Statistics and Study Data in Support of Traffic Camera Automation (School/Work Zones)

Safer Speed
https://saferspeed.com/

PRESENTATION OUTLINE

STATISTICS

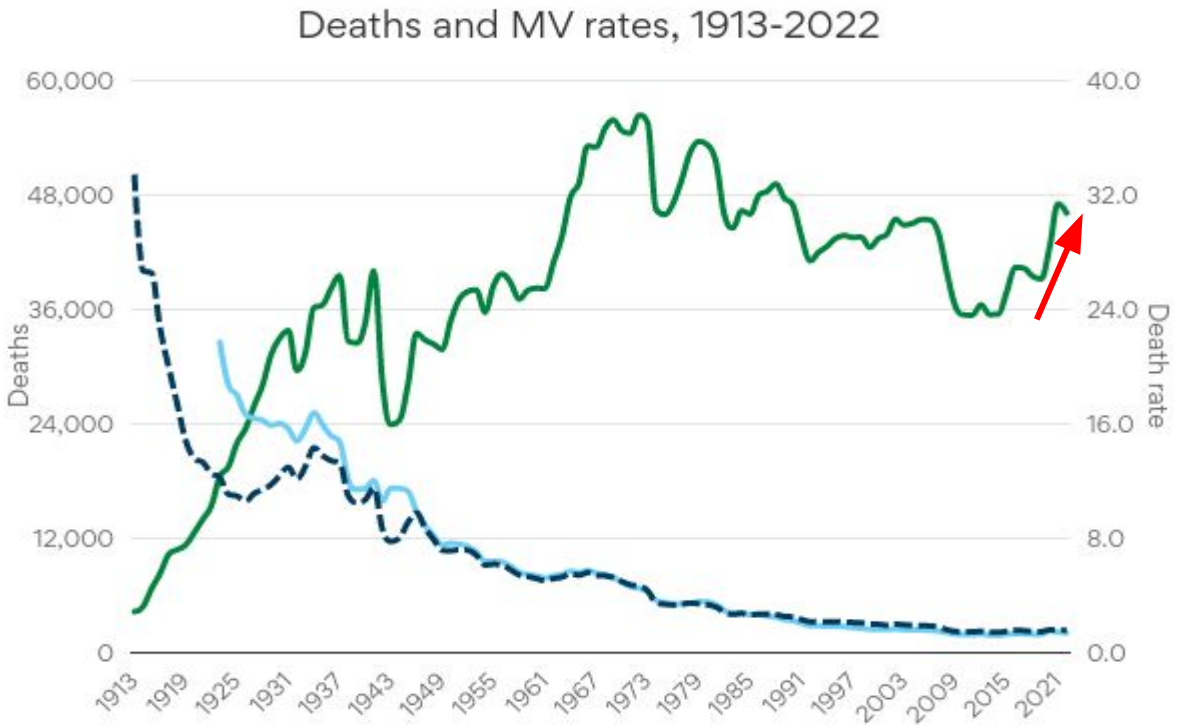
- Vehicle Crashes
- Speeding
- Texting
- Pedestrians
- Pedestrians in School Zones
- Work Zones

PHOTO ENFORCEMENT STUDIES

- School Zones
- Work Zones

STATISTICS (VEHICLES CRASHES)

From 2019 to 2022, the vehicle death rate has increased 6.4%



STATISTICS (SPEEDING)

National Highway Traffic Safety Administration

https://www.nhtsa.gov/campaign/speeding-catches-up-with-you

- More than 12,000 people were killed in speed-related crashes in 2022.
- While drivers of all ages are represented in speeding-related crashes, data shows about 24% of drivers 18-44 involved in fatal crashes were speeding, and young men are the most likely to be speeding at the time of fatal crashes.
- In 2022, 35% of male drivers 15-20 and 32% of male drivers 21-24 involved in fatal crashes were speeding.

STATISTICS (TEXTING)

Texting While Driving

https://www.thezebra.com/resources/research/texting-and-driving-statistics/#:~:text=Texting%20and%20driving%20laws%20and%20facts&text=Fatalities%20involving%20texting%20while%20driving,their%20eyes%20off%20the%20road.

A total of 47 states have a texting ban (Arizona, Missouri, and Montana don't). Only 16 states have a ban on phone usage while driving and hands-free devices for all drivers.

