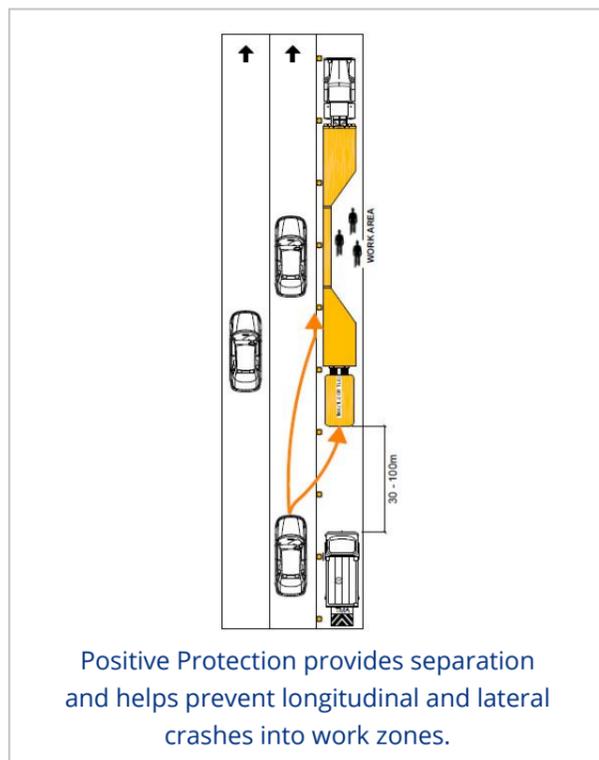


Work Zone Fatalities, Injuries, & Crashes

Between 2013 and 2023, work zone fatalities increased 50 percent. In 2023, over 898 work zone fatalities were recorded. [9] Stated another way, 898 work zone fatalities is the equivalent of 5 commercial domestic airliners. In 2021, over 105,000 work zone crashes were estimated to have occurred resulting in over 42,000 injuries. [8] Stated another way, 42,000 injuries is about the capacity of a football stadium.

Damages and losses from work zone crashes are estimated to reach over \$38.9 billion annually (2025 dollars, comprehensive crash costs). [28] [29] [43] Cost savings from reducing the number crashes by implementing [Positive Protection](#) devices & barrier separation in work zones can be estimated at over \$3.8-\$8.9 billion annually (10%-23% of work zone crash costs, 2025 dollars). [42] Stated another way, \$3.8 to \$8.9 billion in annual cost savings is equivalent to 7 to 17 transportation "Major Projects". [47]



"Cones and barrels are not positive protection... Shifting away from cones and barrels to the **widespread use of positive protection may be the single most important step we can take to protect [lives]...** in highway work zones."

— [Laborers' Health & Safety Fund of North America, "Expanding Use of Positive Protection for Work Zone Safety"](#)

In 2020, during the COVID-19 pandemic, work zone crashes & fatalities climbed despite lower traffic volumes. [20] [21] [22] [23] [32] [33] For the first half of 2021, USDOT estimated another 18.4% surge in traffic fatalities over 2020 and the largest number of traffic fatalities since 2006. [35] In 2021, TxDOT reported that work zone fatalities in fact surged 33%. [36] For the first quarter of 2022, USDOT estimated a record increase in fatalities nationwide. [38] In early 2024, the Governor's Highway Safety Association (GHSA) found that the U.S. pedestrian fatality rate has jumped 48% from a decade ago. [34] In 2025, alarmingly, a number of road rage incidents towards highway workers have been reported. [52]

Work zone intrusions are a serious hazard to highway workers. [54] [55] A single work zone intrusion can have [irreversible outcomes](#) (e.g. multiple deaths, severe long-term injuries, etc.). In a 2025 AGC survey, most highway contractors (60%) reported crashes into their work zones. [51] In 2025, 43% of highway contractors surveyed by AGC reported that work zone crashes resulted in worker injuries or fatalities. [51] In a prior AGC survey, 89% of highway contractors think [Positive Protection](#) would help improve safety and prevent these horrific crashes. [4]

In a 2024 survey of one state DOT's highway workers, "[t]he most cited [safety] concern by most respondents was getting struck by vehicular traffic." The activities perceived by highway workers in the 2024 survey as most hazardous were (1) Roadway/Shoulder Maintenance, (2) Guardrail/Cable Rail Maintenance, (3) Mowing and Trimming, and (4) Patching. [53]

"In 2015, 35 percent of all highway worker fatalities at road construction sites resulted from a vehicle striking a worker. By 2021, this alarming figure had increased to 63 percent" notes Laborers' Health & Safety Fund of North America (LHSFNA). [44] Highway Workers died on the job 3.7 times more often than the average American worker & 19 times more often than Engineering & Office/Administrative workers each year. [39][40] A prior study found that 38% of "Pedestrian" fatalities in work zones were highway workers (i.e. road construction/maintenance workers, utility workers, and planning/surveying workers).

"Injuries [from stuck by incidents] range from contusions and lacerations to fractures, crushing, and fatalities."

— [AGC, "Highway Worker Safety Program: Traffic Control Work: Struck By", pp. 10.](#)

"Most injuries [to pedestrians] arising from these vehicle and ground impacts in adults are trauma to the head, legs and pelvis., tibial plateau fractures and ligamentous injuries of the knee, as well as traumatic brain injuries, are all common."

— ["Pedestrian Injuries: Emergency Care Considerations", Cal J Emerg Med. 2007 Feb;8\(1\):15-21.](#)

"[T]he most common cause of death of pedestrians is head injuries...Among all concurrent injuries, lower extremity/pelvic injuries were observed in 216 patients (23.56%)... Over one-third of pedestrians had 4 simultaneous injuries, with an average cost of \$243,992 [2023 dollars], which was 1.6 times more than the cost of a pedestrian with only one injured part"

— ["Epidemiology of head injuries in pedestrian-motor vehicle accidents", Scientific Reports volume 13, Article number: 20249 \(2023\).](#)

Motorists and highway workers are often killed or seriously injured in **preventable work zone intrusions**. **Tunnel, culvert, bridge repair projects and their work zones are have been identified as having serious hazards in regulations and ANSI Standards**, with high-speed traffic moving in close proximity to employees, roadside hazards, and/or little or no means for pedestrian employees to escape from errant moving vehicles. Serious hazards are hazards that are causing or are likely to cause death or serious physical harm.

👉 Tunnel work zones have serious hazards.

