% Over Speed Limit	% Excessively Speeding (11+ mph)
Channelizer	8,222	18.50%	3.03%
Barrier	3,852	39.56%	8.33%

Throughout the life of the program, the percentage of vehicles over the speed limit and the percentage of vehicles excessively speeding have been more than double in barrier protected work zones than in unprotected work zones.

Table 2. Program Speeding Summary, Through 2023

A NATIONAL SUCCESS STORY

Pennsylvania’s program continues to be a national model for the development of sound, effective use of AWZSE as a tool to improve work zone safety. Numerous states across the country have used Pennsylvania’s example to establish their own work zone pilot programs. In particular, in the northeast and mid-Atlantic states, New York and Connecticut are advancing similar statewide pilot programs, and Delaware and Virginia are piloting AWZSE at individual locations. Nationally, both Indiana and Washington state are developing their own statewide programs, specifically citing Pennsylvania’s program as an example upon which their programs are being built, all the way from the enabling legislation through program development and operation.

Pennsylvania’s program fits in well with national transportation priorities. The United States Department of Transportation (USDOT) has developed a new National Roadway Safety Strategy, and automated speed enforcement is one key Departmental action for USDOT to enable safe speeds as part of this strategy.

In addition to supporting states currently working to establish programs, Pennsylvania has been coordinating with states that already have operational programs. Successes that the Pennsylvania program has experienced have been shared with these other programs. An example of this has been the enforcement of short-term or maintenance work zones, including some of the most vulnerable work zones statewide. Other states are consulting with Pennsylvania’s program to incorporate similar improvements or enhancements in their programs.

To date, the AWZSE program team has discussed Pennsylvania’s pilot program with 25 other states. Of note, the Indiana Department of Transportation enlisted Purdue University to study data from Pennsylvania’s program to determine the effectiveness of AWZSE enforcement. The study team from Purdue has published a study on their findings, which indicate that AWZSE enforcement is effective in Pennsylvania work zones. Pennsylvania and Purdue plan continued cooperation in analyzing Pennsylvania’s program and providing quantitative data and analytics that can help provide context around the successes of Pennsylvania’s program and assist other entities in standing up similar programs.



PROGRAM OVERVIEW

INTRODUCTION

Act 86 (2018) authorized the development of the Automated Work Zone Speed Enforcement (AWZSE) program. This program is a joint safety program supported by the Pennsylvania Department of Transportation, the Pennsylvania Turnpike Commission, and the Pennsylvania State Police. 75 Pa. C.S. §3369(h)(4) requires the following report of the program to the Senate and House Transportation Committee Chairs by no later than April 1 annually. This report provides a summary of the status of the program.

In late 2023, Act 38 of 2023 was passed, which removed the sunset date of the pilot program, making this program a permanent tool to improve work zone safety on appropriate PennDOT and PA Turnpike roadways. To better align with terminology used by the Federal Highway Administration (FHWA) and provide clear messaging to the general public, the agencies have decided to retire the Automated Work Zone Speed Enforcement (AWZSE) name with the end of the pilot program and brand the permanent program the Work Zone Speed Safety Camera (WZSSC) program. Act 38 had an effective date of February 15, 2024.

The statewide Automated Work Zone Speed Enforcement program began operation in March 2020. After a brief pause due to the pandemic, the program has been operating continuously since April 2020. The pilot program operated from March 2020 to February 2024, nearly four full years. The program has reduced speeds in work zones, decreased the number of crashes in work zones, and improved safety for roadway users.

PROGRAM GOALS

The original legislation recognized that Pennsylvania's highway work zones continue to provide safety hazards for Pennsylvania workers and traveling public. The Work Zone Speed Safety Camera program is geared towards improving safety in our highway work zones statewide.

Specific program goals include:

- Reduce speeds in work zones
- Promote work zone safety
- Improve driver behavior
- Save worker and traveler lives
- Complement existing speed enforcement by the Pennsylvania State Police

PROGRAM STATUS

The program began enforcement on March 9, 2020. Enforcement activities were placed on hold March 16, 2020, due to the COVID-19 pandemic halting all construction activities statewide. Enforcement resumed at limited critical and emergency projects on April 20, 2020 and has been in continuous operation since then. Some highlights of enforcement from 2023 include:

- Completion of 3,161 deployments in support of both construction and maintenance activities.
- Issuance of nearly 457,000 notices of violation to registered owners.
- 23.9% of traffic over the speed limit (1+ MPH over the posted speed limit) and 4.7% excessively speeding (11+ MPH over the posted speed limit).

Field Deployment Approach

Since the start of enforcement in March 2020, the approach to field deployments includes:

- The program has 17 enforcement units available statewide. Generally, ten units are available for eligible PennDOT roadways and seven are available for Commission roadways.
- Units are available for two shifts daily: daylight and overnight shifts.
- Program supports both construction and maintenance activities.
- Program supports both long-term and short-term work zones

AGENCY ROLES AND RESPONSIBILITIES

As noted, the Automated Work Zone Speed Enforcement program is a joint program between PennDOT, the Pennsylvania Turnpike Commission, and Pennsylvania State Police. These agencies have jointly developed a program specific Interagency Agreement. Additionally, there are two contracted entities for the program, a Program Administrator and System Administrator. The Program Administrator assists the agencies with program development and execution. The System Administrator is responsible the technical aspects of the program. For additional information, see the “Agency Roles and Responsibilities” section of the Automated Work Zone Speed Enforcement program 2023 Annual Report.

While Act 38 of 2023 changed various statutory elements of 75 Pa. C.S. §3369, Table 3 reflects the statutory requirements that were in place and guided operation of the program throughout the pilot period.

Program Element	Legislative Requirement
Roadway Eligibility §3369(b)	PennDOT: All federal-aid highways with an active work zone PA Turnpike: All Turnpike highways with an active work zone
Police Validation §3369(d)(1)	Pennsylvania State Police (PSP) Automated Enforcement Unit within the Bureau of Patrol reviews all fine carrying violations

Table 3. Summary of Program Requirements

Program Element	Legislative Requirement
Sign Requirements §3369(b)	<ul style="list-style-type: none"> Two “Active Speed Limit Photo Enforced” signs shall be placed prior to the enforcement location (AWZSE Vendor responsibility) One “Active Enforcement Vehicle” sign on Vehicle (AWZSE Vendor Responsibility) One “End Road Work” or “End Active Work Zone” sign (Construction or Maintenance Responsibility) Any regular speed limit reduction signs need to be placed in conformance with the approved Traffic Control Plan
Violation §3369(c)	11 mph or more over the work zone regulatory speed limit
Active Work Zone Requirement §3369(a)	Workers must be present while AWZSE is active. AWZSE enforcement will occur in the activity area of the work zone. (AWZSE Vendor will be Responsible for documenting this requirement through daily logs and certification that the deployment meets the Legislative requirements)
WZSSC Locations §3369(b)	The agencies will identify potential AWZSE locations on its website (workzonecameras.penndot.gov/locations).
Issuing of Violations §3369(d)	<ul style="list-style-type: none"> Once the Registered Owner is identified through state Driver Vehicle Records, the program has 30 days from identification to mail the violation to the Registered Vehicle Owner. <p>Violations must be mailed within 90 days from the date the violation occurred.</p>
Defenses §3369(g)	<ul style="list-style-type: none"> The vehicle was reported stolen at the time the violation occurred. The person receiving the Notice of Violation was not the Registered Owner at the time the violation occurred. Device being used for enforcement was not operating correctly at the time of the violation.
Contest Process §3369(j)	<ul style="list-style-type: none"> Registered Owner has 30 days from the mail date to request a hearing. First level appeals are heard through an Informal Hearing Officer which is a Law Clerk in PennDOT’s Office of Chief Counsel. If the Registered Vehicle Owner wants to contest the finding of liability ruling of the Informal Hearing Officer, the appeal then goes to a 2nd Level Appeal through the District Court System. Second level appeals are heard by the District Justice where the violation occurred, and their finding of liability ruling is considered final.
Penalty Structure §3369(e)	<ul style="list-style-type: none"> First Violation – No Monetary Fine Second Violation - \$75 Fine Third and subsequent Violations - \$150 Fine per occurrence Fines identified are flat fees except for \$3.75 credit card convenience fees and/or late payment fees. Court costs are applied if a violation is appealed to the District Court system.
Annual Reporting §3369(h)(4)	Annual report to the PA Legislature Transportation Committees by April 1 each year.

Table 3, CONT. Summary of Program Requirements



75 P.A. C.S. §3369(h)(4) MANDATED REPORTING

75 P.A. C.S. §3369(h)(4) requires this Annual Report contain specific information regarding the program during the previous calendar year. This section contains that information for calendar year 2023.

WORK ZONE CRASH INFORMATION

In 2022, there were 1,293 total crashes in work zones on all Pennsylvania roadways. On PennDOT and Commission roadways, 44.9 percent of the crashes contained fatalities or injuries. There were 723 injured persons and 14 persons fatally injured resulting from work zone crashes, with no fatalities of workers within the work zone. In general, work zone crashes have reduced since the start of the program. Reduction occurred in 2020 due to lower traffic volumes resulting from the COVID-19 pandemic and a lighter than typical construction season. 2022 had the lowest number of work zone crashes since the implementation of the program, with a 21.6% decrease from 2021. This continued the trend of lower overall work zone crash numbers than years prior to implementation of this program.

