



➤ Message from the Associate Administrator for Safety, Cheryl Walker

## Hello from the New Associate Administrator!



**Cheryl Walker**  
Associate Administrator  
for Safety

A big hello to the safety community! At the time that I am writing these words, it is my very first day as FHWA's new Associate Administrator for Safety.

I have spent the last 8 months as the Director, Office of Safety Programs, at FHWA. In that role, I have met with a number of different people throughout the safety community. A common thread throughout these meetings is the level of passion and energy. When we are gathered as a group focused on reducing the fatalities and serious injuries on our roadways, that passion and energy is contagious. One recent example of this was at the National Safety Engineers Peer Exchange in Minneapolis in July, where almost 200 people came together to learn from one another by sharing information and experiences. (See page 3.) Among many other great topics in this issue, you'll read about a lot of great things happening with our pedestrian safety program. You'll find some state-specific examples, as well as the latest on assessing vehicle-to-pedestrian technologies. (See page 9.)

I hope that as you read through these articles, you will find helpful tips and references to online tools and resources FHWA offers on a variety of topics. I invite you to take a look at our Office of Safety web page <https://safety.fhwa.dot.gov/> for many online tools and resources.

By working together, sharing information, and focusing our unstoppable passions and energy, we all can make a big difference in saving lives.

## Risk and Safety

For those who do not know me, I was on detail to the Office of Safety this summer from the Office of Bridges and Structures where I have a 30-year career in bridge engineering. It is from that perspective I wanted to share what I, from my view as an outsider, have observed as to how risk is considered in the safety community.

Most definitions quantify risk as a product of (1) the impact of consequence, and (2) the likelihood of occurrence. From an engineering perspective, this creates a two-dimensional area of solutions. Events of high impact or high likelihood may not necessarily be high risk. However, events of both high impact and high likelihood are high risk. However, events of both high impact and high likelihood are high risk.

Unlike engineering perspectives that typically consider probability when evaluating likelihood, political perspectives often consider possibility when evaluating likelihood. The political perspective reduces the engineer's area of solutions to a line of solutions (isn't math great?!).

While not all impacts are high impacts, any event of high impact, regardless of likelihood, is high risk.



**Joey Hartmann**  
Former Acting Associate  
Administrator for Safety



Unlike engineering perspectives that typically consider probability when evaluating likelihood, political perspectives often consider possibility when evaluating likelihood. The political perspective reduces the engineer's area of solutions to a line of solutions (isn't math great?!). While not all impacts are high impacts, any event of high impact, regardless of likelihood, is high risk.

The morality perspective is introduced into the risk evaluation when considering highway fatalities. Morality solely effects the evaluation of impact for highway fatalities; therefore, all impacts are high impacts, and all risks are high risks. Morality reduces the politician's line of solutions to a single solution, a single point...a single life.

It is reasonable to rely on sound engineering. It is politically sensible to recognize that there are currently no absolutes in safety. It is morally sound to treat every fatality as unacceptable. What I have observed is that the safety community recognizes and employs all three defensible solutions when considering the context of the question being asked.

At the recent National Safety Engineers Peer Exchange (see page 3 to learn more), I listened to several presentations and discussions about safety performance target setting. There were States that indicated that they set targets based on a reasonable expectation of what their programs could achieve based on the measured impact of strategies and countermeasures on fatalities. This is an engineering solution. There were also States that preferred to establish ambitious safety targets that were not reasonably achievable in the timeframe represented by the target, demonstrating a political decision. Lastly, there were the States that argued the moral solution—that the target should always be zero.

Finally, paraphrasing Mel Gibson just a little, if you focus your aim on a small part of your target, the single life, you have a better chance of hitting the overall target, all lives. I think that line works for moral, political, and engineering solutions. (Or, integrating a single point [a single life] results in a line. Integrating a line results in an area [all lives]...again, isn't math great?!).

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## ► MOVING TOWARD ZERO

### Getting to Zero Together: A National Safety Engineers Peer Exchange

By Karen Y. Scurry, P.E., FHWA Office of Safety, and Kim Eccles, P.E., VHB

On July 9, 10, and 11, nearly 200 State Safety Engineers, FHWA, and American Association of State Highway Transportation Officials (AASHTO) staff, and guests gathered together in Minneapolis, Minnesota, for a National Safety Engineers Peer Exchange. The peer exchange was jointly hosted by FHWA and AASHTO with the theme, *Getting to Zero Together*. The purpose of the peer exchange was to provide a forum for States to discuss and share ideas on various highway safety topics.

Representatives from 48 States, the District of Columbia, and Puerto Rico attended the peer exchange. The peer exchange provided an opportunity for these safety practitioners to:

- Advance the current state-of-the-practice for the Highway Safety Improvement Program (HSIP) and related safety programs.
- Increase technical capacity in FHWA safety priority areas.
- Provide support to States working to improve HSIP management, strategies, and countermeasure selections.

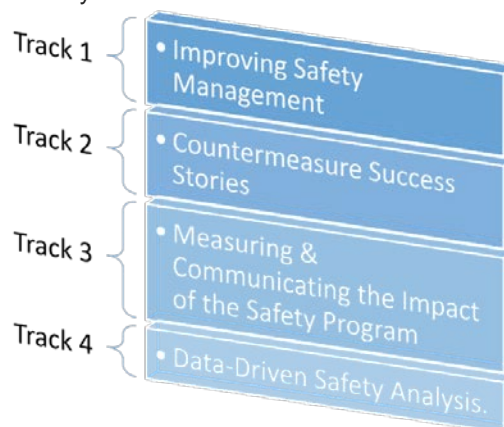
The opening plenary session set the stage for the peer exchange by providing an overview of the three national zero initiatives – Road to

Zero, Towards Zero Deaths, and Vision Zero, as well as a State perspective on the relationship between these initiatives and the State’s Strategic Highway Safety Plan (SHSP) and HSIP. Jane Terry from the National Safety Council presented Road to Zero, and Michelle May from the Ohio Department of Transportation (ODOT) discussed AASHTO’s Towards Zero Deaths program, both providing a national perspective. Jane encouraged the audience to “double down on what works,” and Michelle challenged the audience to work toward zero with an innovative mindset by remembering that, “Good ideas are crazy—until they’re not.” Ryan Anderson from the City of Minneapolis provided a local perspective and discussed Minneapolis’s efforts to implement Vision Zero. Brad Estochen from the Minnesota Department of Transportation (MnDOT) drew together the themes from the other three presentations and discussed how Minnesota has made progress in the last few years through working with local agencies and using the SHSP to drive change. He also challenged the audience to try new

approaches to improving highway safety and noted that, “There is no failure, only feedback.”