LOUISIANA DOES NOT HAVE A BAN ON HELD DEVICES

- Fatalities involving texting while driving comprised **9%** of all fatal crashes nationwide.
- **7%** of drivers are using cell phones (including making a phone call) at any given time.
- Texting while driving increases by **400%** a driver’s time spent with their eyes off the road.

STATISTICS (PEDESTRIANS)

U.S. Department of Transportation NHTSA's National Center for Statistics and Analysis

- In 2022 there were 7,522 pedestrians killed in traffic crashes, a 0.7-percent increase from the 7,470 pedestrian fatalities in 2021. It is the highest since 1981 when 7,837 pedestrians died in traffic crashes.
- There were also an estimated 67,336 pedestrians injured in traffic crashes, an 11-percent increase from 60,579 pedestrians injured in 2021.
- Pedestrian deaths accounted for 18 percent of all traffic fatalities and 3 percent of all people injured in traffic crashes in 2022.
- On average, a pedestrian was killed every 70 minutes and injured every 8 minutes in traffic crashes in 2022.
- Seventeen percent of the children 14 and younger killed in traffic crashes in 2022 were pedestrians.

STATISTICS (PEDESTRIANS)

The primary objective of reducing motorist travel speeds is to enhance reaction time for both drivers and pedestrians, thereby lowering the likelihood of crashes and minimizing the severity of pedestrian injuries when crashes do occur.

- Research consistently shows that higher vehicle speeds lead to more frequent and severe pedestrian crashes and injuries (Tefft, 2011; Martin & Wu, 2018; Thomas et al., 2018).
- Results show that the average risk of severe injury for a pedestrian struck by a vehicle reaches 10% at an impact speed of 16 mph, 25% at 23 mph, 50% at 31 mph, 75% at 39 mph, and 90% at 46 mph.
- The average risk of death for a pedestrian reaches 10% at an impact speed of 23 mph, 25% at 32 mph, 50% at 42 mph, 75% at 50 mph, and 90% at 58 mph.
- Risks vary significantly by age. For example, the average risk of severe injury or death for a 70-year old pedestrian struck by a car traveling at 25 mph is similar to the risk for a 30-year-old pedestrian struck at 35 mph (Tefft, 2011)

STATISTICS (PEDESTRIANS)

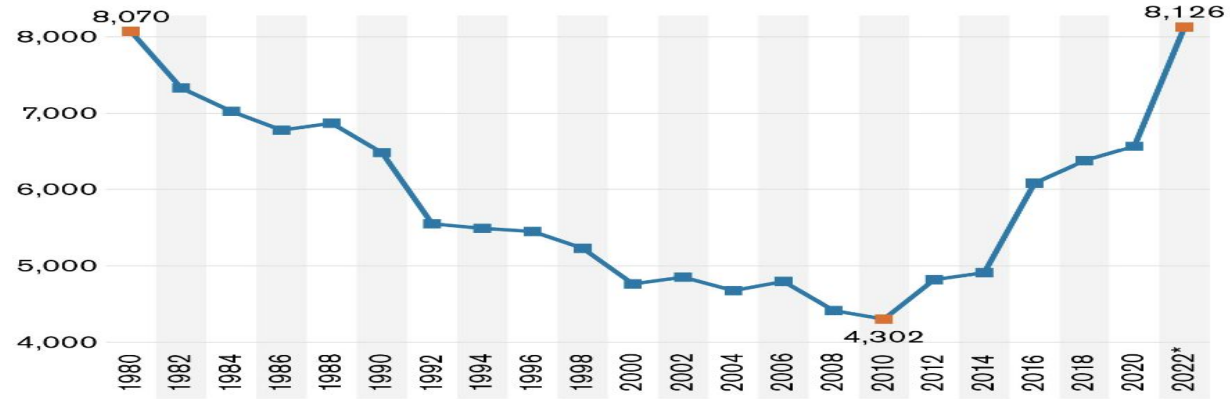
Governors Highway Safety Association (GHSA): Spotlight on Highway Safety report (2022)

https://www.ghsa.org/sites/default/files/2023-06/GHSA%20-%20Pedestrian%20Traffic%20Fatalities%20by%20State%2C%202022%20Preliminary%20Data%20%28January-December%29.pdf

Noteworthy statistic: In 2010, 20.2% of the US population had smartphones, by 2021, 72.7%.
https://www.statista.com/statistics/201183/forecast-of-smartphone-penetration-in-the-us/

As noted, direct comparisons between SHSO data and FARS data are not made due to differences in these two sources. However, if the projected 1% increase in the number of SHSO-reported pedestrian fatalities is applied to 2021 FARS (Release 1) data, **the number of pedestrian fatalities in FARS for 2022 could be greater than 8,000 for the first time since 1980** (Figure 5).