Tunnel Case Study: On June 18, 2025 a vehicle crashed into a tunnel work zone unimpeded. *"[W]e could hear the van hitting barrels coming toward us. We didn't have but a second to react."* The vehicle slammed into a scissor lift, sending one worker falling to the pavement and the other clinging for his life about 25 feet up for more than 20 minutes. *"I was able pull myself into the lighting system we were installing as the lift was swept out from under me."* The driver and one worker were airlifted in critical condition.

— ["Worker recounts North Shore tunnel crash that left him stranded high above badly injured crewmate", The Minnesota Str Tribune. Incident: June 18, 2025.](#)

👉 Trench work zones have serious hazards.

Trench Case Study #1: In 2011, a 20 year-old worker was in a trench on a wiring project on Highway 101, when a car drifted onto the road shoulder and struck him in the trench. The young man was left paralyzed and unable to speak from injuries he suffered.

— ["Jury awards \\$56 million to worker paralyzed in Caltrans incident", The Sacramento Bee. Incident: 2011.](#)

Trench Case Study #2: On December 20, 2024 a motorist crashed into 40-foot-deep trench along Highway 290 after missing a turn toward the frontage road. The driver was airlifted to the hospital. A similar crash previously happened in September.

— ["Video shows woman crashing into 40-foot-deep trench along Highway 290", KHOU11. Incident: December 20, 2024.](#)

👉 Bridge work zones have serious hazards.

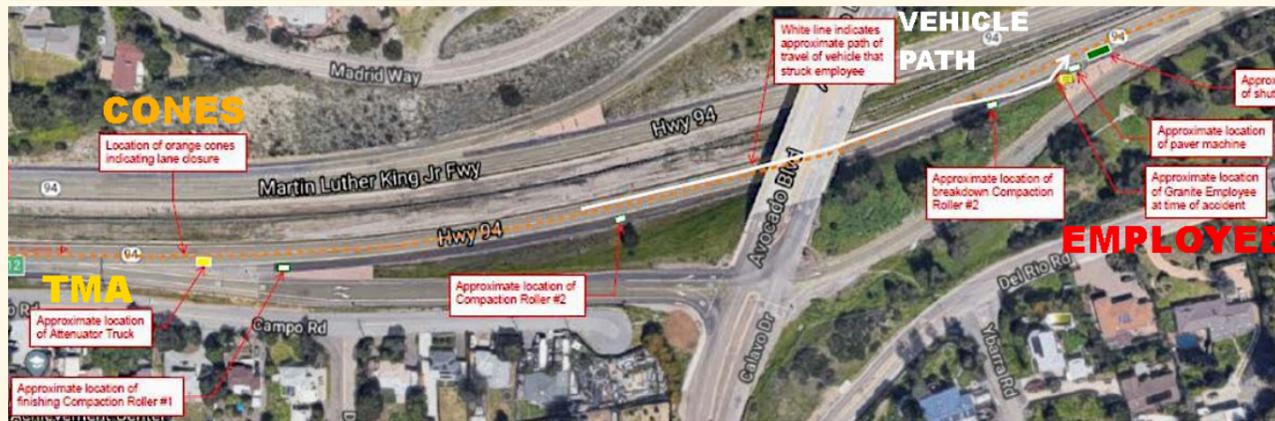
Bridge Case Study: On June 13, 2025 one worker jumped 40 feet off the bridge to avoid being struck by the errant vehicle after two other workers were struck as the vehicle crashed through a bridge work zone. All three state DOT employees were rushed to the hospital.

— ["GDOT worker jumped nearly 40ft off bridge to avoid vehicle on State Route 38, report reveals", WTOC11. Incident: June 13, 2025.](#)

High-speed traffic moving in close proximity to employees is known to be a serious hazard. 2023 NHTSA FARS data indicates that the posted speed limit was 45 mph or less for 40% of pedestrian fatalities inside work zones. [9]

👉 High Operating Speeds are a serious hazard.

High Operating Speed Case Study: In an [April 2021 CPWR webinar](#), a highway contractor reflected on a work zone intrusion: In a posted 45 MPH work zone, a drowsy driver fell asleep and drifted into a lane closure at 70 MPH striking multiple cones. The vehicle continued unimpeded for 3 seconds, when it struck a 41-year old pedestrian employee (who was a husband, father and son) and threw him more than 50 feet. He died at the scene. In June 2021, the contractor joined in efforts calling on industry and roadway owners "to update state standard specifications to give stronger consideration to the use of barriers between workers and motorists."



Live Pedestrian Crash with 49 km/h: PraxisConference Pedestrian Protection 2018



Pedestrian crash test dummy struck at just 30 MPH (49 km/hr) by a car.

Pedestrian Crash Test Dummy | National Geographic



Pedestrian crash test dummy struck at just 25 MPH (40 km/hr) by mid-size SUV.

Front pedestrian collision – Honda CR-V – 87.5 km/h



Pedestrian crash test dummy struck at 54 MPH (87 km/hr) by a mid-size SUV.

A December 2024 IIHS study found that during an impact with a modern taller SUVs and pickup, pedestrians (i.e. workers on foot) are at very high risk. When struck by a median U.S. pickup, a highway worker has an 85% likelihood of severe injury at just 33 mph and an 85% likelihood of dying at just 45 mph. ^[50] The threshold for a "safe" crash speed (risk of serious injury is 10% or less as commonly quoted in literature) occurred at about 15 mph for pedestrians (i.e. workers on foot).^[50]

“As crash speed increases from 15 mph to 35 mph, the risk of a serious injury [for a pedestrian] goes from 9% to 52% when a median-height car is involved. With a median pickup, the risk [of a serious injury for a pedestrian] shoots up from 11% to 91% [as crash speed increases from 15 mph to 35 mph]... **The findings point to the need for policymakers and traffic engineers to account for the makeup of the U.S. fleet.** A commonly used benchmark for a 'safe' crash speed is one at which the risk of serious injury is 10% or less.”