Following the plenary session, the participants broke out into discussion sessions that followed four technical tracks: safety management, countermeasure success stories, measuring and communicating the impact of the safety program, and data-driven safety analysis. State DOT participants presented on efforts in their States to begin each discussion session. Across each track, many themes emerged from these discussions, including obligation limits and authority, improving the project application and selection process for the HSIP, working with partners to turn strategic plans into actionable projects, data access and the role of transparency in increasing collaboration, communicating and educating the public and partners in highway safety efforts, and the relationship between the HSIP and the Statewide Transportation Improvement Program.

A major theme of the conference was the importance of communication—particularly with



Four Technical Tracks at the National Safety Engineers Peer Exchange (Source: FHWA)



stakeholders without technical backgrounds. In the breakout session on intersections, Robert Miles, Utah DOT's Director of Traffic Safety, counseled the audience, "You must engage with the public—early, often, and more than you are comfortable doing. If you specifically choose to serve people, you will need to talk to them, hold their hands, and bring them along."

The day two plenary session featured the safe systems approach to highway safety. Invited speaker Dr. Blair Turner, the Chief Technology Leader for Transport Safety at the Australian Road Research Board, discussed the Safe System and Vision Zero approach in Australia. He discussed the key principles of the safe systems approach and provided his insights on the supporting activities needed



Peer Exchange Speaker, Dr. Blair.  
(Source: FHWA)

to ensure successful implementation. He noted that, "To get to zero deaths and serious injuries, we have to acknowledge that people make mistakes and

embrace the shared responsibility and cultural shift needed to make real change." He discussed the opportunities created by working across all "pillars" (i.e., safe roads, safe road users, safe vehicles, safe speed, and post-crash care) and allowing innovation in approaches and policies. This cultural shift means moving from blaming the drivers to accepting the shared responsibility, focusing on elimination of fatal and serious injury crashes instead of all crashes, proactively identifying risk instead of reacting to crashes, and approaching our work from a systems approach instead of within individual pillars. Following Blair's presentation, John Milton, the Washington State Safety Engineer, and Brian Mayhew, the North Carolina State Traffic Safety Engineer, provided their perspectives on the application of the safe systems approach in the United States. Brian discussed the importance of speed management and kinetic energy management in preventing fatal crashes, which is particularly a concern on the rural roadways in North Carolina. He encouraged his peers to include the whole zero in their approach, noting that many zero deaths efforts in the United States today have focused on primarily pedestrian and bicycle crashes and have missed an opportunity to make progress across all fatal crash types. John shared that Washington was the first State to develop an SHSP with a zero fatality vision in 2000. At the time, he was heavily criticized for setting an "unattainable" vision but he noted, "I would rather have failed at trying to

achieve zero than to never have tried."

After the plenary panel, the participants broke out into more discussion sessions following the four technical tracks. In the afternoon of day two, the participants met with other States in their geographic regions, dividing into four regions—South, North, West, and Mid-America. During these regional discussions, the States posed questions to one another sharing best practices and discussing approaches to overcome shared challenges. Examples of topics discussed included preparing for automated vehicles, data concerns in network screening, addressing wrong-way driving crashes, using specific strategies (e.g., rumble strips, safety edge, wider pavement markings, or high-friction surface treatment), and the project letting process. All of the regions expressed sincere interest in finding more ways to connect, share best practices, and meet regularly as a region.

Beyond the discussion session, participants also exchanged information in the Collaboration Corner. States and FHWA brought publications and materials to share with their peers. The Collaboration Corner also included a selfie station and an interactive roundabout display. In addition to exchanging information with one another, the State representatives provided input to FHWA staff on topics such as marketing and communication, training, the FHWA Focused Approach to Safety, and the Railway-Highway Crossing Program.



The closing session for day two looked to the future. What will the challenges be in five years, ten years, and beyond and what actions do we need to take today to prepare for those challenges? Three panelists—Joey Hartmann, the acting FHWA Associate Administrator for Safety; Mike Tooley, the Director of the Montana DOT and Chair of the AASHTO Committee on Safety; and Mike Griffith, the Director of the FHWA Office of Safety Technologies—shared their thoughts on the future and how States can prepare for what will come. Joey stressed the importance of safety efforts reaching to local roads, noting that we cannot reach zero if we do not work with local agencies. He saw promise for the future in automation and noted that FHWA and others will work to determine the impacts of automated vehicles on existing roadways. Mike Tooley reminded his peers about Michelle May’s challenge for the audience the day before and encouraged everyone to **“Do something crazy, do something different. We have the biggest responsibilities in the world — saving lives.”** Mike Griffith discussed the challenges and opportunities that he saw across road users, infrastructure, and technology. He compared the United States fatality rate of 12 fatalities per



Technical visits with participants.  
(Source: FHWA)

100,000 population to Australia and Western Europe’s fatality rates of 5 and 3, respectively. He noted that, if we can reach these rates, we can save approximately 25,000 lives a year.

On the third day of the peer exchange, the participants participated in workshops and technical visits. The workshops included Driving FoRRRwD (Focus on Reducing Rural Roadway Departures), Performance Based Intersection Design and Operations, and Safe Transportation for Every Pedestrian. The technical visits included a tour of the University of Minnesota’s HumanFirst Lab, a guided walking tour of Minneapolis’s pedestrian and bicycle improvements, and a tour of 3M’s Innovation Center.

To close out the conference, the participants at the National Safety Engineers Peer Exchange participated in the first ever National Traffic Safety Bowl. Four contestants, one from each of the regions, faced off in a 25-question jeopardy-style quiz game. The contestants were selected for each region by winning a qualifying State transportation trivia game. Sean Raymond from the Rhode Island DOT represented the North region; Michael Vaughn from the Kentucky Transportation Cabinet represented the South region; Sonja Piper from the host State of Minnesota represented the Mid-America region; and Jeff Mills from the Utah DOT represented the West Region. In a very close finish, Michael Vaughn came from second place in the final round to win the title of National

Champion Traffic Safety Bowler when he correctly answered that 2005 was the year the Highway Safety Improvement Program was established as a core Federal-aid program by the SAFETEA-LU legislation. The other contestants congratulated Michael but looked forward to a future opportunity to challenge him for the title.



Traffic Safety Bowl. (Source: FHWA)

For more information about the peer exchange, please contact Karen Scurry at [karen.scurry@dot.gov](mailto:karen.scurry@dot.gov).