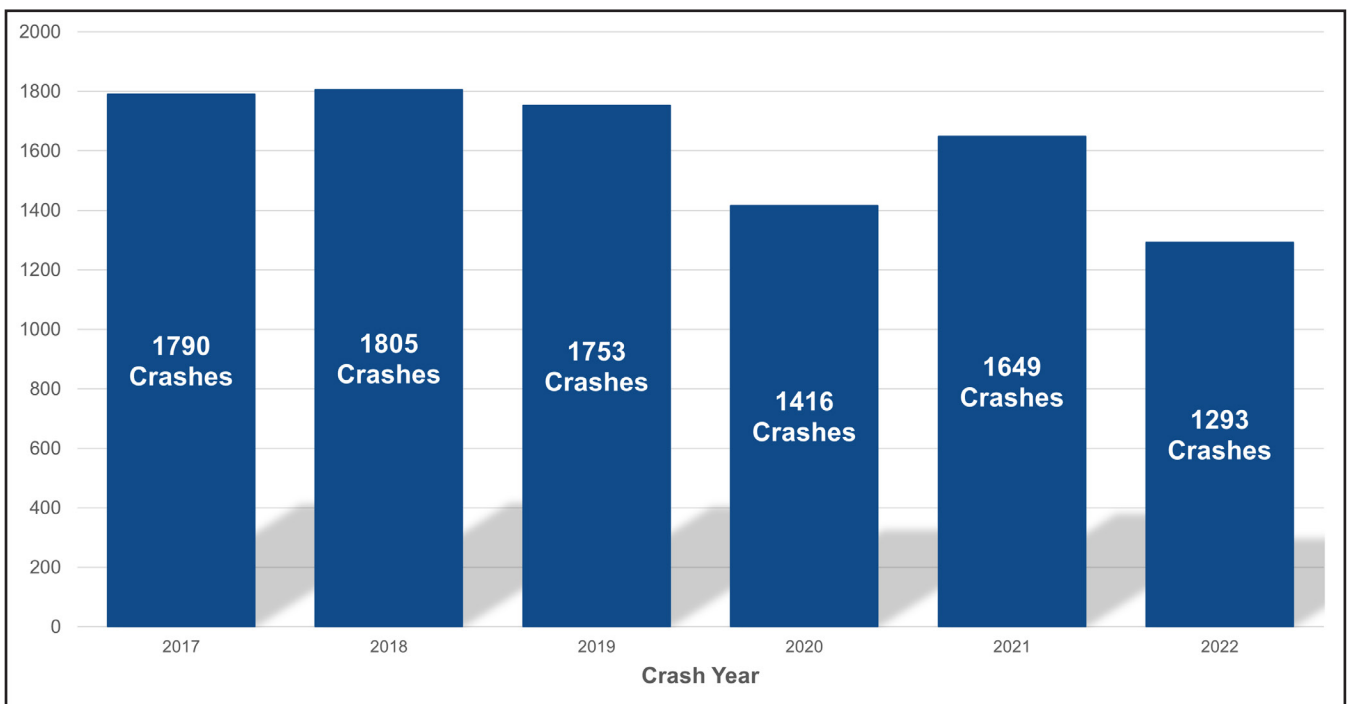


Figure 1. Work Zone Crashes by Year, 2017-2022



Automated Work Zone Speed Enforcement program enforcement can be completed safely and effectively, and often can enforce in portions of the active work zone area where traditional enforcement can be limited due to site constraints. Any crashes that have occurred in a work zone when enforcement is active have not been due to an immediate speed change caused by drivers overreacting to the unit.

SPEED DATA

Speed data presented in this section of the report represents data collected from January 1, 2023, through December 31, 2023. A full discussion on speed data in 2023 is presented in the Speed Data section of this report, and speed data over the life of the pilot period is included in the Pilot Period section of this report. Highlights of the speed data include:

- During the peak construction season (April-October), the total percentage of speeding vehicles in AWZSE enforced work zones has been reduced by 32 percent since the start of the program. Similarly, excessive speeding in AWZSE enforced work zones has been reduced by 29 percent since the start of the program.
- July 2022 experienced the lowest percentage of traffic over the posted speed limit in the program history, at 15%. That same month also had the lowest percentage of traffic excessively speeding (11 MPH or more over the posted speed limit) in program history, at 2%.
- Speeds are consistently higher in barrier protected work zones than in unprotected (channelizer – barrels, cones, panels) work zones. This is believed to be due to drivers having a false sense of security in these work zones, giving the impression that speeds can be higher in these work zones despite the presence of changed roadway characteristics.

NUMBER OF VIOLATIONS

In 2023, the program issued 452,563 violations. Of the issued notices, 84,324 (18.6%) were repeat violators, incurring fines for 2nd and subsequent violations of the statute.

PROGRAM FINES

In 2023, the Transportation Agencies collected \$6,798,593.76 in fine remittance. The program has a payment rate of roughly 72% in 2023, and a payment rate of roughly 76% over the life of the program

PROGRAM CONTRACTS

For calendar year 2023, the amounts paid for contracts related to the program are as follows:

- Program Administrator (Responsible for Program Execution) – \$891,507.10
- System Administrator (Responsible for Technical Aspects of the Program) – \$4,244,980.32
- TOTAL – \$5,136,487.42

Program Administrator costs are based on time spent supporting the Transportation Agencies and System Administrator costs are based on a flat fee per deployment. Additionally, PSP costs incurred by the program total \$116k for calendar year 2023, bringing total expenditures for the program to \$5.25 million for calendar year 2023.

The Transportation Agencies (PennDOT and PA Turnpike) have operated as a single collaborative program (in partnership with PSP). This includes sharing both the Program Administrator and System Administrator contracts. However, there have been other factors which have led to differences in the overall program finances. The variability of roadway types and characteristics present on the PennDOT roadway network, including deploying at locations with lower traffic volumes than Turnpike locations (on average), have affected income. At the same time, PennDOT expenditures are higher due to a higher deployment number share over the life of the program, leading to a higher share of the billings by contracted entities.

Table 4 provides a consolidated financial overview of the program. To date, the program has received nearly \$1.5 million more than expenditures incurred. The difference is driven by the payments received by the PA Turnpike (\$4.4 million surplus) against the expenditures incurred by the Department (\$2.9 million deficit). The Department of Transportation and the Turnpike Commission have made the commitment to use this program as a tool to enhance work zone safety.

PennDOT	Income	Expenditures	ANNUAL NET	CUMULATIVE NET
2019	\$0.00	\$314,504.97	(\$314,504.97)	(\$314,504.97)
2020	\$876,937.03	\$2,404,935.42	(\$1,527,998.39)	(\$1,842,503.36)
2021	\$3,061,764.46	\$1,920,117.64	\$1,141,646.82	(\$700,856.54)
2022	\$2,464,904.76	\$5,821,810.09	(\$3,356,905.33)	(\$4,057,761.87)
2023	\$2,524,804.75	\$1,391,553.73	\$1,133,251.02	(\$2,924,510.85)
PTC	Income	Expenditures	ANNUAL NET	CUMULATIVE NET
2019	\$0.00	\$97,010.92	(\$97,010.92)	(\$97,010.92)
2020	\$683,798.00	\$741,562.07	(\$57,764.07)	(\$154,774.99)
2021	\$2,002,092.88	\$2,461,294.18	(\$459,201.30)	(\$613,976.29)
2022	\$5,281,009.72	\$3,137,361.80	\$2,143,647.92	\$1,529,671.63
2023	\$4,838,300.66	\$1,981,191.50	\$2,857,109.16	\$4,386,780.79
Overall Program	Income	Expenditures	ANNUAL NET	CUMULATIVE NET
2019	\$0.00	\$411,515.89	(\$411,515.89)	(\$411,515.89)
2020	\$1,560,735.03	\$3,146,497.49	(\$1,585,762.46)	(\$1,997,278.35)
2021	\$5,063,857.34	\$4,381,411.82	\$682,445.52	(\$1,314,832.83)
2022	\$7,745,914.48	\$8,959,171.89	(\$1,213,257.41)	(\$2,528,090.24)
2023	\$7,363,105.41	\$3,372,745.23	\$3,990,360.18	\$1,462,269.94

Table 4. Fine Remittance, Income, and Expenditure, Overall Program, 2019-2023



Prior to October 16, 2019—the effective date of the Interagency Agreement—all costs for the program were divided evenly between the Department and the Commission. After the Interagency Agreement effective date each agency is responsible for program costs that can be directly assigned to each agency, for example each agency pays the direct cost for each individual deployment. Shared program costs are currently split to be reflective of the relative utilization of the program by each agency.

The agency legal teams have made the determination that all outstanding expenditures from the start of the program must be recovered before excess funds calculations can take place. Additionally, PennDOT and the Turnpike should be considered separate entities with regards to excess funds, as excess funds realized by one are not transferred to the other agency to cover part or all of a net negative balance.

In 2021, the AWZSE program applied for and received grant money from the Roosevelt Boulevard Automated Speed Enforcement Program (Title 75 Section 3370) to cover the System Administrator’s fixed costs, approximately \$2.1 million over a 12-month period. This grant was not included in the program financial summary but has been used by PennDOT to offset some of the program costs to date.

NUMBER OF HOURS PROVIDED BY PSP FOR INCREASED WORK ZONE PRESENCE

Since the program didn’t generate a cumulative surplus of funds over the first three years, the excess revenue breakdown in the statute was not used.

USE OF REMAINING FUNDS UNDER SECTION 3369 (H) 3. IV.

From the start of the program through the end of 2023, the Turnpike showed a cumulative net surplus of funds, with a cumulative program net of approximately \$4.4 million. Per §3369.h.3.iii, the funds will be used for appropriate safety improvement projects and countermeasures as prescribed in the legislation.