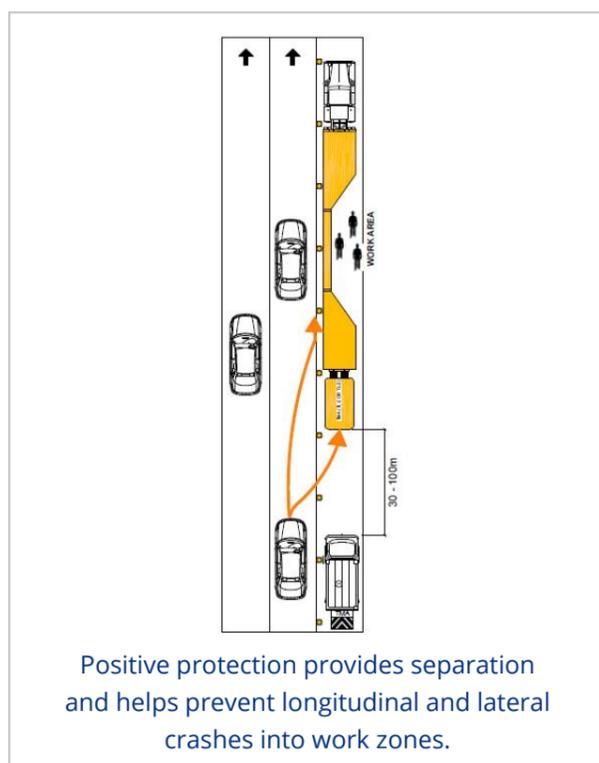
— [Insurance Institute for Highway Safety \(IIHS\), "A modern injury risk curve for pedestrian injury in the United States: the combined effects of impact speed and vehicle front-end height", December 2024.](#)

“When the drivers get past the police, they speed back up as they’re entering the work zone.”

“People will move over after they see the first truck, then get back into their lane instead of staying over until they’re out of the work zone.”

— [CSEA, "Highway workers discuss risks of work zones", August 2019.](#)

A single work zone intrusion can have [high consequence outcomes](#) (e.g. multiple employee deaths, severe long-term employee injuries, project delays, damaged/totaled equipment, rework, and/or liability).



Fortunately, Positive Protection barriers can be used to directly control these hazards to highway workers, who are among the most ["Vulnerable Road Users"](#). Positive Protection are devices placed "between workers and motorized traffic" which function to "contain and/or redirect vehicles" and which meet applicable crashworthiness criteria (see 23 U.S.C. § 112(g) and 23 C.F.R. § 630.1104).

The [USDOT Safe System Approach](#) and [FHWA Safe System Roadway Design Hierarchy](#) (based on the "Hierarchy of Controls" workplace safety protocol) emphasize that death/serious injury is unacceptable and that safety is proactive (e.g. engineering in and using [Positive Protection](#) barriers proactively to separate workers from traffic).

"Focus on the hierarchy of controls (risk treatments) to design a workplace where pedestrian employees do not encounter moving vehicles, materials and similar hazards."

— [American Society of Safety Professionals \(ASSP\), "On the Road to Improving Work Zone Safety"](#)

[Federal law \(23 CFR 630.1108\(a\)\) and ANSI standards \(A10.47-2021 §4.4\)](#) specify types of projects (e.g. tunnels, bridges, drop-offs, etc.) which require require Positive Protection devices & barrier separation in work zones. For such projects, a "separate pay item" for positive protection is required under federal law and regulations. [1] [11] Project Owners have options for [funding Positive Protection](#). Contractors have options for [obtaining and using Positive Protection](#).

"When serious hazards are foreseen or encountered on a project, **positive protection should be specified and an associated pay item provided...**"

— [ARTBA, "Policy Statement on Positive Protection", September 2021.](#)

[MASH](#) certified traffic barriers placed between workers and motorized traffic (i.e. Positive Protection) offer state-of-the-art safety for workers and motorists by physically preventing (i.e. containing and/or redirecting) high-speed motorized vehicles from colliding with workers and other dangerous obstacles inside a work zone. In a national survey, 89% of highway contractors think [Positive Protection](#) would help improve safety and prevent these horrific crashes. [4] Speaking up about work zone safety issues could reduce risk & save a life.

"It is difficult to change the behavior of motorists...But we can and must institute protective measures like positive barriers and other available controls."

— [Laborers' Health & Safety Fund of North America, "Work Zone Intrusions Threaten Safety"](#)

In 2015, Congress directed FHWA to "do all within its power to protect workers in highway work zones." [45] [Federal law and ANSI Standard A10.47-2021 \(§4.4\)](#) identify types of projects that require Positive Protection barriers. For such projects, a "separate pay item" for positive protection is required under federal law and regulations. [1] [11] The Infrastructure Investment and Jobs Act of 2021 (IIJA) amends the [Highway Safety Improvement Program \(HSIP\)](#) to increase [funding & protection](#) for "[Vulnerable Road Users](#)", which includes "highway workers on foot". [41] In 2024, USDOT set the value of a single life (VSL) at \$13.7 million dollars. [13] [37]

In 2021, California launched its award-winning [Caltrans Positive Protection Program](#) which directs Caltrans design engineers and Contractors to use Positive Protection to ensure worker safety. California research found a cost benefit for [highly mobile barrier](#) of \$1.9 million in 2008 dollars (\$2.87 million in 2025 dollars) per year, per barrier. [14]

Today, we have the technology, 'know how', and responsibility to protect highway workers from errant vehicles by implementing [Positive Protection barriers](#).

"A physical barrier provides one of the best possible protection solutions for workers exposed to the flow of traffic. [Implementing Positive Protection] is a common-sense and cost-effective way for safety reform that will prevent death and injuries of workers on roads and highways."

— [March 20, 2023 Hearing: "Assembly Bill No. 752, Blanca Rubio. State highways: worker safety", California Legislature's Committee on Transportation.](#)



"We have the technology and 'know how' to build our roadway system to anticipate user error. It can be designed, constructed, equipped, and operated to forgive the errant user and protect the innocent victim."

— [ARTBA, "Every Life Counts: Improving the Safety of our Nation's Roadways"](#)

2025 Contractor Reported Work Zone Crashes, Project Delays, Injuries, & Fatalities

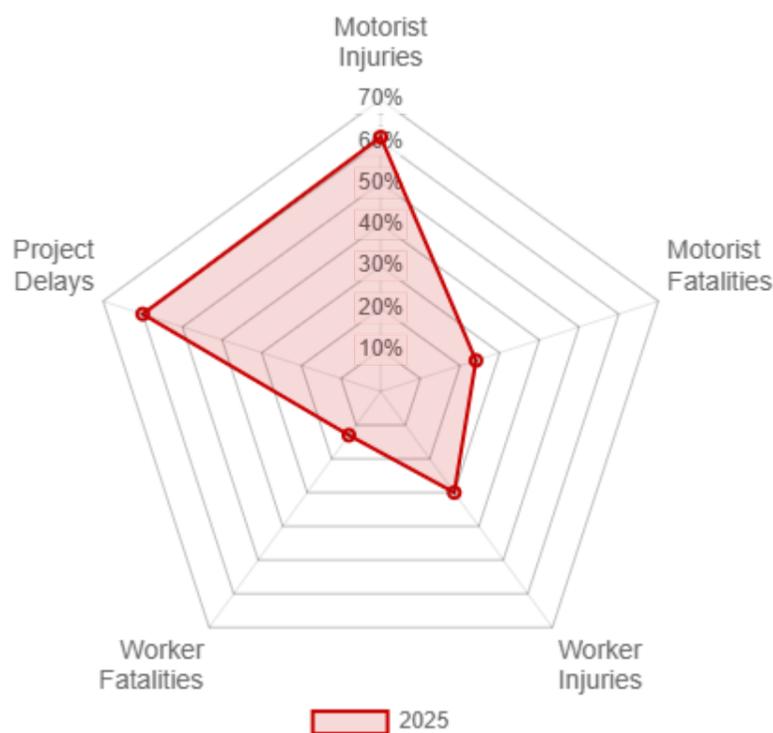


In 2025, 60% of Highway Contractors Reported Crashes into their Construction Work Zones