## Partnerships...a Simple Word but Critical to Achieving Zero Deaths on our Roadways

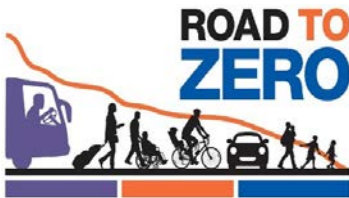
By Norah Ocel, P.E., FHWA Office of Safety

In looking towards our transportation future, we emphasize innovation, what’s next, and what will revolutionize roadway safety. Innovation is crucial, but the tried and true impact of working together toward a common goal is also important. That is what partnerships are all about.

FHWA’s Office of Safety has always recognized the critical role of partnerships in advancing roadway safety. With the advent of the Towards Zero Deaths vision that is



gaining momentum across the United States, working together across the 4 'E's of transportation safety (engineering, enforcement, education, and emergency response) is more important than ever. It is a fundamental element to reaching zero deaths and serious injuries on our roadways.



**Road to Zero.** (Source: National Safety Coalition)

One collaborative approach to reaching the zero goal is the safe systems approach, which acknowledges human fallibility and the shared responsibility we all have as part of the system (highway designers, users, and vehicles). While we move towards a safe systems approach, we continue to use data to make informed decisions, develop policies and regulations, and implement safety countermeasures to save lives. We also focus on maintaining and broadening our partnerships through



**Meeting with stakeholders to discuss latest headlight research and testing.**  
(Source: FHWA)

a variety of venues in the transportation community.

For instance, FHWA is partnering with the National Safety Council to assist with its [Road to Zero Coalition](#). Many agencies and private sector organizations are part of this coalition, whose goal is zero road fatalities by the year 2050. The FHWA Office of Safety continues to support this coalition by being an integral part of promoting and implementing its three core strategies—double down on what works, accelerate advanced technology, and prioritize safety—and providing technical support for each one of them.

Through the years, the Office of Safety has met with non-profit organizations to discuss topics related to safety on our roadways. These interactions serve as a platform to share information and best practices, but also to spark innovative ways to improve safety.

The Office of Safety also collaborates with other Federal agencies, such as the National Highway Traffic Safety Administration and Federal Motor Carrier Safety Administration to discuss how we can be better partners across the 4Es of highway safety.

The importance of our partners is celebrated through the National Roadway Safety Awards, which is co-sponsored by FHWA's Office of Safety and the Roadway Safety Foundation. These awards honor agencies/organizations in the transportation community that have made significant strides towards

zero deaths and serious injuries on our nation's roadways.

Every two years, this prestigious awards program examines the “best of the best” projects based on criteria including effectiveness, innovation, and efficient use of resources. For more than two decades, this program has provided the winning teams with well-deserved top industry honors and helped shine a spotlight on these heroes of highway safety. Selected projects are included in a [noteworthy practices guide](#) so they can be replicated nationwide.



**National Roadway Safety Awards.**  
(Source: FHWA)

In closing, partnership is sometimes defined as a contractual relationship between two or more persons associated as joint principals in a business. In our case, we are all joint principals in the business of saving lives. It takes the right personalities, energy, and purpose to make partnerships last through the years to achieve a common goal. Once formed, strong partnerships are a simple yet critical tool in safety, and what better outcome than getting to zero together.

For more information about the partnership initiatives, please contact Norah Ocel at [norah.ocel@dot.gov](mailto:norah.ocel@dot.gov).



## ► PEDESTRIAN AND BICYCLE SAFETY

### Is it a Plan? Is it a Policy? Is it a Program? Yes! It's STEP Integration

By Becky Crowe, FHWA Office of Safety

As part of the FHWA Safe Transportation for Every Pedestrian (STEP) program, 22 State Departments of Transportation (DOTs) have been working with FHWA representatives to develop action plans aimed at improving pedestrian safety at uncontrolled locations. FHWA staff conducted a series of one-day, in-person meetings with State agency staff to discuss current State DOT plans, policies, designs, and programs to identify strengths and weaknesses, a precursor to determining the types of recommendations that would be included in the action plans. It was during this phase of the planning

22 State Departments of Transportation (DOTs) have been working with FHWA representatives to develop action plans aimed at improving pedestrian safety at uncontrolled locations.

- Becky Crowe, FHWA Office of Safety

process that several State DOTs shared noteworthy practices on how they integrate STEP into existing State plans, policies, and programs. FHWA developed one-page summaries to briefly highlight these practices and how they improve pedestrian safety at uncontrolled locations.

During the STEP Action Plan meetings, officials discussed the extent to which agency design

manuals include pedestrian crossing features (e.g., refuge islands or raised crosswalks). Most of the State DOT design manuals reviewed either missed guidance related to one or more recommended STEP countermeasures or included out-of-date design guidance. The [Washington State Department of Transportation \(WSDOT\) Design Manual](#) emerged as being one of the strongest pedestrian-safety State DOT design manuals reviewed because of its emphasis on pedestrian safety countermeasures. The WSDOT Design Manual provides flexible and context-sensitive design policies and guidance that provide engineers the tools they need to design for multimodal needs and safety.

Several States have Complete Streets policies or design guides that were reviewed during the in-person meetings. The [New Jersey Department of Transportation \(NJDOT\) Complete Streets Design Guide](#) stood out as an exemplary resource for engineers and planners. The guide includes a toolbox with pedestrian safety improvements tailored to meet multimodal and community needs. NJDOT's Complete Streets Design Guide pulls from a variety of national design guides, emphasizes the role of context and flexibility during the design process, and describes the benefits and applications of numerous design options. The guide provides detailed recommendations on most of the STEP countermeasures and includes

public education and programmatic recommendations.

Several State DOTs leverage Highway Safety Improvement Program (HSIP) funding to focus on pedestrian safety improvements. For example, the Tennessee Department of Transportation (TDOT) reserves HSIP funding for the implementation of pedestrian safety countermeasures—a percentage of HSIP funding that is roughly proportionate to the percentage of serious and fatal crashes involving pedestrians. TDOT has also committed to including pedestrian safety countermeasures in all HSIP-funded projects (where applicable), including those mostly directed toward improving motorist safety.

The Connecticut Department of Transportation (CTDOT) has taken a more programmatic approach. By updating every crosswalk on the State highway system with high-visibility crosswalk markings and warning signs, CTDOT has surpassed spending 10 percent of HSIP funds. Pedestrian safety is included in many of Connecticut's plans and policies, such as its Complete Streets Policy, Statewide Pedestrian Plan, and the Strategic Highway Safety Plan (SHSP). The engineering and design efforts included in those policies and plans are largely funded as initiatives through HSIP.