2023 AWZSE PROGRAM ACHIEVEMENTS

During calendar year 2023, the program completed 3,161 deployments on PennDOT and Turnpike roadways. Deployments occurred in support of both construction and maintenance activities on both agencies' roadways. The Turnpike increased their deployment share in 2023 compared to prior years, primarily due to an increase in suitable work activities on the Turnpike network and fewer suitable activities on the PennDOT network. Complementary to that, 2023 had the highest number (445) and highest share (14%) of deployments to maintenance activities, the vast majority of which were on the Turnpike network.

WORK ZONE CRASHES

- Work zone crashes have reduced since the start of the AWZSE program.
- A decrease in work zone crashes occurred in 2020 due to impacts from the COVID-19 pandemic and a smaller number of construction activities occurring than usual.
- In 2022, there were 1,293 total crashes in work zones on all Pennsylvania roadways. On PennDOT and Commission roadways, 44.9 percent of the crashes contained fatalities or injuries. There were 723 injured persons resulting from work zone crashes and 14 persons fatally injured, with no fatalities of workers within the work zone.
- Comparing work zone crashes in 2023 to the pre-pandemic and pre-AWZSE year of 2019, 2022 had 460 fewer crashes than 2019, a reduction of approximately 26%. This is in direct contrast to national trends of increased work zone crashes from pre-pandemic to today.

PROGRAM FEEDBACK

The feedback the program has received throughout 2023 is consistent to previous years since its implementation: Field personnel appreciate the safety the program provides and the noticeable difference seen in motorist behavior when a unit is present within their work zones.

- Feedback received from construction and maintenance personnel has been overwhelmingly positive.
- Field personnel, including the most vulnerable workers in unprotected work zones, have indicated that they perceive that drivers more consistently comply with the work zone speed limit when the enforcement unit is present and enforcing.
- The use of AWZSE enforcement has become a mainstream activity for many agency and field staff. Construction and maintenance personnel at both agencies see the value of the program as a safety enhancement tool, and now proactively request WZSSC enforcement at new project locations.

SPEED DATA

Two primary metrics are used to measure the performance of the AWZSE program's impacts: Percent over the Speed Limit and Percent Excessively Speeding. Percent over the Speed Limit measures the percentage of detected vehicles exceeding the posted work zone speed limit by any amount. Percent Excessively Speeding measures the percentage of detected vehicles going 11 MPH or more over the posted work zone speed limit. These metrics are tracked for each deployment completed, which allows for program staff to monitor speeding trends across all projects. This leads to identification of work zones with consistent speeding issues that may benefit from increased enforcement to better manage speeds through those work zones. Figure 2 on the following page provides a summary of speed data captured in 2023.

Speeds have generally been higher in long-term barrier protected work zones than in short-term unprotected work zones. As the enforcement units have been deployed to the long-term barrier protected work zones, a reduction in speeds has been seen in these work zones. Some of the more vulnerable long-term work zones still have crashes in these barrier-protected long-term work zones; these crashes occur when workers are not present and automated enforcement is not active. This shows that the enforcement units are not only increasing safety for the workers active in the zone, but also for the motorists traveling through these work zones.



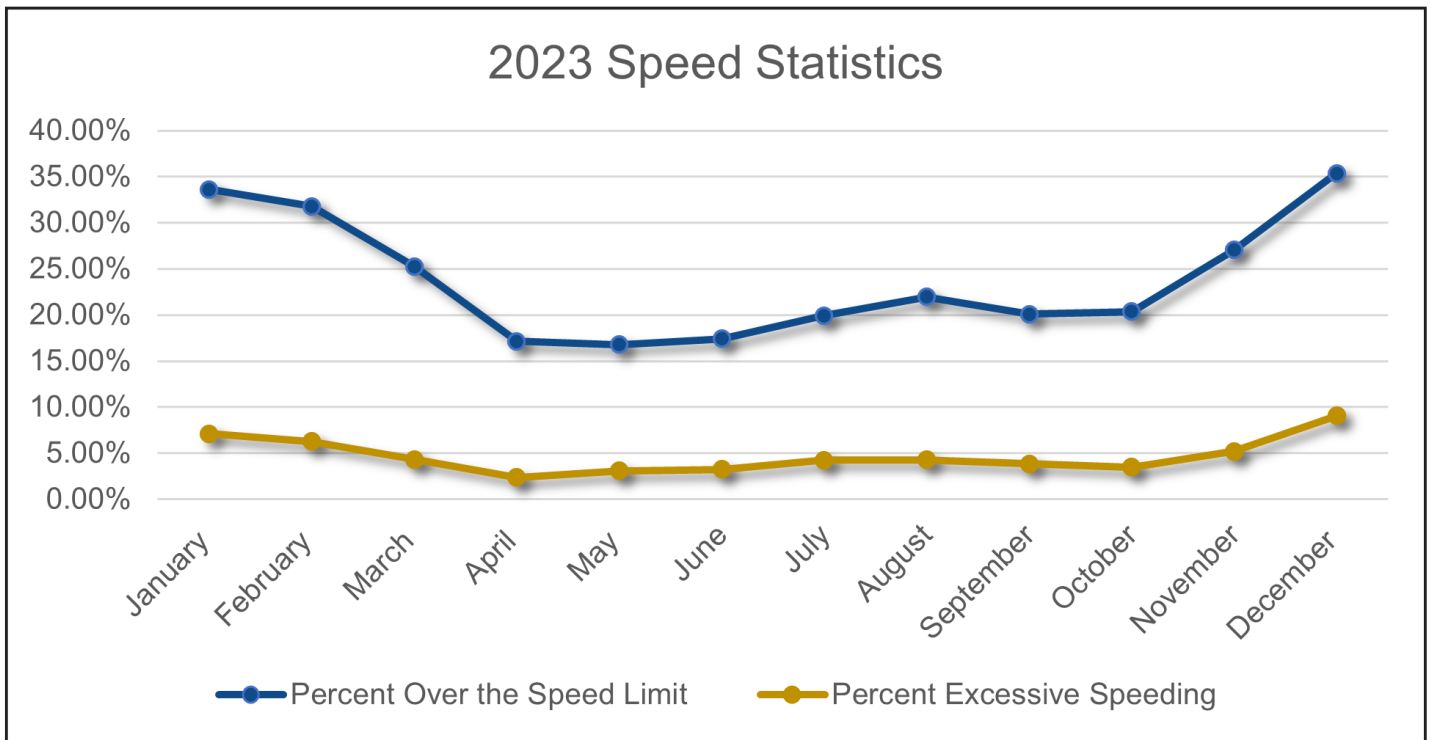


Figure 2 . Percent over Speed Limit and Percent Excessively Speeding, by Month, 2023



ENFORCEMENT VEHICLE

2023 AWZSE PROGRAM OPERATION

In 2023, the program continued its focus on enhancement and continued improvement. Throughout the year, the program was effective in meeting its stated goals.

DEPLOYMENT INFORMATION

One of the program goals is to improve driver behavior in Pennsylvania work zones. To achieve this goal, program deployment locations and frequency must strike a balance between statewide coverage and focusing deployments at work zones where speeding has been identified as a major issue. With that in mind, deployments were completed to 9 of 11 PennDOT Engineering Districts and to Turnpike roadways across the state. A total of 3,161 individual deployments across 68 different activities were completed in 2023.

As shown, the AWZSE program actively enforced year-round throughout 2023, with no significant interruptions to program operation. During the winter months (December – March), the number of deployments is typically reduced due to a lower number of active work zones available. Additionally, winter weather events across the state can impact multiple days of deployments to the already lower number of construction activities that are available for deployment in winter. Deployments by month are shown in Figure 3.

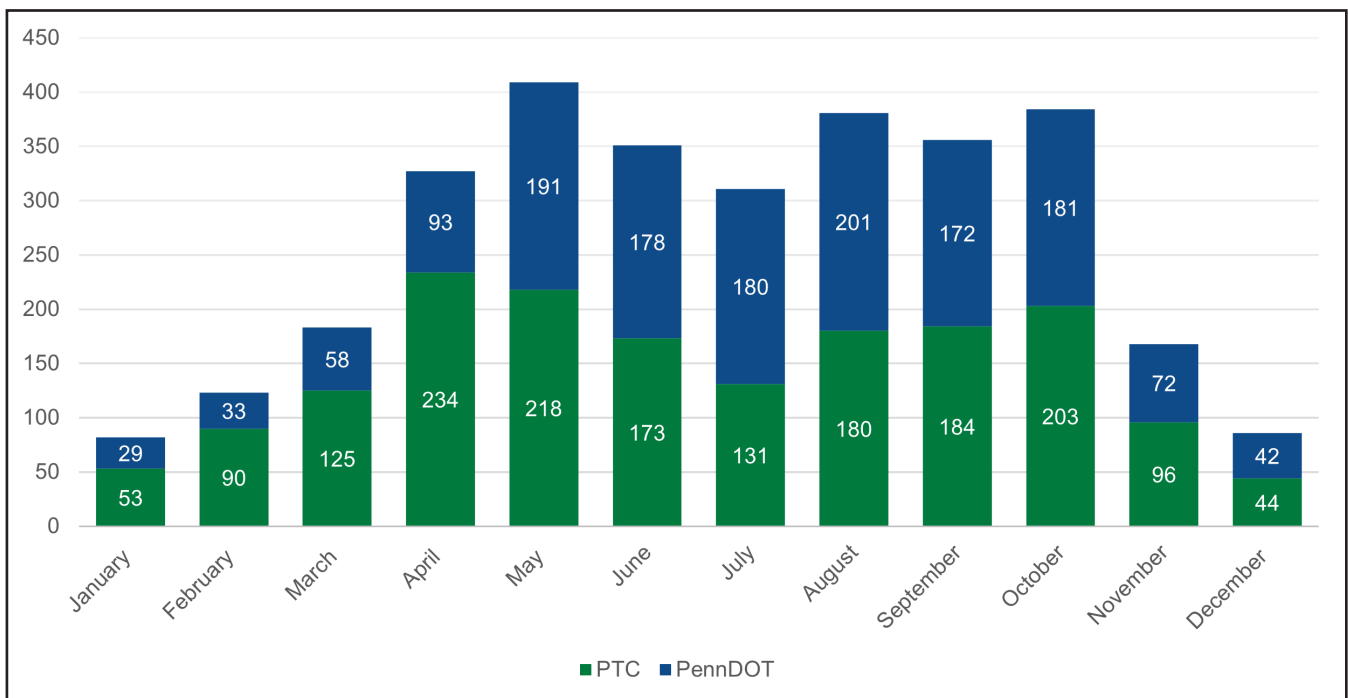


Figure 3. Deployments by Agency by Month, 2023

DEPLOYMENT APPROACH

Work zones selected for AWZSE enforcement continue to be selected and prioritized using a data-driven process to maximize the effectiveness of the systems. To that end, during 2023, PennDOT and the Turnpike Commission deployed to a wide variety of projects under differing conditions. These include (but are not limited to):