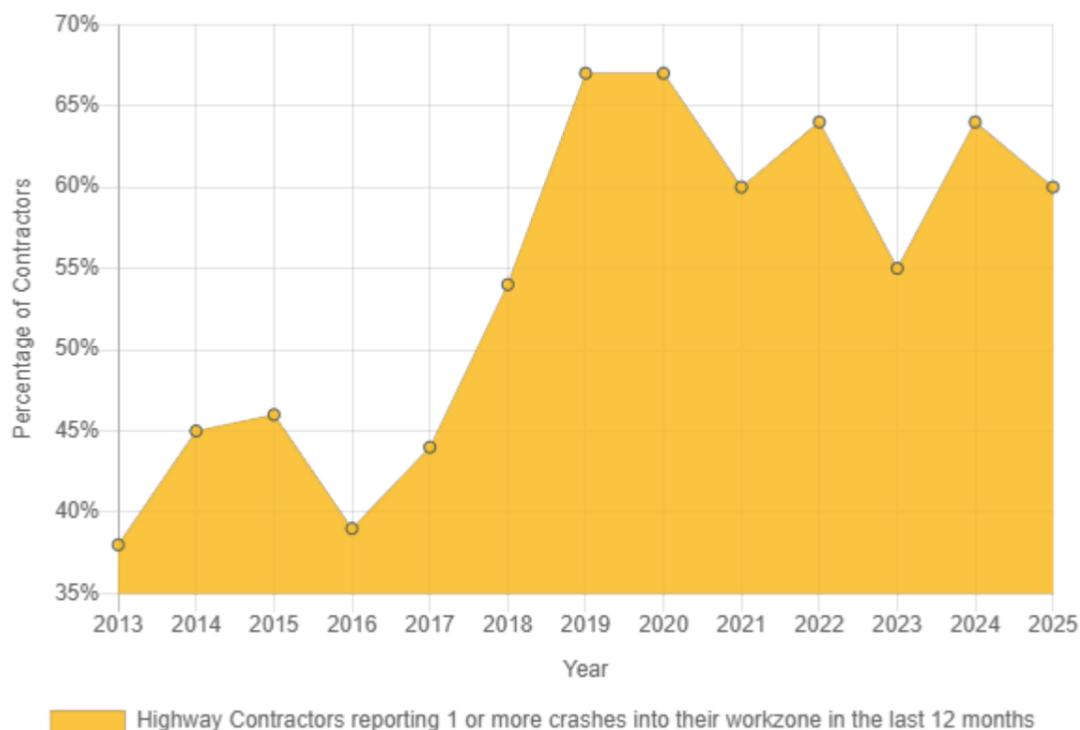
The Associated General Contractors of America's (AGC) 2025 nationwide study on highway work zone safety reveals that **60% of highway contractors reported work zone crashes** over the last year. As a result of these work zone crashes, 60% of firms reported project delays, 13% reported worker fatalities, 30% reported worker injuries, 24% reported public fatalities, and 61% reported public injuries. 98% of highway contractors also reported that the risk of highway work zone crashes is as great or greater than a year ago. [\[51\]](#)

AGC Study - Outcomes of Work Zone Crashes [\[51\]](#)

(Mouseover data points for details.)



AGC Study - Percentage of Highway Contractors Reporting Work Zone Crashes Over Time [\[51\]](#) [\[46\]](#) [\[45\]](#) [\[38\]](#) [\[26\]](#) [\[25\]](#) [\[4\]](#) [\[5\]](#) [\[6\]](#) [\[7\]](#) [\[19\]](#) [\[18\]](#) [\[17\]](#)



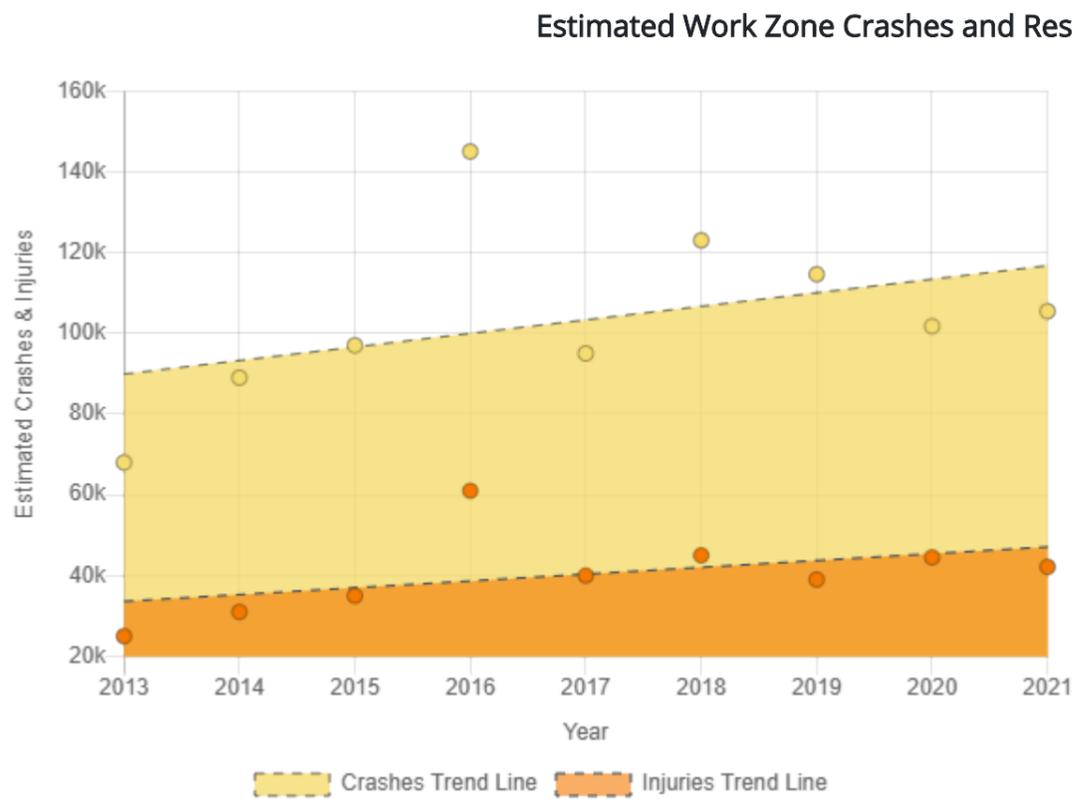
The 2019 AGC study revealed that an increasing percentage of contractors believe Positive Protection would improve safety on their projects.