The following list includes the participating State DOTs and the



topics that were included in the eight best practices summaries

- Alabama DOT: Statewide Bicycle and Pedestrian Plan.
- Arizona DOT: Pedestrian Safety Action Plan.
- CTDOT and TDOT: HSIPs.
- Louisiana Department of Development: Complete Streets Policy Update.
- Maine DOT: Rectangular Rapid Flash Beacons.
- NJDOT: Complete Streets Design Guide.
- Virginia DOT: 2017-2021.
- WSDOT: Design Manual.

For more information about how STEP is integrated into DOT policy, and to view the STEP one-page summaries, visit the [FHWA Office of Safety STEP Program page](#) or contact Becky Crowe at [rebecca.crowe@dot.gov](mailto:rebecca.crowe@dot.gov).

## **Bikeway Selection Guide: Accelerating the Delivery of Bicycle Networks**

*By Tamara Redmon, FHWA Office of Safety*

FHWA recently released its Bikeway Selection Guide, a resource to help transportation practitioners make decisions that accelerate the delivery of high-quality bicycle networks.

As part of the project, FHWA hosted a webinar on March 26, 2019. The webinar's strong attendance of around 600 demonstrated the interest of State and localities in better accommodating bicyclists. The webinar shared details about the guide, related FHWA resources, and technical assistance and training

available to local and State agencies. The webinar was recorded and can be viewed at the [Pedestrian and Bicycle Information Center website](#). Copies of the presentations can also be downloaded from that website.

As a result of the webinar, FHWA received 245 requests from those interested in more information about a workshop. These requests were narrowed down and formed the basis for a summer schedule of workshops in Northeast and Northwest Arkansas; El Paso, Texas; Hampton Roads, Virginia; Ohio; Pennsylvania; and North Carolina. Several other technical assistance sessions will be scheduled for later in the year.

FHWA discovered that States and localities are already starting to use the guide to update their own guides and plans, enhance training courses, and justify street re-configurations. For example:

- The Minnesota Department of Transportation (DOT) used the guide to update its bikeway design manual.
- East Baton Rouge Parish, Louisiana, is developing a Bike/Pedestrian Masterplan.
- The City of La Crosse, Wisconsin, when meeting opposition, cited the guide as a reason for deciding to put bike lanes on a busy street.
- The city of Arlington, Virginia, referenced the guide in its Transportation Master Plan adopted on April 23, 2019.

- The Michigan DOT is incorporating information from the guide into its Training Wheels 3.0 Course, being developed.



**Bikeway selection guide.**  
(Source: FHWA)

Is your State or locality using the new guide? If so, please let us know. Contact [tamara.redmon@dot.gov](mailto:tamara.redmon@dot.gov).

## **ScRAM: Proactively Improving Safety**

*By Tamara Redmon, FHWA Office of Safety*

The FHWA recently published the Guide for Scalable Risk Assessment Methods for Pedestrians and Bicyclists (ScRAM), which outlines eight sequential steps to develop risk values. Practitioners can use this easy-to-follow, step-by-step scalable risk assessment method to evaluate pedestrian and bicyclist risk at different geographic scales to inform program and project funding decisions.

The Mid-Ohio Regional Planning Commission (MORPC) recently completed a pilot project that tested the processes and methodologies outlined in the ScRAM Guide. With a





network of over 200 miles of trails, the Central Ohio Greenways (COG) comprises a significant portion of the region's pedestrian and bicycle network. COG trails are mostly separated from road rights-of-way, but trail users have the potential to come into conflict with motorized vehicles at trail access points and at-grade roadway crossings. While MORPC was aware of the risk, it had not developed a method to understand, quantify, and address it prior to this study. The team followed the ScRAM Guide to develop a numeric index quantifying the risk experienced by non-motorized users of the COG trail network within the metropolitan planning organizations boundary. The risk index establishes a methodology for prioritizing trail crossings and access points in need of advanced facilities and treatments.

MORPC calculated risk experienced by non-motorized users at 110 regional trail crossings and access points based on extrapolated trail count data and roadway user volumes. Staff estimated volumes on roadways without count data using Statewide averages by roadway functional classification. The risk index will allow MORPC to prioritize locations for safety investments, allowing the organization to engage in a more proactive approach to improving the safety of the non-motorized users.

Training sessions were held in Ft. Lauderdale, Florida (October 2018); Denver, Colorado (November 2018); Reno, Nevada (December 2018); Augusta, Maine (April 2019); Hawaii (April 2019); and Tulsa, Oklahoma

(June 2019). Technical assistance is available for the next year. Please contact [tamara.redmon@dot.gov](mailto:tamara.redmon@dot.gov) if you are interested in learning more.

## CV Program Studies Effectiveness of Emerging Pedestrian Technologies

*By Karen Timpone, FHWA Office of Safety*

For the past decade, the U.S. Department of Transportation (DOT) Connected Vehicle (CV) Research Program has paid special attention to mitigating conflicts between vehicles and pedestrians. The purpose of the vehicle-to-pedestrian (V2P) component of the CV research program is to address the safety issues that arise between vulnerable users and vehicles.

However, given that V2P technologies are relatively new and not yet widespread, it is necessary to assess the effectiveness of V2P technologies. As a result, DOT has developed a Pedestrian Technology Test Bed at the Turner-Fairbank Highway Research Center (TFHRC) in McLean, Virginia, to test available technologies for market readiness and real-world implementation.

The objectives of this research include:

- Developing a standardized and flexible assessment plan strategy and establishing a robust Pedestrian Technology Test Bed at TFHRC in McLean, Virginia.
- Acquiring and assessing a variety of market-ready V2P systems and documenting their safety effectiveness.

- Communicating to stakeholders the potential value of the Pedestrian Technology Test Bed and assessment plan for evaluating the safety effectiveness of market-ready V2P technologies, as well as associated research findings, to stakeholders.

In March of this year, FHWA conducted a webinar to present the findings of this study to an array of agency safety, policy and planning staff; equipment and technology developers, manufacturers, and vendors; and other groups that represent the interests of vulnerable road users. During this webinar, presenters provided an overview of V2P systems and the establishment of the TFHRC V2P Technology Test Bed, presented preliminary results from the safety effectiveness evaluation of market-ready V2P systems, shared an overall assessment of the evaluated V2P technologies, discussed future directions, and solicited feedback from attendees.