- Construction or Maintenance activities
- Barrier-Protected or Channelizer (unprotected) work zones
- Work zones with reduced speed limits vs. work zones with no speed limit reduction

CONSTRUCTION VS. MAINTENANCE ACTIVITIES

A primary difference in Pennsylvania's program from other peer state programs is the emphasis to pilot on all work zones on the applicable roadways. This includes enforcement in maintenance activities, which are locations where workers are most vulnerable.

- In 2020, the program completed 97 deployments to maintenance activities, representing under 5% of all deployments completed in 2020. In 2023, the program completed 445 deployments to maintenance activities, representing nearly 14% of all deployments completed in 2023. This is the highest number and highest share of deployments to maintenance activities since the start of the program.
- The program completed 52% more deployments overall in 2023 than in 2020. However, there were 10% fewer deployments overall in 2023 than in 2022. Deployments to maintenance work zones increased by 21% from 2022 to 2023.
- During the periods of the year when maintenance activities are most active on the Turnpike (April-May and September), one enforcement unit is dedicated to support maintenance activities within each of the five maintenance districts. During the periods of the year when maintenance activities are not as common, when a maintenance activity is scheduled in advance, every effort is made to schedule an enforcement unit to that activity.

During 2023, maintenance activities were 14% of all deployments, with a heavier emphasis in April, May, and September. Compared to previous years, there were more maintenance activities available for enforcement throughout the summer months. This contributed to the higher number of maintenance deployments despite the overall reduction in deployment volume for the year. Generally, the performance of AWZSE in maintenance work zones has been consistent with the performance in short-term, channelized construction zones.

For both construction and maintenance deployments, there have been program operations lessons learned. Enforcements in support of maintenance activities tend to have shorter enforcement durations than enforcements supporting long-term construction projects. This is due to the short-term nature of work zones established for maintenance activities. Enforcements in support of Turnpike maintenance activities rarely exceeded four hours in duration, whereas enforcements supporting construction projects were generally longer than six hours, with many fulfilling the entire eight-hour enforcement shift window. Similarly, AWZSE deployments supporting short-term overnight construction projects are generally shorter due to restricted time windows permitted for contractors to occupy travel lanes to perform work activities.

BARRIER-PROTECTED VS. CHANNELIZER (UNPROTECTED) WORK ZONES

The data-driven process to select work zones for AWZSE deployments considers the work zone configuration as an influencing factor. In particular, the number of travelers speeding and excessively speeding has been much higher in long-term barrier protected work zones than in short-term unprotected work zones. Additionally, barrier-protected long-term work zones continue to experience crashes when workers are not present and automated enforcement is not occurring. On the other hand, those work zones without barrier protection often pose a higher risk for those working in those zones and reducing speeds adjacent to them is an important factor in improving their safety. Optimizing the balance between barrier and channelizer protected work zones to provide the greatest safety benefits is an on-going evaluation. In 2023 roughly 33% of all deployments were to barrier protected work zones, and 67% were to work zones without barrier protection.

SPEED LIMIT REDUCTIONS

Speed limits in work zones are carefully established as they affect the safety of motorists and workers. PennDOT and the Turnpike Commission have slightly different approaches to establishing work zone speed limits, though both are rooted in optimizing safety in work zones. For most Turnpike Commission work zones, the work zone speed limit is reduced from 70 MPH to 55 MPH. The establishment of most work zones along Turnpike roadways introduces hazards that necessitate the reduction of the speed limit for safe travel adjacent to the work areas. Additionally, since most of the Turnpike roadways are homogeneous in nature, a consistent work zone speed limit is generally applied systemwide.

PennDOT's highway network is much more varied, requiring that the evaluation of speed limit reductions be conducted on a case-by-case basis. Most work zones on PennDOT highways are located where the normal speed limit is less than 70 MPH; many work zone configurations on PennDOT roadways also may not warrant a reduction. Before and after evaluations through the AWZSE program have enabled PennDOT to refine how speed limit reductions are evaluated. These efforts have resulted in improved speed limit compliance while maintaining work zone safety as the top priority.

The presence of a reduced work zone speed limit is not a selection factor for AWZSE deployments. When a project is selected in a work zone that has a reduced speed limit, the AWZSE unit will enforce at 11 MPH over the reduced work zone speed limit. Similarly, when a project is selected and the speed limit is not reduced, the AWZSE unit will enforce at 11 MPH over the normal posted speed limit.

In 2023, 31 of the 68 projects (46%) that received enforcement did not have a reduced work zone speed limit. All 20 projects on the Turnpike system and 17 of the 48 PennDOT projects (35%) that the program supported in 2023 had a reduced speed limit.

DATA TRACKING AND REPORTING

The program has established a set process and format for receiving deployment information from the System Administrator. This information is ingested into a management console that is used for scheduling, providing a single point of information for the program. Through the same management console, the program has instituted a tracking application to show current, paused, and completed deployments on an interactive state map that is pushed to the public facing website. This replaces an earlier manually intensive process to update the project list and map on the public website on a weekly basis in accordance with the enabling legislation. Recent enhancements to the scheduling process have refined this process to improve responsiveness to individual project changes.



VIOLATION DATA

For calendar year 2023, the program issued 452,563 violations, which is an 84.2% issuance rate from 537,635 captured events. When an event is captured, a detailed verification and review process occurs to ensure that the event captured can progress forward through the issuance process. Violations are issued to all types and classes of vehicles, with very few exceptions (i.e. active emergency responder). During this multi-step process, events may be rejected for a variety of reasons, but will fall into two main categories: Controllable Rejects and Uncontrollable Rejects.

Controllable Rejects are issues that are within the System Administrator's control that prevent the captured event from being issuable. Uncontrollable rejects are issues with a captured event outside of the System Administrator's control that prevent it from being issuable. Some examples of each type of reject category are:

- Controllable Rejects
 - Image Clarity – Plate is illegible and cannot be read
 - Image Framing – Cameras are not aligned properly to capture plate images
- Uncontrollable Rejects
 - Canadian/Diplomat/Foreign Plate
 - No DMV Hit – After three attempts, no registered owner information is available for violation issuance.
 - No Plate – Vehicle is fully in view, but no plate is visible in any of the collected images.
 - Obstruction – Obstruction of license plate to prohibit plate read (trailer hitch, bike rack, etc.)

The program team is continually reviewing processes to increase the issuance rate. The rejection rate has been reduced from nearly 24% in 2021 to nearly 16% in 2023. Ongoing actions that have been taken to improve the issuance rate include:

- Reviewing and refining deployment locations to make sure as many obstructions resulting from the roadway or work zone configuration are avoided.
- Establishing direct connections with neighboring state DMVs to minimize the number of Out-of-State No DMV hits, reducing the reliance on third party vehicle record lookup services currently resulting in increased “No DMV Hit” rejections. Currently, the accuracy of vehicle records from state DMVs with direct connections are roughly 20% higher than those states relying on third party services.

Additionally, the System Administrator contract includes liquidated damages designed to limit the allowable percentage of controllable rejects. For all violations processed in 2023, the System Administrator has met the contract goals for controllable reject percentage. Table 5 provides a summary of violations captured by the program in 2023. Table 6 provides a breakdown of how many of each tier of violations were issued by the program in 2023.

Potential Violations	Controllable Rejects	Uncontrollable Rejects	Other Rejects	In Process	Issued
537,635	32,026	53,027	10	4	452,563 (84.2%)

Table 5. Overall Program Violation Summary, 2023

	First Violation (\$0)	Second Violation (\$75)	Third/ Subsequent Violation (\$150)	Issued	Total Repeat Rate
PennDOT	189,502	26,891	10,829	227,222	16.6%
PTC	178,734	31,010	15,594	225,338	20.7%
TOTAL	368,236	57,901	26,423	452,560	18.6%

Table 6. Issued Notice Distribution by Agency, 2023



PILOT PERIOD: 2019 – 2024

AUTOMATED WORK ZONE SPEED ENFORCEMENT (AWZSE)

Pennsylvania passed Act 86 of 2018 on October 19, 2018, establishing or modifying various sections within Pa. C.S. Title 75. Specifically, §3369 established automated speed enforcement in active work zones. Act 86 provided for a five-year pilot program for Automated Work Zone Speed Enforcement (AWZSE), with an effective start date of February 2019 and continuing through to a sunset date of February 16, 2024.