- **89%** of contractors report that increased use of Positive Protection barriers would help reduce injuries and fatalities on their projects.
[\[4\]](#)
-

Estimated National Work Zone Crashes & Injuries ^[8]

The number of crashes in work zones and injuries resulting from those crashes has been increasing.

- In 2021, an estimated 105,000 crashes and 42,000 injuries were estimated to have occurred in work zones.



* Estimated Work Zone Crashes & Injuries Data are obtained from NHTSA statistical models (NASS/GES & CRSS). The NHTSA statistical models underestimate work zone crash fatalities by as much as 64% in 2019 (see Table 1 below). In general, the NHTSA FARS & CRSS crash report datasets underreport work zone crashes as well as resulting injuries and fatalities (see note †).

Table 1. NHTSA CRSS Statistical Model Percent Error:

	2015	2016	2017	2018	2019	2020	2021
Recorded Fatalities (FARS)	701	781	806	754	842	857	954
Estimated Fatalities (CRSS Statistical Model)	349	525	597	636	298	478	714
Percent Error (of CRSS Statistical Model)	-50%	-32%	-26%	-15%	-64%	-44%	-33%

National Work Zone Crash Fatalities ^[9]

Work zone crash fatalities have been on the rise nationally.

- 50% increase in fatalities since 2013.



[†] In general, the NHTSA FARS & GES/CRSS crash report datasets underreport work zone crashes as well as resulting injuries and fatalities.

The statistic for fatalities resulting from work zone crashes is obtained from NHTSA FARS dataset which attempts to aggregate various state police crash report datasets. However, crashes occurring inside work zones are not always properly classified by police as work zone related.

A cursory glance of NHTSA FARS data in 2018 quickly reveals [examples of missed fatalities resulting from work zone crashes](#). A number of studies confirm that work zone crashes are underreported in crash report datasets. ^[31]

Pedestrian Fatalities in Work Zones

Pedestrian fatalities inside work zones encompass both workers and members of the public. A review of NHTSA FARS data confirmed that [38% of pedestrian fatalities inside work zones occurred while working](#) in 2018. In 2023, 176 pedestrians were struck and killed inside a work zone. [9] *"In 2015, 35 percent of all highway worker fatalities at road construction sites resulted from a vehicle striking a worker. By 2021, this alarming figure had increased to 63 percent"* notes Laborers' Health & Safety Fund of North America (LHSFNA). [44]

"So what can help protect against intrusions?... It is difficult to change the behavior of motorists...But we can and must institute protective measures like positive barriers and other available controls."

— [Laborers' Health & Safety Fund of North America, "Work Zone Intrusions Threaten Safety"](#)

A single work zone intrusion can have [high consequence outcomes](#) (e.g. multiple employee deaths, severe long-term employee injuries, project delays, damaged/totaled equipment, rework, and/or liability). **Tunnel, culvert, bridge repair work zones, etc. are known to be extremely hazardous** with high-speed traffic moving in close proximity to employees, roadside hazards, and/or little or no means for employees to escape from errant moving vehicles. Traffic speed is another well-known hazard to highway workers. 2023 NHTSA FARS data indicates that the speed limit was 45 mph or less for 40% of pedestrian fatalities inside work zones. [9] A December 2024 IIHS study found that during an impact with a modern taller SUVs and pickup, pedestrians are at very high risk. When struck by a median U.S. pickup, a highway worker has an **85% likelihood of severe injury at just 33 mph and an 85% likelihood of dying at just 45 mph.** [50]

*"As crash speed increases from 15 mph to 35 mph, the risk of a serious injury [for a pedestrian] goes from 9% to 52% when a median-height car is involved. With a median pickup, the risk [of a serious injury for a pedestrian] shoots up from 11% to 91% [as crash speed increases from 15 mph to 35 mph]... **The findings point to the need for policymakers and traffic engineers to account for the makeup of the U.S. fleet.** A commonly used benchmark for a 'safe' crash speed is one at which the risk of serious injury is 10% or less."*

— [Insurance Institute for Highway Safety \(IIHS\), "A modern injury risk curve for pedestrian injury in the United States: the combined effects of impact speed and vehicle front-end height", December 2024.](#)

"Pedestrian involvement in fatal work zone crashes overall does not appear to be overrepresented on facilities in urban areas but is on minor arterials and collectors/local roads in rural areas. Given the low pedestrian involvement in non-work zone crashes on these facilities in general, **it is likely that the overrepresentation reflects collisions with highway workers on foot on these facilities.** Based on U.S. Bureau of Labor Statistics (BLS) data, 45 percent of all worker fatalities at road construction sites involve a vehicle striking a worker on foot [2019]."

— [FHWA, "Identification of National Work Zone Safety Objectives and Activities: Summary Report", March 2023. Publication No. FHWA-HOP-22-059](#)

Work zone pedestrian fatalities are often assumed to be members of the public who have fallen into complacency walking a routine route. However, in 2018, a review of NHTSA FARS data confirmed that [38% of pedestrian fatalities in work zones were actually on the job](#) and primarily engaged in road work, utility work, and planning/surveying.

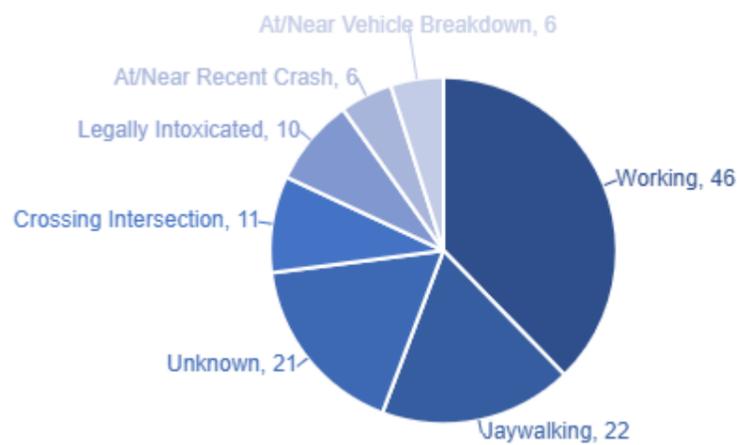
Work activities at the time of death include activities such as installing traffic signs, reopening a lane, flagging, picking up debris, replacing damaged concrete, paving operations, exiting a work vehicle, utility work, construction labor, DOT electrical work, DOT maintenance work, fence contracting, repairing guardrail, stringing cable guard rail, and repairing a bridge.