Figure 5 Number of Annual U.S. Pedestrian Fatalities, 1980-2022



STATISTICS (PEDESTRIANS)

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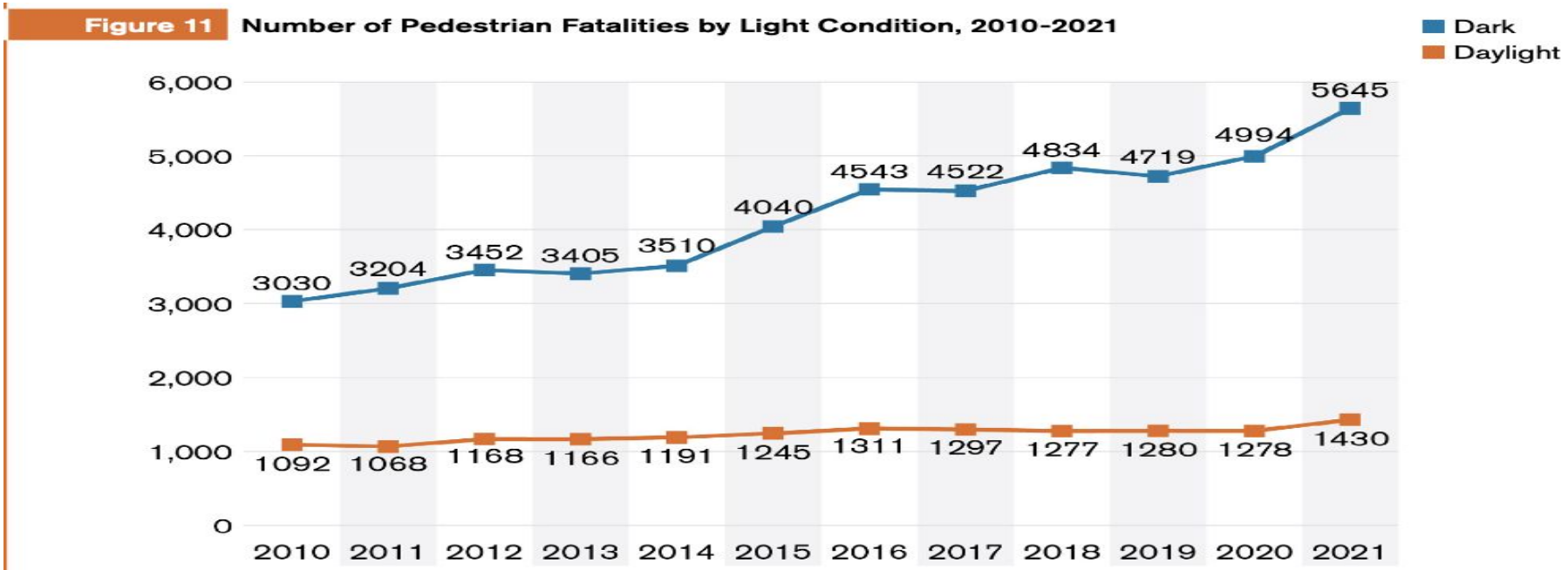

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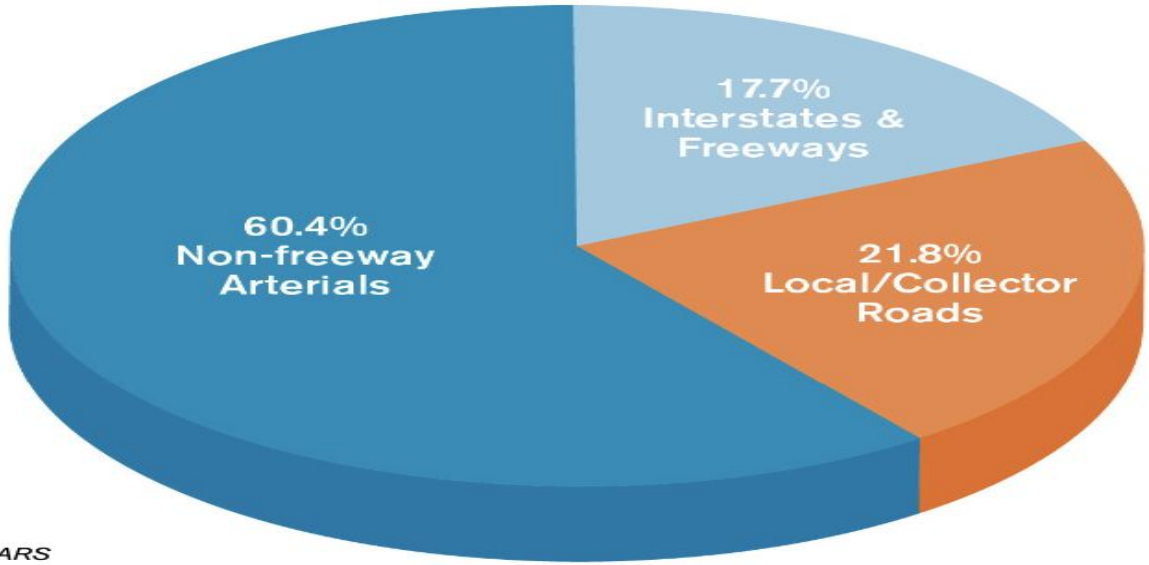
Figure 13 Percentage of Pedestrian Fatalities by Roadway Class, 2021