The five-year pilot period proved that the program:

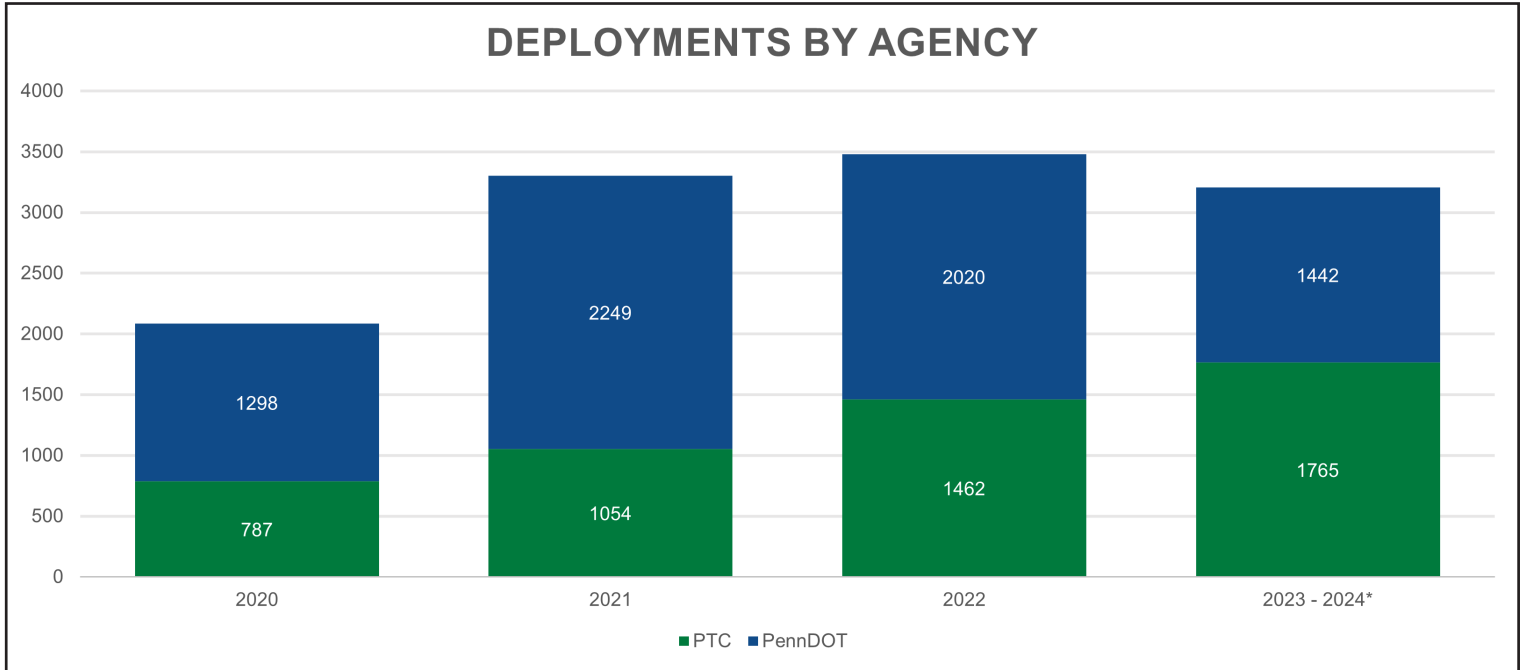
- Operated as intended by and in accordance with the enabling legislation,
- Could be developed quickly and efficiently, with input and buy-in from multiple internal and external stakeholders,
- Established and met overall goals of the program,
- Addressed any shortcomings, issues, or concerns that arose during the pilot period to make any potential subsequent permanent program better, and
- Was sustainable as an ongoing tool in the safety toolbox for the Transportation Agencies.

Since the program became operational in 2020, the AWZSE program has demonstrated success in reducing motorist speeds through active work zones and improving crash rates when consistently deployed. Since the start of enforcement in March 2020 through the end of the pilot period in February 2024, the program has completed over 12,000 deployments and issued over 1.5 million notices of violation.

DEPLOYMENTS

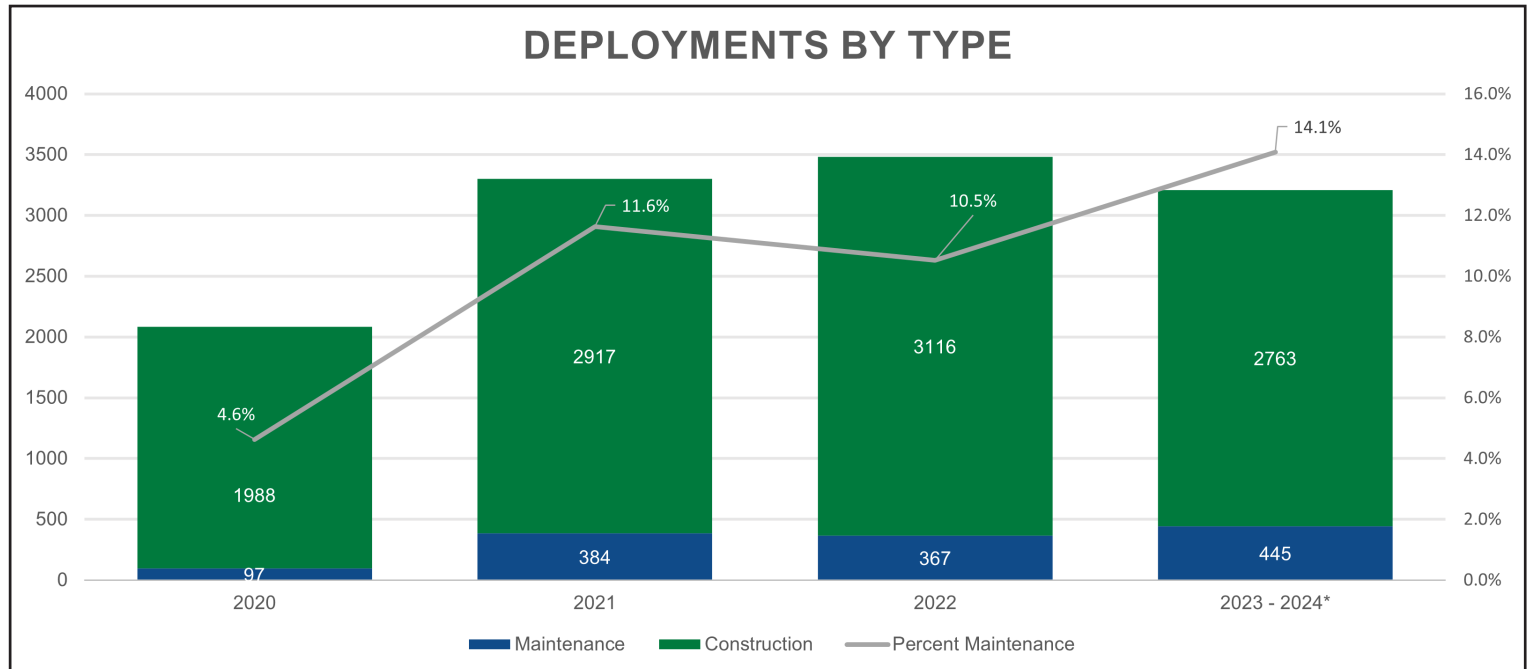
Throughout the pilot period, the program has worked to support as many work activities on Pennsylvania's roadways as possible. This includes ensuring deployments are occurring in as many geographic locations as possible, supporting a variety of work activities including construction and maintenance activities, and supporting a variety of work forces including Department, Commission, and contractor workers. Throughout this period the program has supported 210 different activities.

The program's heaviest deployment volume typically falls between April and October annually. The program enforces a combination of work zones that may have barrier protection or channelizers during these months.



*Through 2/3/2024

Figure 4. Breakdown of Payment Status, Program Life (2020-2024)



*Through 2/3/2024

Figure 5. Breakdown of Vehicle Registrations for Events Captured, Program Life (2020-2024)

SPEED DATA

The program uses two key metrics to measure program effectiveness as it relates to speed: the percent of traffic traveling over the posted speed limit by any amount and the percent of traffic excessively speeding by 11 MPH or more. The vehicles detected traveling 11 MPH or more in the work zone are those vehicles eligible to be captured by the enforcement unit and receive a notice of violation. This speed data is collected by the enforcement units while they are providing support to the work zone activities.

A recurring theme throughout the pilot period was an annual seasonal increase in the percent over the speed limit (1+ MPH) and percent excessively speeding (11+ MPH) during the winter months, typically December to the following March. This is the time of the year where there are fewer construction activities, fewer opportunities for enforcement, and most projects that are enforceable by the program are behind barrier where speeds are consistently higher regardless of time of year.

During the typical construction season of April-October annually, in 2020 the average percent over the speed limit was approximately 28%. By 2023, that average had dropped to approximately 19%, a reduction of 32%. Analogous to that, during that same period in 2020, the average percent excessively speeding was nearly 5%. By 2023, that average had dropped to 3.5%, a 30% reduction. This illustrates the impact that the program has had in just four years in changing driving behavior and reducing vehicle speeds in work zones during the construction season.