Based on a [review of each work zone pedestrian fatality](#), it is found that

- **Activity:** Many Pedestrian Fatalities in Work Zones occurred while working (38%, 46 of 122).
- **Work Activity:** The majority of Working Pedestrian Fatalities in Work Zones were engaged in road work, utility work, planning/surveying (87%, 40 of 46 Working Pedestrians).
- **Work Hazard:** The majority of Working Pedestrian Fatalities in Work Zones were killed by motorist incursions (80%, 37 of 46 Working Pedestrians)
- **Location:** Few Pedestrian Fatalities in Work Zones occurred at/near intersections (15%, 18 of 122).

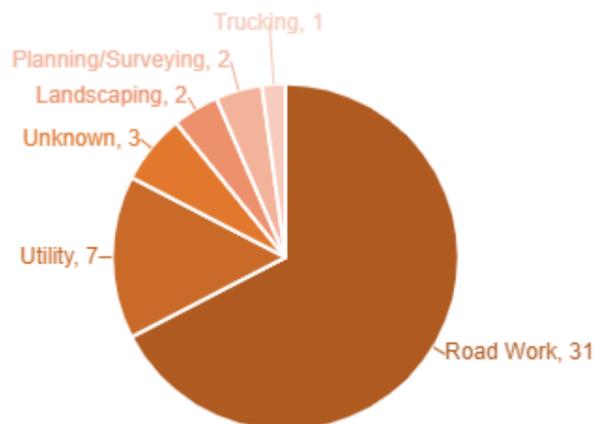
38% of Pedestrian Work Zone Fatalities occurred while working.

Primary Activity of the 122 Pedestrian Work Zone Fatalities (2018)



87% of Working Pedestrians were engaged in Road Work, Utility Work, or Planning/Surveying.

Work Activity of the 46 Working Pedestrians in Work Zones (2018)



Road Work activities at the time of death include activities such as installing traffic signs, reopening a lane, flagging, picking up debris, replacing damaged concrete, paving operations, exiting a work vehicle, utility work, construction labor, DOT electrical work, DOT maintenance work, fence contracting, repairing guardrail, stringing cable guard rail, and repairing a bridge.

Methodology

Fatality data was obtained from the 2018 NHTSA FARS dataset [9]. Accident and Person datafiles were joined on 'ST_CASE' and filtered by 'WRK_ZONE'>=1 (ACCIDENT file records a work zone), 'INJ_SEV'==4 (PERSON file records a fatality for that person), and 'PER_TYP'==5 (Person type recorded as Pedestrian). Each fatality was then categorized by Activity, Location, Work Type, and Work Hazard based on [FARS, News Article, & OSHA case record information](#).

"There must be considerable ethical blindness when loss of life is somehow considered an acceptable risk... Ultimately, the deciders, those who are taking the risk of other people's lives in their own hands, have the responsibility of *not risking other people's lives*... When we do take steps that minimize risk, we should not consider these steps to be 'managing' risk, but rather as steps that *reduce the consequences of risk*."

— [R. Elliott, 'On the Very Idea of Risk Management: Lessons from the Space Shuttle Challenger', Risk Management - Current Issues and Challenges. InTech, Sep. 12, 2012.](#)

"Safety is a people profession. We want to help workers feel safe, contribute to organizational goals and return home healthy at the end of the workday."

— [Bradley D. Giles, P.E., CSP, STS, FASSP, GIOSH, 2021-2022 ASSP President, "Ethics and Our Profession"](#)

Footnotes

¹ [Temporary Traffic Control Devices, 23 U.S.C. § 112\(g\).](#)

² [Definitions, Subpart K - Temporary Traffic Control Devices, 23 C.F.R. § 630.1104.](#)

³ [Positive Protection Measures Defined, 23 U.S.C. 112\(g\)\(4\).](#)

⁴ [2019 Associated General Contractors of America \(AGC\) Highway Workzone Safety Study.](#)

⁵ [2018 Associated General Contractors of America \(AGC\) Highway Workzone Safety Study.](#)

⁶ [2017 Associated General Contractors of America \(AGC\) Highway Workzone Safety Study.](#)

⁷ [2016 Associated General Contractors of America \(AGC\) Highway Workzone Safety Study.](#)

⁸ Estimated Total Crashes & Injuries Data: 2013-2015 data from NHTSA National Automotive Sampling General Estimates System (NASS/GES). NHTSA retired NASS/GES at the end of 2015. 2016-2021 data from NHTSA's replacement Crash Report Sampling System (CRSS).

⁹ Fatalities Data: NHTSA Fatality Analysis Reporting System (FARS) Encyclopedia. 2023 is the last year with available data.

¹⁰ [Positive Protection Devices, Subpart K - Temporary Traffic Control Devices, 23 C.F.R. § 630.1108\(a\)\(1-5\).](#)

¹¹ [Payment for Traffic Control, Subpart K - Temporary Traffic Control Devices, 23 C.F.R. § 630.1108\(f\)\(2\).](#)

¹² ["Portable Positive Protection: A Guide for Short Duration and Short Term Work Zones", Updated by Mobile Barriers LLC, Based on Material Developed by ATSSA for the FHWA Work Zone Safety Grant Program \(June 2016\).](#)

¹³ [U.S. Department of Transportation, "Guidance on Treatment of the Economic Value of a Statistical Life in U.S. Department of Transportation Analyses - 2016 Adjustment," \(August 8, 2016\).](#)

¹⁴ UC Davis/AHMCT, "A Risk Assessment and Cost Benefit Analysis for [Highly Mobile Barriers]," Technical Report Number UCD-ARR-08-09-30-01, (2008). Ibid, Attachment 3.

¹⁵ Mobile Barriers LLC internal crash analysis for Washington D.C. located highly mobile barrier.

¹⁶ Former Deputy Executive Director of the Texas Department of Transportation (TxDOT).