**V2P technologies** are able to detect pedestrians and alert the vehicle drivers through visual, audible, or haptic feedback, enabling them to act (applying brakes, slowing down, etc.) to prevent a collision. These technologies use an array of system types for identifying and communicating pedestrian presence, including:

- Direct wireless communications.
- Optical camera-based image processing.
- Infrared sensors.
- Infrastructure-based sensors.
- Laser-based sensors.
- Mobile phone networks.
- Motion sensors.



FHWA also held a panel discussion on the topic at ITS America 2019 in June and developed a poster that was presented at the 2019 Automated Vehicle Symposium in July.

The results of this research, which will be published in early fall 2019 in the Pedestrian Technology Test Bed Phase II Final Report, represent an important step in evaluating the strengths and weaknesses of highly

diverse pedestrian safety and V2P implementations. Framing the safety effectiveness of technologies within a common perspective of accessibility, functionality, and applicability to known high-risk scenarios enables researchers to advance the development and effectiveness of safety technology for vulnerable road users.

The assessment plan developed under this project will be further

enhanced as more commercial V2P technologies become available for testing. In the meantime, FHWA will continue to increase the capabilities of the FHWA V2P Technology Test Bed to improve its reliability and enhance its capacity to test more advanced V2P technologies.

To learn more about the Pedestrian Technology Test Bed or this research effort, please contact Karen Timpono at [karen.timpono@dot.gov](mailto:karen.timpono@dot.gov).

## ➤ ASSESSMENT AND ANALYSIS

### Geometric Design Laboratory Uses IHSDM to Assist in Freeway Safety Analysis

*By Abdul Zineddin, FHWA Office of Safety Research and Development*

The Geometric Design Laboratory (GDL) at the FHWA Turner-Fairbank Highway Research Center and Washington State Department of Transportation (WSDOT) are teaming to perform a study that could demonstrate the usefulness of the Interactive Highway Safety Design Model (IHSDM) safety and analysis tool. The study applies Highway Safety Manual (HSM) Part C crash prediction methods to examine existing conditions along a 4 mile section of the Interstate 5 (I-5) freeway in Bellingham, Washington, including mainline freeway segments and ramps at five interchanges. The goal of the IHSDM analysis is to provide input to WSDOT for evaluating the safety of the existing I-5 corridor, and potentially for developing future design alternatives.

The GDL is using data provided by WSDOT to build and evaluate highway models using the IHSDM. WSDOT collected the required data (e.g., curve data; cross-sections of lanes, shoulders, and medians; median and barriers; traffic volumes; crash data, etc.) with technical support from the GDL. The GDL then used WSDOT's data to build highway models in IHSDM for the I-5 freeway section and interchanges.

WSDOT chose this portion of I-5 after performing a qualitative collision analysis of the surrounding corridor. The WSDOT planning team recognizes that issues on I-5 are interconnected with the surrounding State route and local road network.

To examine the results of the analysis, the GDL team conducted a webinar on May 15, 2019, with key WSDOT staff. WSDOT will use the results of the safety analysis to determine if there are any safety issues that warrant further investigation. The results will help WSDOT evaluate how the subject location is performing in comparison

with other stretches of similar freeways.

Other States can learn from the process used to perform the safety analysis and the research conducted by WSDOT. The results may also be used to identify potential safety countermeasures and to develop alternative designs. The GDL could assist WSDOT in conducting a safety analysis of any future proposed alternative designs.

For more information, contact Abdul Zineddin, 202-493-3288, [Abdul.Zineddin@dot.gov](mailto:Abdul.Zineddin@dot.gov).

### Assessing State Safety Data Capabilities

*By Esther Strawder, FHWA Office of Safety, and Bob Scopaz and Catherine Chestnutt, VHB*

Highway safety practice is constantly evolving. Access to timely, accurate, complete, uniform, and integrated data has never been more crucial to States' safety decision making. Every State is working toward an all-public roads database that contains information on roadway attributes,



traffic volumes, and crashes. When these core data sets are merged together, they support advanced methods and tools for safety analysis. The resulting analyses support decision makers' efforts in reducing crashes, injuries, and fatalities.

In 2012, FHWA conducted the first capabilities assessment program with every State, plus Washington D.C. and Puerto Rico. The assessment helped States and the FHWA Office of Safety plan data improvements. The FHWA Office of Safety used the results to establish the Roadway Safety Data Program. This program features a one-stop website where practitioners can access training, guidance documents, noteworthy practices, case studies, tool descriptions, and technical assistance for data improvement efforts.

"Access to **timely, accurate, complete, uniform, and integrated** data has never been more crucial to States' safety decision making."

- Esther Strawder, FHWA Office of Safety

FHWA repeated the process—referred to as the second United States roadway safety data capabilities assessment (CAP2)—with States over the course of 2017 and 2018. The purpose of the new assessment was to review progress and identify needs in the key focus areas of:

- Roadway safety data collection/technical standards.
- Data analysis tools and uses.

- Data management and governance.
- Data integration.
- Performance management.

### **Methodology Behind the CAP2 Assessment**

Each State capability assessment consisted of three meetings (kickoff, assessment, and action plan) with each of the 50 States, Puerto Rico, and Washington, D.C.

Contractor assessment teams were trained on the assessment process, gathered information on existing sources, and provided their pre-filled questionnaires before meeting with their assigned States. Next, the assessment team worked with the State to review and complete the entire questionnaire. Each State was scored using a five-level capability maturity model (CMM) to describe the current capabilities of each State in the five key focus areas.

Following the assessment, the teams scheduled a final meeting with their States to review the CMM scores and discuss goals and possible actions that the State could take to improve capabilities over the next several years. The teams then created an action plan for each State providing them with their agreed-upon scores, goals, and priority actions. States also used the final meeting as an opportunity to suggest topics for peer exchanges scheduled for completion in Summer 2019.

### **CAP2 Findings**

The project final report provides an overview of key findings based on the CAP2 assessment. While each State is unique, there are some

commonalities in the final results. Data quality management and data governance are not formal parts of how agencies do business. Local data completeness and safety analysis for local roads continue to lag behind the same attributes for the State-maintained system. States found value in assembling multiple agencies and professionals together to respond to the assessment questions and set goals. The State meetings and peer exchanges provided valuable discussions of plans and goals.