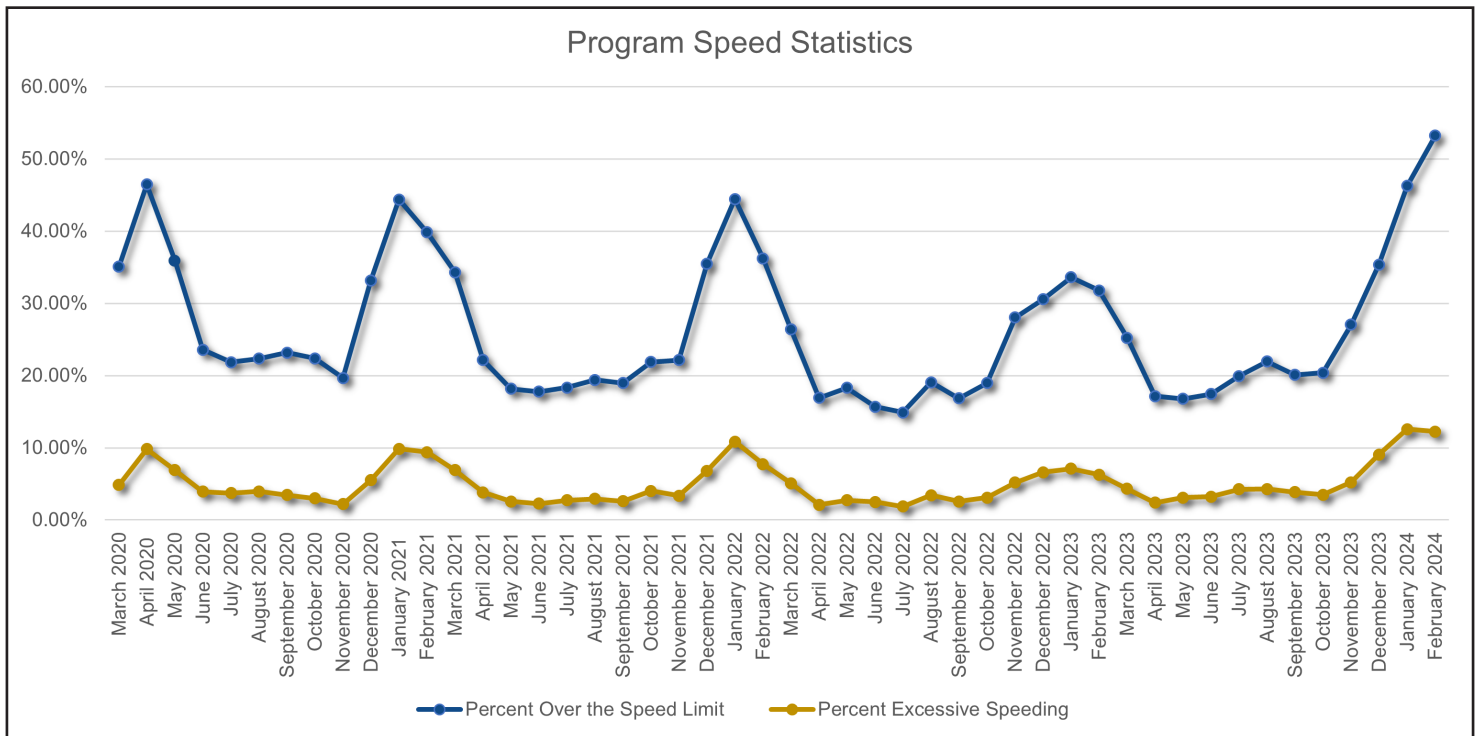


Figure 6. Breakdown of Speed Data, Program Life (2020-2024)

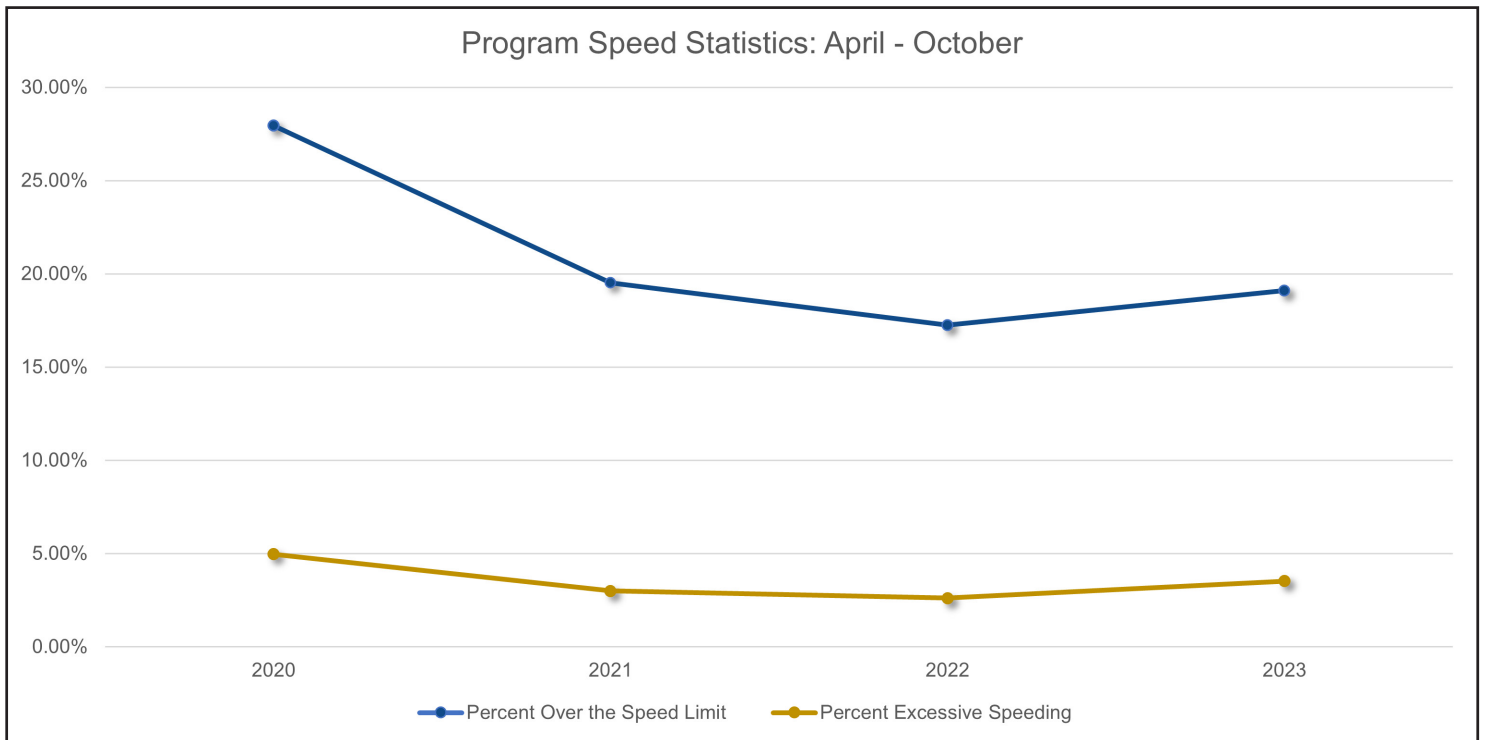


Figure 7. Speed Data for Construction Seasons (2020-2023)

During the pilot period, the agencies performed some test deployments with a new “high visibility” advance warning sign that incorporated a primarily fluorescent green sign face in an attempt to increase conspicuity of the advance warning signs to motorists. The results from these deployments showed that the program saw a 10% reduction in speeding and excessive speeding in the locations where the pilot signs were used. The tables below show a project breakdown of the performance of the pilot signs.

	Percent over the Speed Limit - Original Signs	Percent over the Speed Limit - Pilot Signs	Percent Difference
I-95 Section ECA	49.24%	41.71%	-7.53%
I-78 Section 13B	21.24%	19.32%	-1.91%
PTC T324-T326	44.27%	43.26%	-1.00%
PTC A38-A44	32.26%	30.46%	-1.80%
PTC A94	11.10%	3.07%	-8.03%

Table 7. Speed Data for Hi-Visibility Sign Pilot Locations

	Percent Excessively Speeding - Original Signs	Percent Excessively Speeding - Pilot Signs	Percent Difference
I-95 Section ECA	14.52%	11.29%	-3.24%
I-78 Section 13B	2.62%	2.09%	-0.53%
PTC T324-T326	10.60%	9.56%	-1.04%
PTC A38-A44	5.65%	5.23%	-0.42%
PTC A94	0.67%	0.26%	-0.41%