Source: FARS

STATISTICS (PEDESTRIANS IN SCHOOL ZONES)

Warsh J, Rothman L, Slater M*, et al.* Are school zones effective? An examination of motor vehicle versus child pedestrian crashes near schools *Injury Prevention* 2009;15:226-229.

Methods:

- Data on all police-reported motor vehicle collisions involving pedestrians less than 18 years of age that occurred in Toronto, Canada, between 2000 and 2005 were analysed.
- Geographic information systems (GIS) software was used to assess the distance of each collision relative to school location.
- The relationships between distance from school and collision-related factors such as temporal patterns of school travel times and crossing locations were analysed.

STATISTICS (PEDESTRIANS IN SCHOOL ZONES)

Warsh J, Rothman L, Slater M*, et al.* Are school zones effective? An examination of motor vehicle versus child pedestrian crashes near schools *Injury Prevention* 2009;15:226-229.

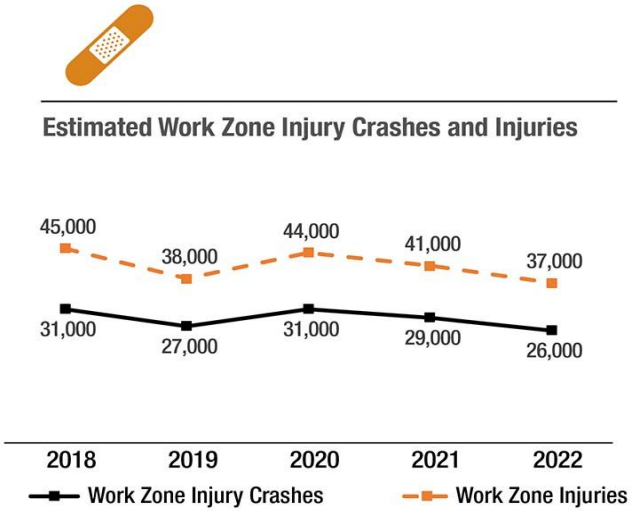
Results:

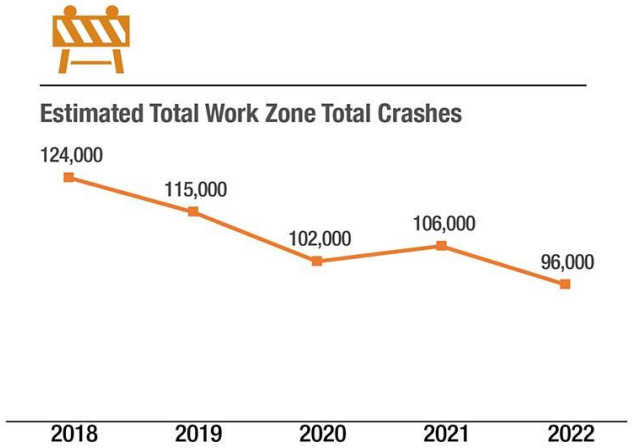
- Study data showed a total of 2717 motor vehicle versus child (<18) pedestrian collisions.
- The area density of collisions (collisions/area), particularly fatal collisions, was highest in school zones and decreased as distance from schools increased. The highest proportion of collisions (37.3%) occurred among 10–14-year-olds.
- Within school zones, collisions were more likely to occur among 5–9-year-old children as they travelled to and from school during months when school was in session. Most collisions within school zones occurred at midblock locations versus intersections.