The chart below shows a side-by-side comparison of the national average capability scores for all sections of the assessment, making it easy to spot gaps in State capabilities. The inverted triangles in the chart show the corresponding results reported in the 2012 capabilities assessment. For Area I, the triangles show the single score for each data quality attribute because these were not separately scored for data and CMM, as was done in this assessment. The performance management scores (Area 5) were not collected in the first round; therefore, no prior scores are indicated. On average, States scored high in data quality (timeliness, accuracy, completeness, and uniformity), but noticeably lower in formally managing these data quality attributes. Nationally, States also achieved relatively high scores in network screening methods and data, safety diagnosis and safety evaluation, spatial data integration and expandability, and performance management coordination and data. States scored relatively lower in data



quality management, countermeasure selection, data management and governance roles and responsibilities, and performance management analysis capabilities. These comparisons suggest areas for increased focus by States and FHWA.

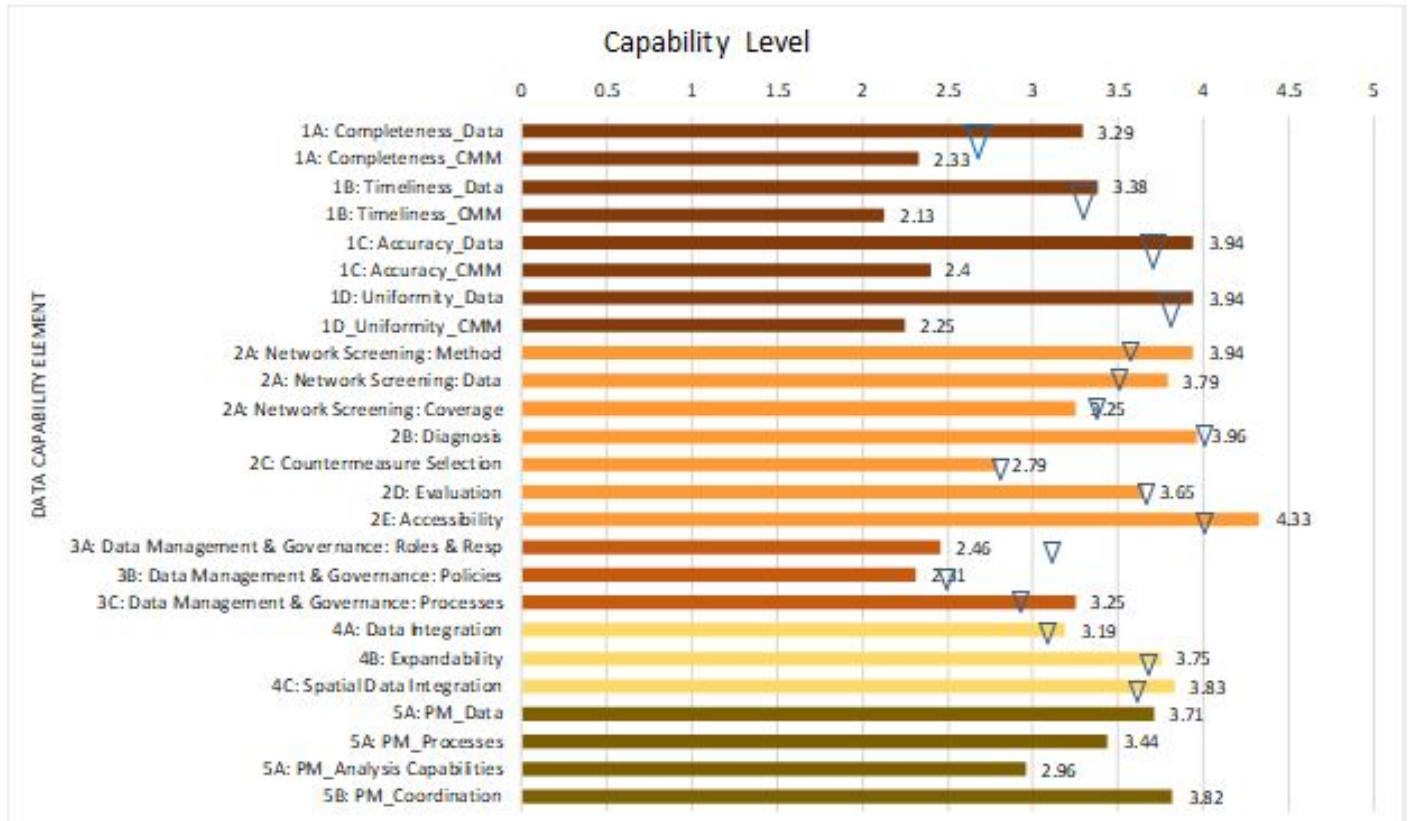
**Advancing Data Capability**

States used the CAP2 process to plan data capability improvements

and provide recommendations for the Office of Safety. Ultimately, FHWA can use the results of the CAP2 project to identify common needs among the States and to see how best to tailor assistance to the needs of specific States. States can use their action plans when they develop their safety- and data-related strategic plans (e.g., the Strategic Highway Safety Plan and Traffic Records Strategic Plan). The

2019 peer exchanges help FHWA and States set priorities and identify the most needed types of assistance and preferred delivery mechanisms.

For more information, please contact Esther Strawder at [esther.strawder@dot.gov](mailto:esther.strawder@dot.gov).



National average baseline for State data capability. (Source: FHWA)



## A Holistic Approach to Roadway Safety Management

By Stuart Thompson, FHWA Office of Safety, and Frank Gross and Tim Harmon, VHB

The intent of a roadway safety management program is to identify and improve sites expected to benefit the most from targeted, cost-effective treatments. The following are two complementary approaches that together represent a holistic approach to managing roadway safety:

1. **Spot approach:** select and treat sites based on site-specific crashes.
2. **Systemic approach:** select and treat sites based on site-specific geometric and operational attributes known to increase crash risk.

The spot approach allows for higher-cost and higher-effectiveness projects, particularly when targeting high-crash locations. The systemic approach provides an opportunity to address many locations through relatively lower-cost projects. While spot projects have the potential to produce large crash reductions at the treated locations, these projects also carry a higher investment risk due to the higher cost. Systemic projects are typically less effective (i.e., reduce fewer crashes) per site compared to the spot approach; however, systemic projects have the potential for large crash reductions at the network level. The figure at right illustrates the differences and the need to find an appropriate balance between the two approaches.