Table 8. Excessive Speed Data for Hi-Visibility Sign Pilot Locations

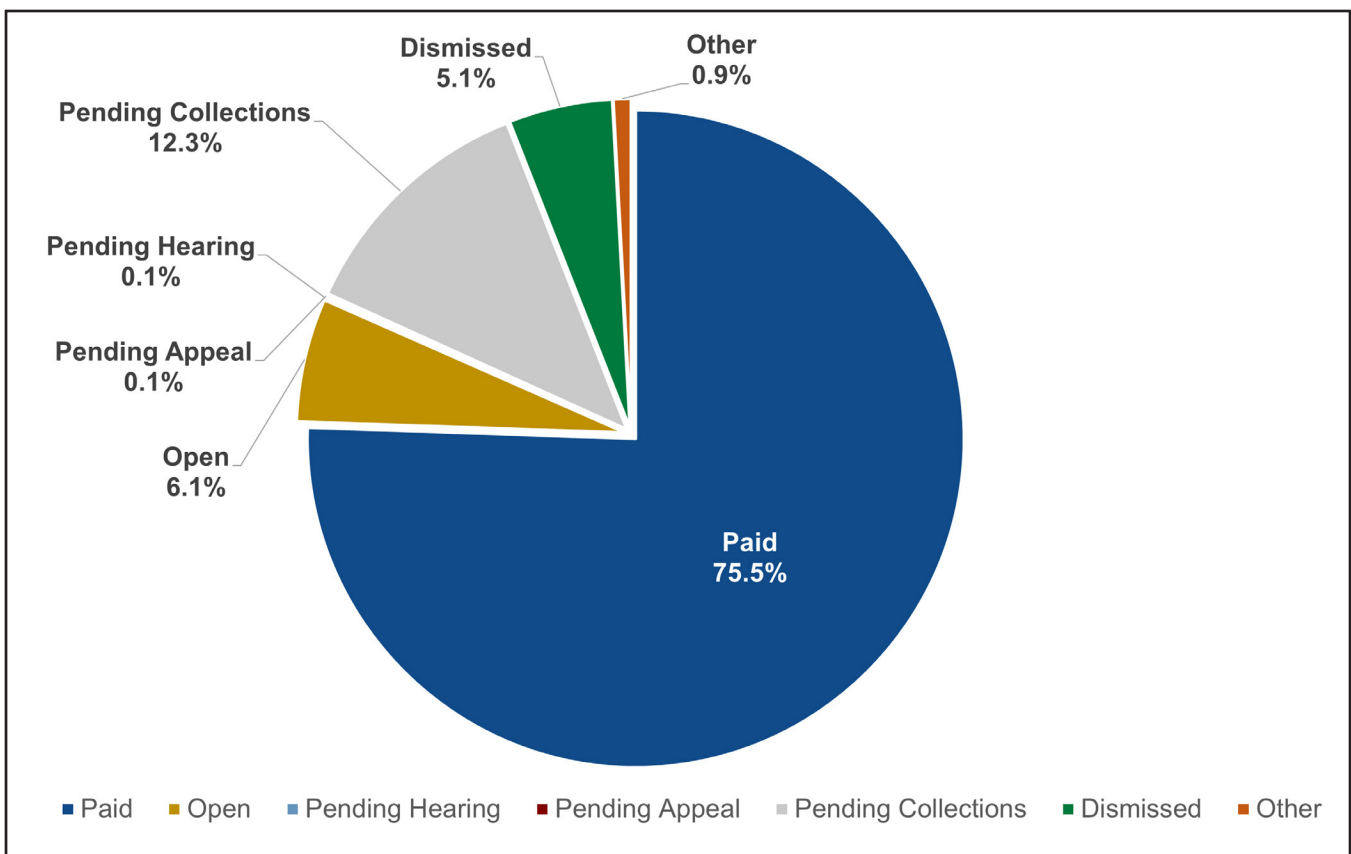


Figure 8. Breakdown of Payment Status, Program Life (2020-2024)

Over the life of the program, 78% of events captured were of vehicles registered in Pennsylvania or states adjacent to Pennsylvania (i.e. Maryland, Ohio, New York, New Jersey, etc.). An additional 13% were other out-of-state registrations, and the final 9% were foreign plates or unidentified plate origin which are unable to be issued. For vehicles captured that are registered in or adjacent to Pennsylvania, this indicates the motorists whose behavior is most important to change through this program. The program is working towards establishing direct lookup agreements with states that represent the highest share of out-of-state violators to ensure greater accuracy and timeliness with Registered Owner information. The breakdown of captured vehicle registrations is shown in Figure 9.

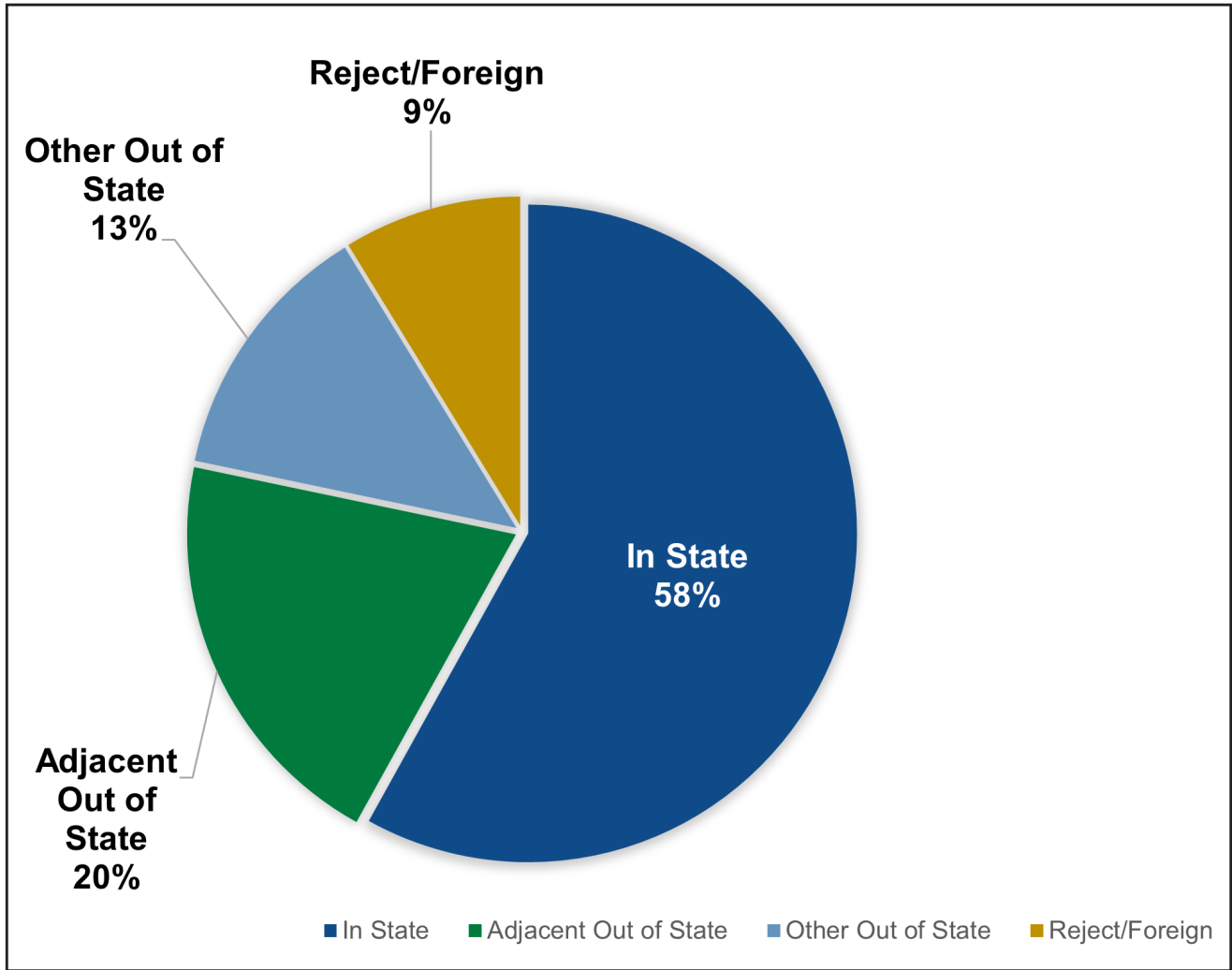


Figure 9. Breakdown of Vehicle Registrations for Events Captured, Program Life (2020-2024)





CONTESTED VIOLATIONS

From the start of the program in March 2020 through the end of 2023, the program received approximately 9,700 informal hearing requests, less than 1% of all violations, from registered owners contesting liability. PennDOT has multiple full-time and part-time AWZSE hearing officer positions to preside over the informal hearings, which began in March 2021. At the current time, all hearings are being conducted virtually.

Numerous hearing requests have been made where the registered owner attempts to void the violation based on a technicality rather than questioning the accuracy of the violation or the applicability of the location of the work zone deployment. Hearings held to date have generally resulted in the registered owner being found liable. “Not liable” findings have typically been associated with one of the original three defenses in §3369(g) – a stolen vehicle reported to a police department, evidence that the registered owner was not the owner at the time of the offense, or an error in the speed timing device accuracy. At the time of this report, there have been zero “not liable” findings attributed to the last defense.

Table 9 and Figure 10 provide data about informal hearings over the life of the program (March 2020 – December 31, 2023).

Hearings Requested	Found Liable	Found Not Liable	In Process	Other (Cancelled or Rescheduled)	Appealed to Courts
9,766	8,116	1,247	56	347	222

Table 9. Contested Violation Data over Life of Program, March 2020 – December 2023