STATISTICS (WORK ZONES)

NATIONAL WORKZONE SAFETY INFORMATION CLEARINGHOUSE

https://workzonesafety.org/work-zone-data/





STATISTICS (WORK ZONES)

Fatality Analysis Reporting System (FARS) 2021 and 2022 Annual Report File. All 50 States.

https://ops.fhwa.dot.gov/wz/resources/facts_stats.htm#ftn9

Total Work Zone Fatal Traffic Crashes

Total Work Zone Fatal Crashes by Type

The following types of fatal work zone crashes changed significantly from 2021 to 2022:	2021	2022
• Involving a Rear-End Collision	206 23%	174 21%
• Involving a CMV	294 33%	246 30%
• Where Speeding Was a Factor	281 32%	281 34%

PHOTO ENFORCEMENT STUDIES (SCHOOL ZONES)

Quistberg DA, Thompson LL, Curtin J, Rivara FP, Ebel BE. Impact of automated photo enforcement of vehicle speed in school zones: interrupted time series analysis. Inj Prev. 2019 Oct;25(5):400-406. doi: 10.1136/injuryprev-2018-042912. Epub 2018 Oct 2. PMID: 30279165; PMCID: PMC6445786.

Methods:

- Automated enforcement cameras, active during school commuting hours, were installed around 4 elementary schools in Seattle, WA in 2012.
- Investigators examined the effect of automated enforcement on motorist speeds and speed violation rates during the citation period (December 10, 2012 to January, 15 2015) compared to the “warning” period (November 1 to December 9, 2012).
- Researchers evaluated outcomes with an interrupted time series approach using multilevel mixed linear regression.

PHOTO ENFORCEMENT STUDIES (SCHOOL ZONES)

Results:

- Motorist speed violation rates **decreased by nearly half** in the citation period compared to the warning period (standardized incident rate ratio 0.53, 95% confidence interval [95% CI] 0.42, 0.66).
- The hourly maximum violation speed and mean hourly speeds **decreased 2.1 MPH**.
- The impact of automated enforcement was sustained during the second year of implementation.

PHOTO ENFORCEMENT STUDIES (SCHOOL ZONES)

New York Traffic Camera Study

https://highways.dot.gov/safety/speed-management/noteworthy-speed-management-practices/6-successful-strategies-adoption

Methods:

- New York conducted a safety camera pilot program in 20 school zones starting in 2013, using fixed and mobile cameras.
- The system was specifically targeted to school safety.
- The cameras operate 1 hour before and 1 hour after school activities and the speed threshold was set at 10 mph over the speed limit. Additionally, data collected from the program cannot be used for unrelated purposes.
- The program was expanded to 140 school speed zones in 2014.

PHOTO ENFORCEMENT STUDIES (SCHOOL ZONES)

New York Traffic Camera Study

Results

- NYC use of safety cameras has shown significant success.
- A **63 percent decrease** in speed in school zones where safety cameras were present has been reported.
- Additionally, a 15 percent decrease in crashes, a 17 percent reduction in injuries, and a 55 percent reduction in fatalities have occurred in school zones with safety cameras.
- By 2018, the daily rate of camera violations had decreased by 60 percent and only 19 percent of violations are repeat offenders.

PHOTO ENFORCEMENT STUDIES (SCHOOL ZONES)

Hu, Wen / McCartt, Anne T. (2016) ***Traffic Injury Prevention (TIP)***

Objectives:

- In May 2007, Montgomery County, Maryland, implemented an automated speed enforcement program, with cameras allowed on residential streets with speed limits of 35 mph or lower and in school zones.
- In 2009, the state speed camera law increased the enforcement threshold from 11 to 12 mph over the speed limit and restricted school zone enforcement hours.
- The long-term effects of the speed camera program on travel speeds, public attitudes, and crashes were evaluated.

PHOTO ENFORCEMENT STUDIES (SCHOOL ZONES)

Methods:

- Changes in travel speeds at camera sites from 6 months before the program began to 7½ years after were compared with changes in speeds at control sites in the nearby Virginia counties of Fairfax and Arlington.
- Using data on crashes during 2004–2013, logistic regression models examined the program's effects on the likelihood that a crash involved an incapacitating or fatal injury on camera-eligible roads and on potential spillover roads in Montgomery County, using crashes in Fairfax County on similar roads as controls.