### The Challenge

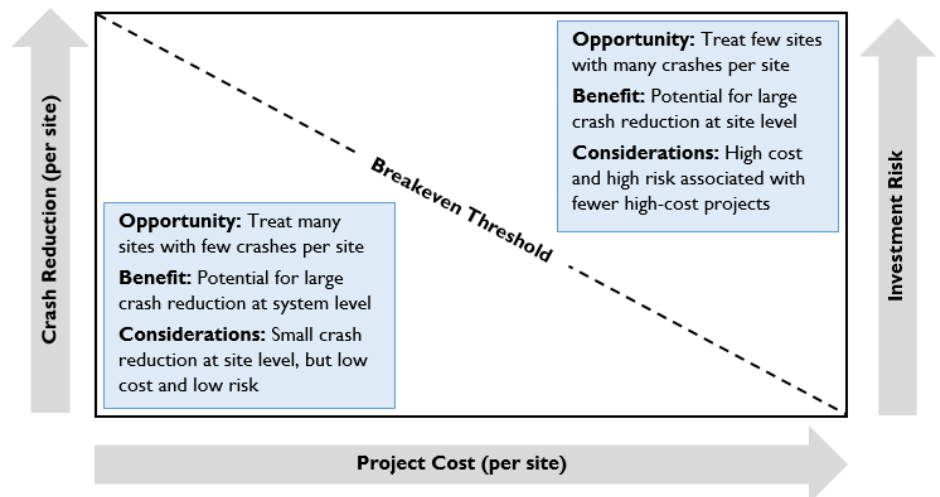
Safety program managers are challenged with selecting projects and allocating resources to maximize the program's return on investment. Agencies can address a few higher-crash locations with higher-cost improvements, address many lower-crash locations with lower-cost improvements, or some combination of the two. A common question is how to allocate funding between spot and systemic projects to achieve the maximum return on investment, improve safety performance, and make progress toward strategic objectives.

The figure on the next page illustrates a typical distribution for expected fatal and injury crashes across a State highway network. All sites are predicted to have some level of crash frequency, but relatively few sites have many expected crashes, and many sites have few expected crashes. The goal of a highway safety program is to reduce the area under the curve—by basic calculus, this area reflects the overall safety performance of the

network, represented here by the expected fatal and injury crashes.

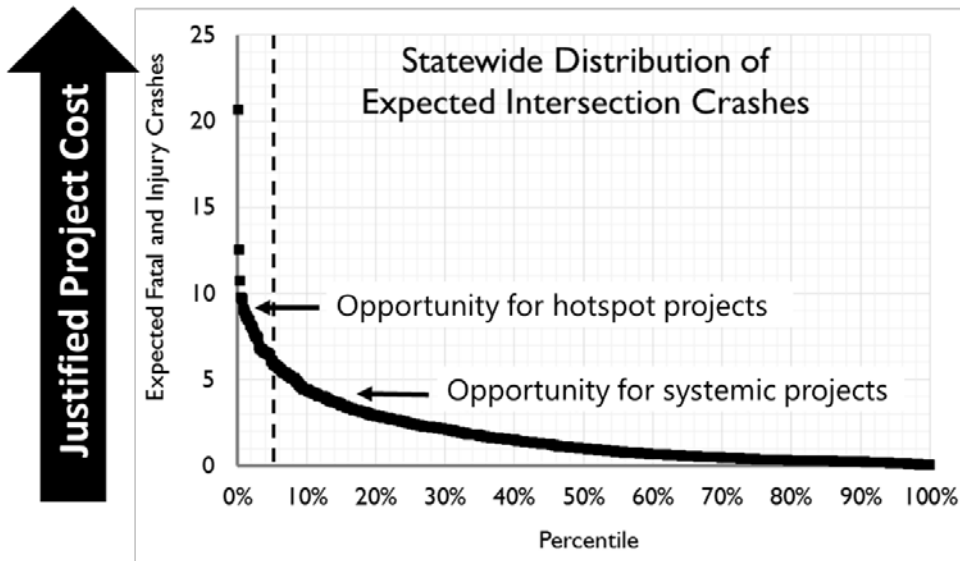
Agencies have many options for achieving the goal of reducing fatal and serious injury crashes. Each option (i.e., portfolio of projects) will vary in terms of the cost and expected effectiveness. High-cost projects may be a sound investment at sites with the highest expected crashes, particularly when there is a clear opportunity for a large crash reduction. High-cost investments do not present the same potential return at sites with lower expected crash frequencies, however. Instead, an investment strategy focused on low-cost improvements with a modest return on investment per site may be more appropriate to address sites with lower expected crash frequencies. This helps to gain some economies of scale with respect to mobilization, preliminary engineering, and other planning costs.

In either case, a program based solely on spot projects or solely on systemic projects will not achieve the goal of significantly reducing traffic



Framework for identifying breaking point for high-cost and low-cost projects. (Source: FHWA)





Statewide distribution of expected fatal and injury crashes. (Source: FHWA)

fatalities and serious injuries on all public roads. While spot projects have the potential to substantially reduce crashes at a given location, this will have limited impact on the safety performance of the entire system. Lower-cost projects can produce a substantial impact on the safety performance of the system; however, there may be a need for higher-cost improvements to effectively address the underlying crash contributing factors at locations with the highest expected crashes.

**The Opportunity**

To implement the holistic approach, agencies need to apply a benefit-cost framework based on estimated project costs, historical project effectiveness, and average crash costs. This framework can be applied at the project level (e.g., identifying the most cost-effective countermeasure for a given location) or program level (e.g., identifying the most cost-effective group of projects within a program budget).

As an example, consider different investment options for a \$3 million safety program. The table below provides project costs, estimated benefits, and benefit-cost ratios for several proposed projects. Proposed projects A, B, and C are based on the spot approach, while proposed projects 1, 2, and 3 are based on the systemic approach. There are numerous combinations of investment options for a \$3 million budget, and different options provide different returns on investment. Investing completely in the spot projects (A, B, and C), the total cost is \$3 million, the total benefit is \$30 million, and the benefit-cost ratio is 10:1. Investing completely in the

systemic projects (1, 2, and 3), the total cost is \$3 million, the total benefit is \$30 million, and the benefit-cost ratio is 10:1. However, given this level of information for each proposed project, an agency could select the most cost-effective projects that fit within the budget to maximize the return on investment. In this case, the agency would select spot project A, systemic project 1, and systemic project 2, resulting in a total cost of \$3 million, total benefit of \$37 million, and benefit-cost ratio of 37:1.

This type of framework is possible within the current capabilities of many transportation agencies. Agencies commonly estimate construction and maintenance costs as part of the project development process. Historical crash data and tools such as the Highway Safety Manual also make it possible to estimate the future safety performance of the no-build scenario. If an agency can determine the average project effectiveness and average crash costs, it is possible to estimate the future safety performance and monetary benefit of the proposed project. With this information, analysts can compare spot and systemic projects based on the benefit-cost ratio.