¹⁷ [2013 Associated General Contractors of America \(AGC\) Highway Workzone Safety Study.](#)

¹⁸ [2014 Associated General Contractors of America \(AGC\) Highway Workzone Safety Study.](#)

¹⁹ [2015 Associated General Contractors of America \(AGC\) Highway Workzone Safety Study.](#)

²⁰ [Work Zone Crashes Climb During Pandemic, Even as Traffic Ebbs, PEW Charitable Trusts, October 6, 2020.](#)

²¹ [Missouri work zone crashes double despite half the traffic, Better Roads, September 1, 2020.](#)

²² [Ohio DOT reports string of work-zone crashes despite less traffic, Better Roads, June 8, 2020.](#)

²³ [CDOT and CSP warn that not all workplaces are meant to zoom: Fatal crashes in work zones on the rise Journal Advocate, November 27, 2020.](#)

²⁴ [An Optimization Methodology to Improve Work Zone Safety within a Limited Budget in a Roadway Network, Promotes Saha, Ph.D., International Conference on Transportation and Development 2020 : Transportation Safety.](#)

²⁵ [2020 Associated General Contractors of America \(AGC\) Highway Workzone Safety Study.](#) Study based on nationwide survey of approximately 224 highway construction firms.

²⁶ [2021 Associated General Contractors of America \(AGC\) Highway Workzone Safety Study.](#) Study based on nationwide survey of approximately 292 highway construction firms.

²⁷ [Work Zone Fatalities at Highest Level Since 2006, New Data Shows, Roads & Bridges, April 28, 2021.](#)

²⁸ [An Optimization Methodology to Improve Work Zone Safety within a Limited Budget in a Roadway Network, Promotes Saha, Ph.D., International Conference on Transportation and Development 2020 : Transportation Safety.](#)

²⁹ ["Crash Costs for Highway Safety Analysis", FHWA-SA-17-071](#)

"Economic costs (a.k.a., human capital costs) are the monetary impacts of crashes including goods and services related to the crash response, property damage, and medical costs...Comprehensive crash costs (a.k.a., societal crash costs) are the combination of tangible impacts (i.e., economic costs) and the monetized pain and suffering (i.e., QALY). Comprehensive costs are meant to capture all the impacts that result from crashes...It is critical to account for the comprehensive costs of crashes."

³⁰ [Ullman, G. L., & Scriba, T. A. \(2004\). Revisiting the Influence of Crash Report Forms on Work Zone Crash Data. Transportation Research Record, 1897\(1\), 180-182. https://doi.org/10.3141/1897-23.](#)

³¹ [Md Abu Sayed, Xiao Qin, Rohit J. Kate, D.M. Anisuzzaman, Zeyun Yu, Identification and analysis of misclassified work-zone crashes using text mining techniques, Accident Analysis & Prevention, Volume 159, 2021, 106211, ISSN 0001-4575, https://doi.org/10.1016/j.aap.2021.106211.](#)

³² [Despite fewer drivers on the road, Texas work zone traffic deaths climb during pandemic](#) CBS Austin, April 26, 2021.

³³ [AGC: Work Zone Crashes Up Despite Pandemic Traffic Drop](#) AASHTO Journal, June 4, 2021.

³⁴ [Early 2024 U.S. Pedestrian Fatalities Up 48% From a Decade Ago](#), Governors Highway Safety Association (GHSA), 2024.

³⁵ [USDOT Releases New Data Showing That Road Fatalities Spiked in First Half of 2021](#), Secretary Buttigieg calls rising traffic deaths a crisis and calls for cooperation among all levels of government, industry, and advocacy to change course, October 28, 2021.

³⁶ [Traffic Deaths Spike in Texas Work Zones](#), Texas Department of Transportation, April 4, 2022.

³⁷ [U.S. Department of Transportation, "Departmental Guidance on Valuation of a Statistical Life in Economic Analysis," \(Effective April 28, 2025\).](#)

"Based on the methodology adopted in the 2013 guidance, price and real income changes since 2012 yield a current VSL estimate of \$13.7 million for analyses using a base year of 2024.

³⁸ [NHTSA Early Estimates Show Record Increase in Fatalities Nationwide](#), USDOT, August 17, 2022.

"NHTSA estimates that 9,560 people died in motor vehicle traffic crashes in the first quarter of 2022. This is an increase of about 7% as compared to the 8,935 fatalities projected for the same quarter in 2021. This would be the highest number of first-quarter fatalities since 2002."

³⁹ [The Center for Construction Research and Training \(CPWR\), "Fatal Injuries at Road Construction Sites among Construction Workers", Second Quarter 2018.](#) Figure 14 shows for Road Maintenance occupations that there have been 13.6 fatalities per 100,000 full-time equivalent (FTE) workers on average.

⁴⁰ [Forbes, "Fatal Employment: Men 10 Time More Likely Than Women to Be Killed at Work", Dec 19, 2018.](#)

The national average was 3.5 workplace fatalities per 100,000 full-time worker equivalents (FTE). Architecture and engineering occupations had had a fatality rate of 0.7 fatalities per 100,000 full-time equivalent (FTE) workers. Office and administrative support occupations had a fatality rate of 0.6 fatalities per 100,000 full-time equivalent (FTE) workers.

⁴¹ "Vulnerable Road Users" as defined in the Infrastructure Investment and Jobs Act (IIJA or BIL) includes road construction workers and people working on foot on or along our roadways. Sec. 11111 amends the [Highway Safety Improvement Program \(HSIP\)](#) to increase funding & protection for "Vulnerable Road Users".

- [FHWA Guidance "Vulnerable Road User Safety Assessment Guidance" published October 21, 2022](#) states that "A **vulnerable road user** is a nonmotorist with a fatality analysis reporting system (FARS) person attribute code for pedestrian, bicyclist, other cyclist, and person on personal conveyance or an injured person that is, or is equivalent to, a pedestrian or pedalcyclist as defined in the ANSI D16.1-2007. (See 23 U.S.C. 148(a)(15) and 23 CFR 490.205). A vulnerable road user may include people walking, biking, or rolling. Please note that a vulnerable road user:
 - **Includes a highway worker on foot in a work zone, given they are considered a pedestrian.**
 - Does not include a motorcyclist."

⁴² ["Work Zone Intrusion Countermeasure Identification, Assessment, and Implementation Guidelines", FHWA/CA10-1102, pp. 4.](#)

On average, 10% of work zone crashes are intrusion impacts with workers, equipment, or debris. An additional 13% of work zone crashes are non-intrusion impacts with workers, equipment, or debris "(e.g., a crash involving a worker conducting a task outside the actual work space)" but still occurring inside a designated work zone.