PHOTO ENFORCEMENT STUDIES (SCHOOL ZONES)

Results:

About 7½ years after the program began, speed cameras were associated with:

- A **10% reduction** in mean speeds.
- A **62% reduction** in the likelihood that a vehicle was traveling more than 10 mph above the speed limit at camera sites.

PHOTO ENFORCEMENT STUDIES (SCHOOL ZONES)

Insurance Institute for Highway Safety Study

https://www.iihs.org/news/detail/speed-cameras-reduce-injury-crashes-in-maryland-county-iihs-study-shows

- An IIHS study in Montgomery County, Maryland, of speed cameras used in school zones and residential streets with speed limits of 35 mph or lower found that on roadways with cameras, the likelihood of a driver exceeding the speed limit by more than 10 mph **decreased by 59%,** compared with similar roads in two Virginia counties that don't use speed cameras.
- Crashes also were lower compared to the control study roads in Virginia as IIHS found that the cameras resulted in a **19% reduction** in the likelihood of a crash with a fatality or an incapacitating injury.

PHOTO ENFORCEMENT STUDIES (WORK ZONES)

PHOTO RADAR SPEED ENFORCEMENT IN AN OREGON STATE HIGHWAY WORK ZONE: DEMONSTRATION PROJECT YEON AVENUE

https://www.oregon.gov/odot/Programs/ResearchDocuments/PhotoRadar_Speed.pdf

- The 2007 Oregon legislative assembly passed House Bill (HB) 2466, allowing the Oregon Department of Transportation to use photo radar in ODOT work zones on non interstate state highways.
- The objective of this research was to evaluate the impact of photo radar on safety in a work zone and provide a quantitative answer to the question of whether photo radar speed enforcement causes speed reduction in work zones.

PHOTO ENFORCEMENT STUDIES (WORK ZONES)

PHOTO RADAR SPEED ENFORCEMENT IN AN OREGON STATE HIGHWAY WORK ZONE: DEMONSTRATION PROJECT YEON AVENUE

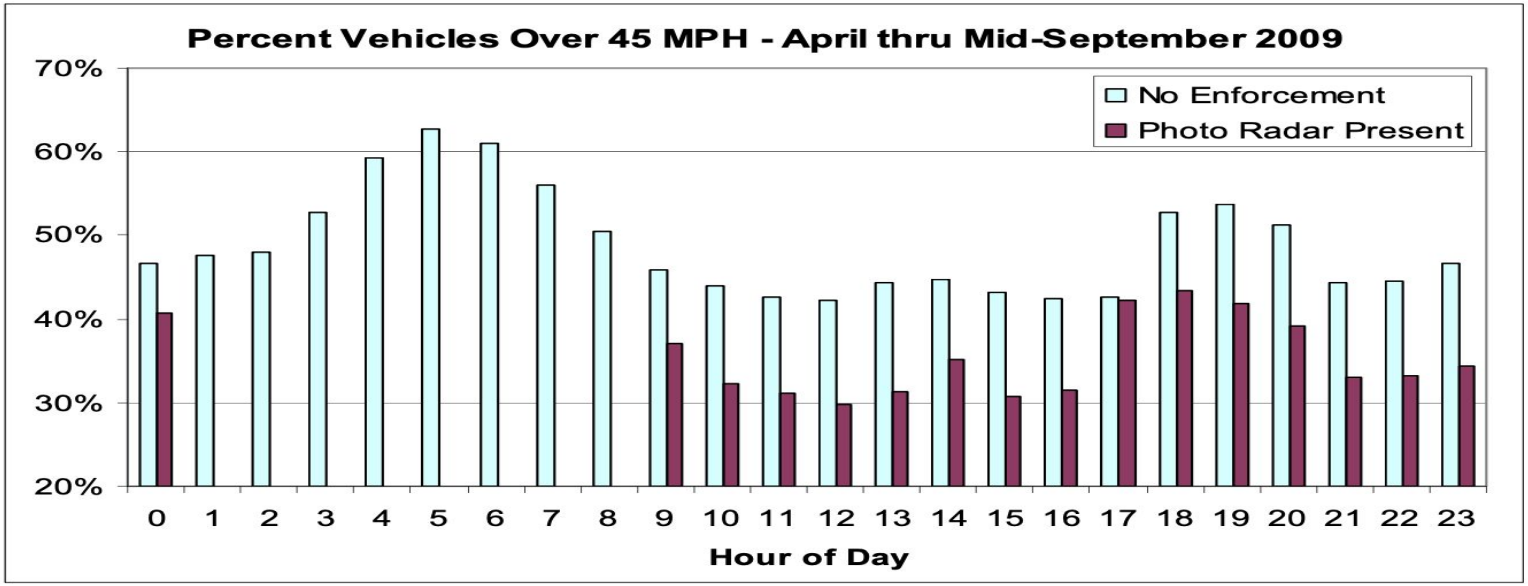


Figure 4.2: Speeding vehicles by hour of the day during the active life of the work zone showing the effect of photo radar enforcement.