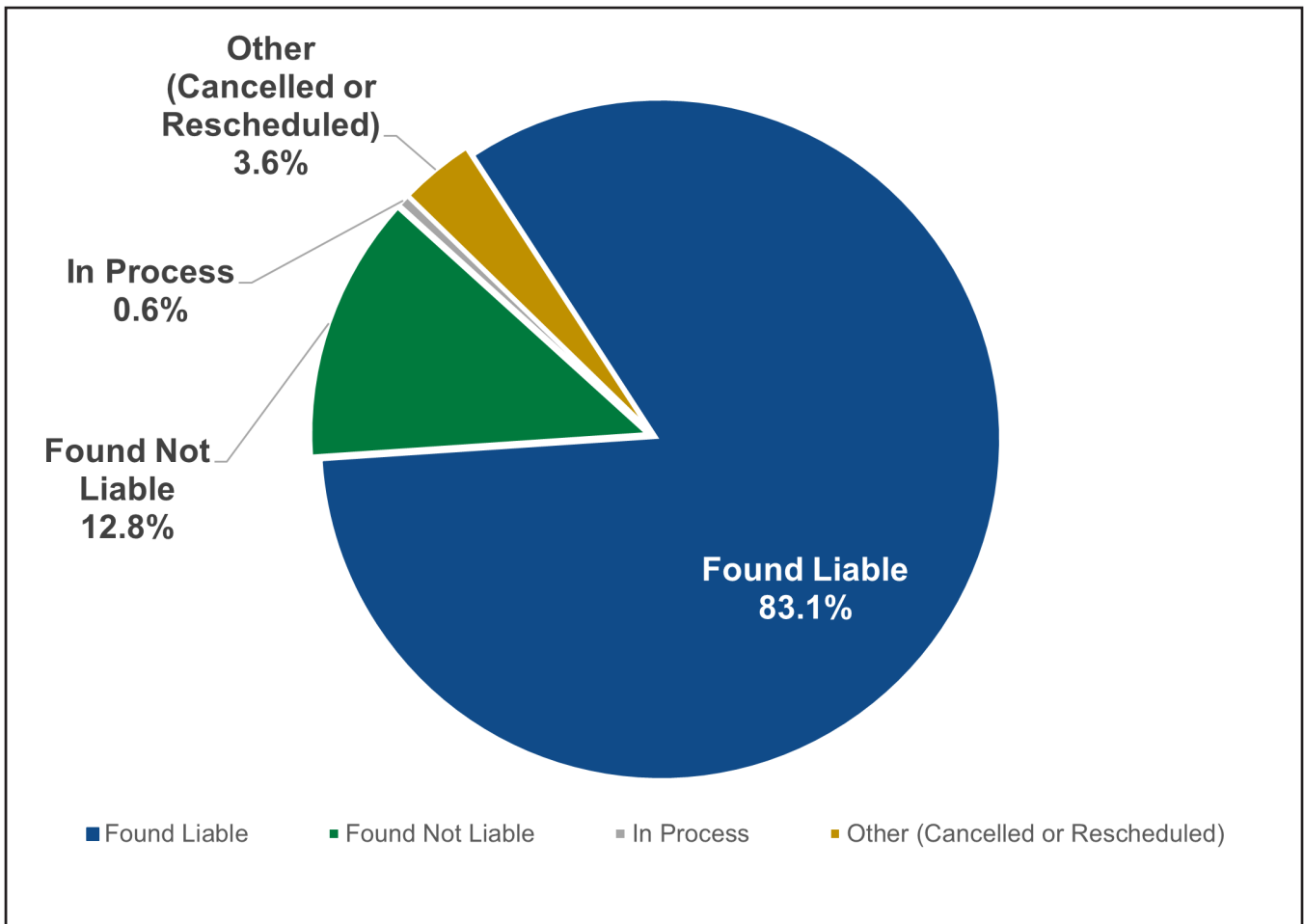


Figure 10. Contested Violation over Life of Program, March 2020 – December 2023

As Table 10 shows, zero-fine first violations have been a majority of the violations contested, though the proportion of first violations contested is significantly less than the proportion of all first violations. While there are no financial implications to the violators, they have expressed several reasons why they contested. First, several violators were concerned about violations impacting their driving record for insurance purposes. While they would often admit their guilt, they would also request leniency in merit points. For these hearings, the program hearing officers explained the program, relayed that the violations are civil in nature and did not impact their driving record, and described the facts in each case. In many of these cases violators were appreciative and indicated that they would change their behavior. This was a common refrain for first violation hearings.

Contested First Violations	Contested Fine Carrying Violations
5,279 (54%)	4,487 (46%)

Table 10. Contested Violation Breakdown by Type, March 2020 – December 2023



PUBLIC OUTREACH

Public outreach is a key element of the program – as it is the cornerstone of the education component of the program principles. Outreach goals have included:

- Overall program awareness,
- Enforcement location and approach, and
- Program goals,
- Consequences of violating this law.

PROGRAM WEBSITE

A dedicated program website has been developed and is hosted by PennDOT at workzonecameras.penndot.gov. This website includes program information, locations where AWZSE deployments are active or completed, Frequently Asked Questions (FAQ) about the program, and a contact form for program questions or concerns. In 2023, the website had over 745,000 unique page views.

SOCIAL MEDIA AND MEDIA RELATIONS

Social media has been a key tool to disseminate information about the program and remind motorists of the consequences of speeding in Pennsylvania work zones. Over the life of the program, PennDOT social media posts across four platforms amassed roughly 450,000 impressions.

Throughout the lifespan of the program, media requests have been consistently fielded by the Department and the Commission. Throughout the life of the program, PennDOT fielded at least 34 formal media inquiries on the AWZSE program.

HOME ABOUT REGULATIONS LOCATIONS FAQs SAFETY VIOLATIONS HEARINGS CONTACT US

PAY OR CONTEST VIOLATION

Pennsylvania's Work Zone Speed Safety Cameras



PROGRAM CONTROLS

Historically throughout the program, the Program Administrator has performed field QC and backoffice QC activities, and PSP has performed field QC activities. A summary of QC activities traditionally completed by each group include:

- Program Administrator field quality control reviews include:
 - Confirming that both advance warning signs are present and conspicuous.
 - Confirming that the notice is located on the vehicle.
 - Confirming that the end road work sign is present and conspicuous.
 - Confirming that speed limit signs are present and conspicuous.
 - Confirming that the enforcement unit is placed appropriately in relation to the work activity.
- Program Administrator backoffice quality control reviews include:
 - Random sampling of deployment records to ensure that completed deployments meet statutory requirements.
 - Random sampling of rejected events to confirm appropriate reject categorization.
 - Random sampling of prepared notices of violation to confirm accurate details.
- PSP field quality control checks include:
 - Confirmation that speed detection equipment has current certification.
 - Enforcement signing is set up according to the legislation.
 - PSP performed quality control at 244 unique enforcement setups since the start of the program (March 2020) and has found no improper setups per the statute.

Between the Program Administrator and PSP, a total of 4.1% of all deployments that occurred were field quality control checked over the life of the program.

PROGRAM PILOT PERIOD LESSONS LEARNED

Throughout the pilot period the AWZSE program continued to meet its overall program goals:

- **Reduce speeds in work zones.** Generally speaking, work zone speeds have trended downward throughout AWZSE enforced work zones, with a significant reduction in the percentage of traffic traveling over the speed limit since the project's inception. During 2023's primary construction months (April – October), speeding in AWZSE enforced work zones has been reduced to 19% of all traffic, and excessive speeding (11+ MPH over the posted speed limit) has been reduced to 3.5%.
- **Promote work zone safety.** AWZSE has continued to be used as a tool to enhance work zone safety by the Transportation Agencies (PennDOT and the Turnpike Commission). From 2019 to 2020, the first year the program was in operation, there was a 19% reduction in crashes in work zones. A reduction of over 100 crashes per year has occurred on Pennsylvania interstates, freeways, and expressways since the program's beginning compared to before. The agencies have incorporated this messaging into their overall work zone safety messaging programs. Several press articles and efforts have highlighted the effectiveness of the program and have focused on the safety benefits of the program.
- **Improve driver behavior.** Measured, sustained speed reductions have been observed in AWZSE-enforced work zones, with smaller (but measurable) reductions at times when AWZSE is not in effect in those zones.
- **Save worker and traveler lives.** Overall fatality numbers from work zone crashes decreased slightly from 2019 to 2020 and have maintained steady since then. This is counter to national trends where work zone fatalities are increasing.
- **Complement existing speed enforcement by the Pennsylvania State Police.** In 2023, Pennsylvania State Police supported 119 projects for \$6.45 million. This support was for work activities where PSP support remains the most effective tool to enhance safety. PSP also remains a committed program partner and serves a vital role in the program. The combination of existing and automated enforcement continues to be applied in a complementary manner and is yielding benefits in our work zones.

Establishing a five-year pilot period allowed the program to grow and mature through growing pains of program development and early deployments. This allowed the program to resolve any issues that occurred and take measures to ensure mistakes were made only once. Through these measures, the program has established itself as one that can work successfully and effectively into the future as a tool in the toolbox of the Department and Commission to improve the safety of work zones for workers and motorists.



PERMANENT PROGRAM

WZSSC – WORK ZONE SPEED SAFETY CAMERAS

In late 2023, Act 38 of 2023 was passed, which removed the sunset date of the pilot program, making this program a permanent tool to improve work zone safety on appropriate PennDOT and PA Turnpike roadways. In addition to removing the sunset date of the pilot program, Act 38 provided for some additional enhancements and changes to the program. These legislative changes had an effective date of February 15, 2024.

PROGRAM NAME CHANGE

To better align with terminology used by the Federal Highway Administration (FHWA) and provide clear messaging to the general public, the agencies have decided to retire the Automated Work Zone Speed Enforcement (AWZSE) name with the end of the pilot program and brand the permanent program the Work Zone Speed Safety Camera (WZSSC) program

LEGISLATIVE CHANGES AND PROGRAM IMPLEMENTATION

Act 38 establishes revised requirements for advance warning sign placement and added a requirement for a speed limit sign to be placed in between the two advance warning signs.

Upon the passage of Act 38, PennDOT and the PA Turnpike worked diligently to establish new signing standards to comply with the new statute. These new standards were finalized in advance of the start of enforcement under the permanent program in early March 2024. Additionally, the agencies made the determination to change the design of the advance warning sign program-wide to a primarily fluorescent green sign face to improve conspicuity for passing motorists. This style of warning sign was piloted in limited areas late in the pilot program and was deemed to be more conspicuous to motorists and improve driver behavior when those signs were present (see Pilot Period – Speed Data section for more information on the results of that signing pilot).

Another significant change in the new legislation is the addition of a fourth defense that the registered owner named on the notice of violation was not driving the vehicle at the time of the violation. Numerous discussions with the agency legal teams determined the best path forward with regards to incorporating that defense and what processes will need to occur for that defense to be used.

Enforcements under the permanent program began in early March 2024 and are anticipated to be continuous moving forward.



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