⁴³ ["The Economic and Societal Impact of Motor Vehicle Crashes, 2019 \(Revised\)", DOT HS 813 403](#)

Nationally, Comprehensive Costs for 33,244 fatal crashes "which includes both economic impacts and valuation for lost quality-of-life, was \$1.37 trillion in 2019". Comprehensive Costs "represent the value of the total societal harm that results from traffic crashes". In 2019, there were 765 fatal work zone crashes (2.301% of all fatal crashes) resulting in an estimated \$31.5 billion (2019 dollars) in comprehensive costs. Adjusted for inflation, comprehensive costs of work zone crashes are estimated at over \$38.9 billion in 2025 dollars.

⁴⁴ [Laborers Health & Safety Fund of North America - Comments on FHWA-2022-0017-0016, November 19, 2023. Available at:](#)

<https://www.regulations.gov/comment/FHWA-2022-0017-0016> "In 2015, 35 percent of all highway worker fatalities at road construction sites resulted from a vehicle striking a worker. By 2021, this alarming figure had increased to 63 percent... The heightened risks underscore the specific vulnerability of highway workers, a concern acknowledged by Congress through the categorization of pedestrians, inclusive of workers operating on or along roadways, as Vulnerable Road Users (VRUs) in the BIL. This legislative move amended the Highway Safety Improvement Program to incorporate safeguards for VRUs. The DOT similarly recognizes highway workers as among the most vulnerable in its 2022 VRU Safety Assessment Guidance. The FHWA urges states and other funding recipients to prioritize safety for VRUs in all federal highway investments and relevant projects."

⁴⁵ [2023 Work Zone Awareness Survey Results: National Results](#), AGC, May 25, 2023.

Study based on nationwide survey of highway construction firms with approximately 901 responses from contractors.

⁴⁶ [2024 Work Zone Awareness Survey Results: National Results](#), AGC, May 23, 2024.

Study based on nationwide survey of highway construction firms with approximately 514 responses from contractors.

⁴⁷ ["Major Projects", FHWA.](#)

Prior to the enactment of SAFETEA-LU in August 2005, projects with over \$1 billion in construction costs were designated as "Mega Projects". SAFETEA-LU lowered the monetary threshold from an estimated total cost of \$1 billion to \$500 million or greater, and the term "Mega Project" has since been eliminated and replaced with the term "Major Project".

⁴⁸ Peden, World Health Organization, World Report on Road Traffic Injury Prevention, (2004); See also, DOT/FHWA Report, Leaf and Preusser, Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups, (October 1999) (estimating "fatality rates of 40, 80, and nearly 100 percent for striking speeds of 30, 40, and 50 miles per hour or more respectively.").

⁴⁹ [Hallowell, M., "The Energy Wheel: The Art & Science of Energy-Based Hazard Recognition", Professional Safety, December 2021, pp. 27-33. Available at: https://www.safetyfunction.com/files/ugd/3b3562_f842104d5fe64409ba6362d661eee21d.pdf](#)

"The research by Hu et al. (2018) revealed very strong evidence that commonly identified hazards (e.g., gravity, motion) are identified instinctually and require comparatively low mental effort...requir[ing] very little oxygen and the cognitive processing occurs quickly. This suggests that gravity and motion hazards are processed in the amygdala, the location of the brain responsible for our fight or flight response and perception of core emotions (Cahill et al., 1996)... Alternatively, hazards that are most commonly missed (e.g., mechanical, pressure, chemical) are processed in more advanced locations of the brain and require much greater cognitive effort (Hu et al., 2018)...requir[ing] much longer processing times and elevated oxygen demand. This suggests that they are processed by the temporal lobe of

the cerebrum, the part of the brain that is responsible for memory, sequencing and complex problem-solving (Banich & Compton, 2018). Simply put, the hazards we see first and most often are processed instinctually with minimal cognitive effort and those that we commonly miss are identified through complex problem-solving that requires relatively high cognitive effort."

⁵⁰ [IIHS, "Vehicle height compounds dangers of speed for pedestrians". December 10, 2024. Available at: https://www.iihs.org/news/detail/vehicle-height-compounds-dangers-of-speed-for-pedestrians#:~:text=As%20far%20as%20fatalities%20were,mph%2C%20it%20exceeded%2080%25.](https://www.iihs.org/news/detail/vehicle-height-compounds-dangers-of-speed-for-pedestrians#:~:text=As%20far%20as%20fatalities%20were,mph%2C%20it%20exceeded%2080%25.)

⁵¹ [2025 Associated General Contractors of America \(AGC\) Highway Workzone Safety Study](#). Study based on nationwide survey of approximately 675 highway construction firms.

⁵² [CSEA Long Island Region, "Increasing violence a threat to highway workers", April 1, 2025. Available at: https://cseany.org/workforce/?p=14320](https://cseany.org/workforce/?p=14320)

⁵³ [Marji, L.K.; Zech, W.C.; Kirby, J.T. Safety Culture and Worker Perception in Highway Maintenance Operations: A Survey of Alabama Department of Transportation Maintenance Technicians. Safety 2024, 10, 82. https://www.mdpi.com/2313-576X/10/3/82](https://www.mdpi.com/2313-576X/10/3/82)

"To further assess the safety perception and exposure of TMTs [Transportation Maintenance Technicians], respondents were given a list of ten activities and were asked to select their top three most hazardous activities....The activities that accumulated the highest scores were (1) Roadway/Shoulder Maintenance, (2) Guardrail/Cable Rail Maintenance, (3) Mowing and Trimming, and (4) Patching. These activities are indicative of those perceived as the most hazardous by the TMTs. This ranking method highlights not only the frequency of selection but also the ranking of perceived risk associated with each activity. The top-ranked activities, therefore, represent those that are considered to pose the greatest safety challenges and require the most attention in terms of risk management and safety protocols...Additionally, to gain a better understanding of the specific concerns faced by ALDOT TMTs, they were asked to list their top safety concerns in an open-ended question. The most cited concern by most respondents was getting struck by vehicular traffic. This concern is not surprising due to the nature of the work environment and it has been noted in several studies"

⁵⁴ [CDC, "Highway Work Zone Safety", Nov 6 2024, Available at: https://www.cdc.gov/niosh/motor-vehicle/highway/index.html.](https://www.cdc.gov/niosh/motor-vehicle/highway/index.html)

⁵⁵ [NIOSH, "Preventing Struck-by Injuries in Construction", Oct 1 2020, Available at: https://blogs.cdc.gov/niosh-science-blog/2020/10/01/struck-by-injuries/](https://blogs.cdc.gov/niosh-science-blog/2020/10/01/struck-by-injuries/)

"The construction workers building our nation's highways and roads experience more of these tragic fatalities compared to other construction subsectors (4). About 1 in 10 construction worker fatalities are from work zone injuries. Of these work zone injuries, about half (50%) involve a pedestrian-vehicle incident..."

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