PHOTO ENFORCEMENT STUDIES (WORK ZONES)

PHOTO RADAR SPEED ENFORCEMENT IN AN OREGON STATE HIGHWAY WORK ZONE: DEMONSTRATION PROJECT YEON AVENUE

- Photo radar enforcement, as conducted by the Portland Police Bureau, has a substantial impact on reducing the number of speeding vehicles in a construction work zone.
- During photo radar enforcement periods, speeding was reduced by an average of **27.3%** at the traffic sensor site within the work zone.
- The observed speeding reduction was temporary and did not persist beyond the departure of the photo radar van.

PHOTO ENFORCEMENT STUDIES (WORK ZONES)

Washington Traffic Safety Commission: Automated Speed Enforcement Pilot Project Evaluation. https://wtsc.wa.gov/wp-content/uploads/dlm_uploads/2015/03/Automated-Speed-Enforcement-Pilot_2012.pdf

- Tacoma installed a fixed camera system on the East Bay Street curve in November 2009.
- Full speed enforcement operations began December 1, 2009 after an initial two-week warning period. The camera takes photos of vehicles traveling 10 MPH or more over the posted speed limit of 35 MPH.

PHOTO ENFORCEMENT STUDIES (WORK ZONES)

Results:

A decrease in crashes resulting in injuries. Average speeds decreased from 30.3 MPH at the 2010 baseline, to 27.8 MPH in quarter two of 2012.

Figure 4. Average Speeds at the Bay Street Project Site

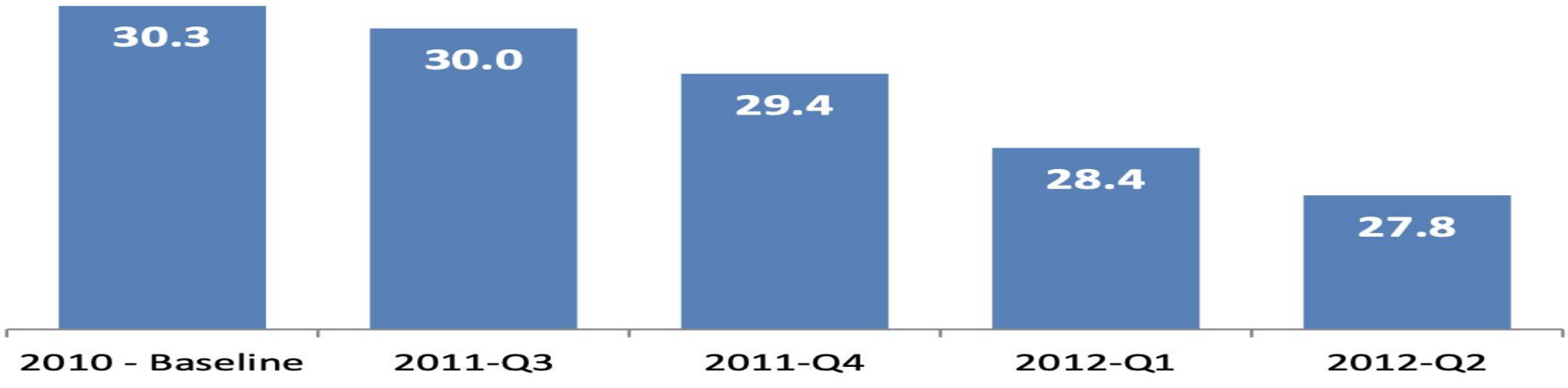


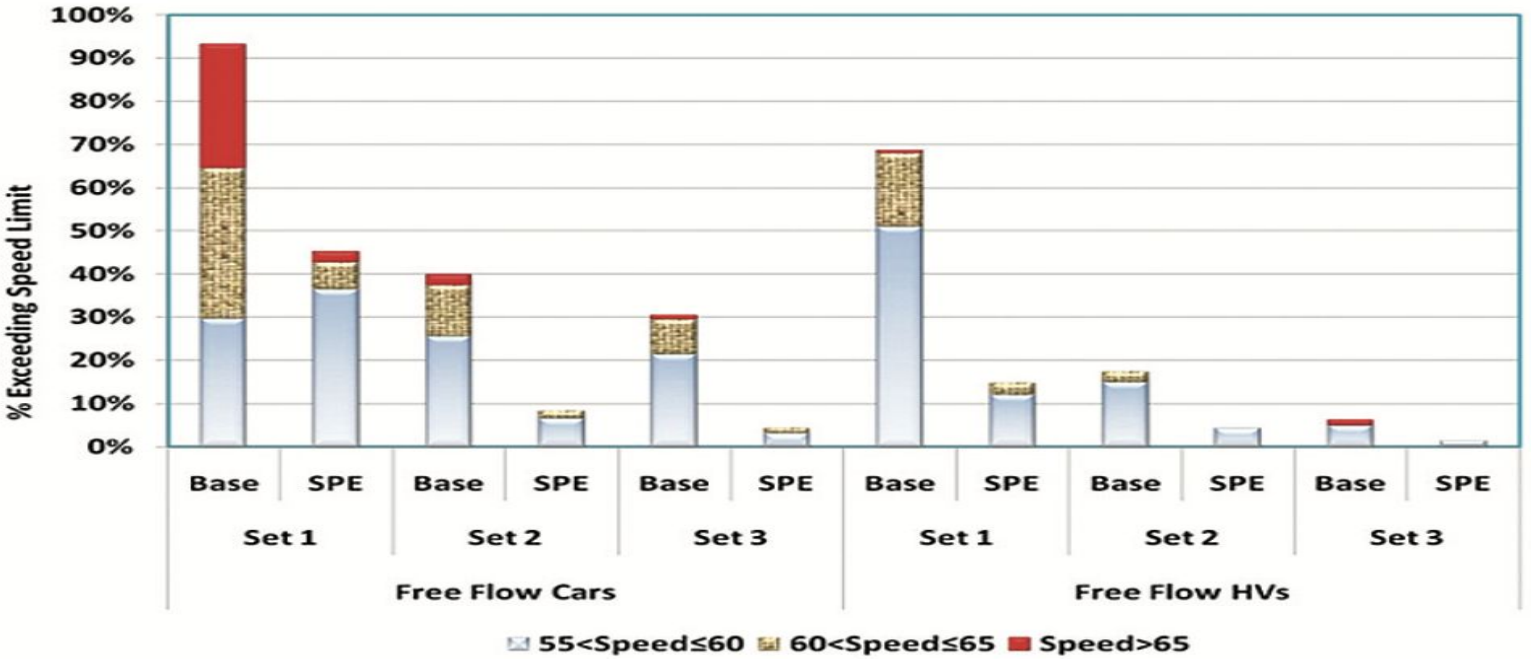
PHOTO ENFORCEMENT STUDIES (WORK ZONES)

Illinois Department of Transportation: Work Zone Phot Enforcement Study https://onlinepubs.trb.org/onlinepubs/trnews/trnews277rpo.pdf

- Speed Radar Enforcement (SPE) was pilot-tested in two work zones in Illinois— one on Interstate 64 in summer 2006 and the other on Interstate 55 in summer 2007. Both work zones were part of major reconstruction projects.
- The team evaluated the effectiveness of SPE in reducing motorist speeds in work zones and compared the results with those of traditional enforcement approaches,such as police presence with and without patrol lights,speed display trailers, and a combination of police presence and a speed display trailer.

PHOTO ENFORCEMENT STUDIES (WORK ZONES)

FIGURE 2 Percentage of free-flowing vehicles exceeding speed limit at the treatment location (HVs = heavy vehicles).



References (In text citations)

Martin JL, Wu D. Pedestrian fatality and impact speed squared: Cloglog modeling from French national data. Traffic Inj Prev. 2018 Jan 2;19(1):94-101. doi: 10.1080/15389588.2017.1332408. Epub 2017 May 30. PMID: 28557669.

Thomas, L., Kumfer, W., Lang, K., Zegeer, C., Sandt, L., Lan, B., . . . Horowitz, Z. (2018). Systemic Pedestrian Safety Analysis: Contractor's Technical Report: National Cooperative Highway Research Program Project No. 17-73 ….

Tefft, B.C. (2011). *Impact Speed and a Pedestrian's Risk of Severe Injury or Death* (Technical Report). Washington, D.C.: AAA Foundation for Traffic Safety.