Proposed Projects	Coverage	Project Cost	Estimated Benefit	Benefit-Cost Ratio
Spot Project A	1 intersection	\$1,000,000	\$11,000,000	11:1
Spot Project B	1 intersection	\$1,000,000	\$10,000,000	10:1
Spot Project C	1 intersection	\$1,000,000	\$9,000,000	9:1
Systemic Project 1	100 intersections	\$1,000,000	\$14,000,000	14:1
Systemic Project 2	100 intersections	\$1,000,000	\$12,000,000	12:1
Systemic Project 3	100 intersections	\$1,000,000	\$4,000,000	4:1

Example investment options.



## Summary

A holistic approach to managing roadway safety includes both spot and systemic projects. The spot approach helps agencies select projects that potentially cost more but also have greater potential effectiveness, particularly when targeting high-crash locations. The systemic approach enables agencies

to address many locations through relatively lower-cost projects. Both approaches focus on preventing future crashes and reducing fatalities and injuries. Another commonality is focusing on sites with the greatest potential for safety improvement.

Regardless of which approach an agency uses, it is important to use reliable, data-driven methods to

inform decisions and identify the optimal combination of projects to achieve a significant reduction in fatal and serious injury crashes.

For more information about how to implement a holistic, data-driven approach to managing roadway safety, contact Stuart Thompson at [stuart.thompson@dot.gov](mailto:stuart.thompson@dot.gov).

### To Learn More, Check Out These Resources!

FHWA's [Roadway Safety Data Program Toolbox](#) contains a number of resources to support the holistic approach to safety management. The following are select tools to support benefit-cost analysis, which is a cornerstone of a data-driven holistic approach to roadway safety management.

[Highway Safety Benefit-Cost Analysis Guide and Tool](#) (FHWA-SA-18-001). This guide can assist transportation agencies in making consistent and sound investment decisions. The companion software tool is an Excel-based application that supports implementation of the methods described and demonstrated in the guide. The guide and tool will help users to quantify the costs and direct and indirect safety-related benefits of project alternatives. The tool is intended for project-level analysis of single or multiple improvements at a given location. It can also support network-level economic analysis for projects that include multiple locations (e.g., systemic improvements).

[Crash Costs for Highway Safety Analysis](#) (FHWA-SA-17-071). This guide describes the various sources of crash costs, current practices and crash costs used by States, and critical considerations when modifying and applying crash unit costs, and explores the feasibility of establishing national crash unit cost values.

## AWARDS NEWS

### Florida International University Student Receives 2019 Excellence in Highway Safety Data Award

*By Caroline Mozingo, UNC Highway Safety Research Center*

Congratulations to Florida International University Ph.D. candidate Seyedmirsajad Mokhtarimousavi, who received first place for the 2019 Highway Safety Information System (HSIS) Excellence in Highway Safety Data Award competition. The winning paper, "A Time of Day Analysis of Pedestrian-Involved Crashes in

California: Investigation of Injury Severity, a Logistic Regression and Machine Learning Approach Using HSIS Data," explores the contributing factors for pedestrian-involved crashes in California.

Mokhtarimousavi was recognized during the Award Luncheon at the 2019 Joint Institute of Transportation Engineers (ITE) International and Texas District Annual Meeting and Exhibit in Austin, Texas.

The HSIS Excellence in Highway Safety Data Award is part of the Highway Data Analysis Excellence Awards Program, which is jointly administered by the FHWA and ITE.

It was created to introduce future highway safety professionals to the HSIS safety database, which contains crash, roadway inventory, and traffic volume data for a select group of States and cities. FHWA uses the HSIS to support the FHWA safety research program and



Excellence in Highway Safety Data Award winners. (Source: FHWA)



provides input for program policy decisions.

“This year’s winning paper is a great illustration of how the HSIS database allows young researchers to gain insights into and explore transportation safety topics of interest to them,” said Brian Cronin, FHWA’s Director, Office of Safety and Operations Research and Development (R&D). “The goal of the awards program is to inspire university students to use HSIS data to investigate a topic that advances highway safety, and we hope these young researchers will continue exploring important transportation safety challenges in the future.”

“This year’s winning paper is a great illustration of how the HSIS database allows young researchers to gain insights into and explore transportation safety topics of interest to them,”

- Brian Cronin, FHWA Office of Safety Operations R&D

“I used the HSIS database to investigate pedestrian-involved crashes in California by time-of-day,” explained Mokhtarimousavi, “which was interesting and important to me because, in recent years, California has ranked among the States with the highest pedestrian fatalities in traffic crashes across the country.”

Congratulations also go out to Alyssa Ryan, University of Massachusetts Amherst, for the paper “Evaluating Crash Type Likelihood at Various Control Devices: A Multinomial Logistic Regression Using HSIS Data,” which took second place, and Jianqing Wu, University of Nevada, Reno, who

received third-place honors for the paper “Analysis of Crash Severity for Hazard Material Transportation Using Highway Safety Information System Data.”

This year’s HSIS Excellence in Highway Safety Data winning paper will be published in the October 2019 issue of ITE Journal.

More information about the HSIS Excellence in Highway Safety Data Award is available at <https://www.hsisinfo.org/award>.

## Seven States Awarded ASAP Funding for Fiscal Year 2019

*By Esther Strawder, FHWA Office of Safety*

The Accelerating Safety Activities Program (ASAP) specifically supports the goal of promoting safety innovation through training, outreach, and education focusing on roadway departure, intersection, and pedestrian and bicycle safety.

The program also promotes partnerships between FHWA, State Departments of Transportation, local and Tribal technical assistance

programs, and local transportation agencies.

Currently, ASAP funding is only available to the 23 States eligible to participate in the [Focused Approach to Safety](#).

The Office of Safety awarded nine projects from seven States with Fiscal Year 2019 ASAP funding totaling \$140,487.00. States submitted a total of 19 proposals evaluated by a technical panel, which ranked the projects based on their merit. The States that received awards also invested at least 20 percent of their own funds, bringing the total investment for the projects to \$258,856.00. The selected 2019 ASAP projects are:

- AL: Pelzer Avenue HFST Project
- AZ: Pedestrian Safety Forum
- FL: Pedestrian and Bicycle Safety Best Practices Symposium
- FL: Roadway Departure Safety Workshops



ASAP Focus States. (Source: FHWA)





- FL: Intersection Control Evaluation Workshop: Roundabouts
- KY: Safety Improvements for Rural Roads Courses
- MO: Missouri Systemic Countermeasure to Improve Pedestrian Safety (MoSCIPS)

- NJ: Proven Safety Countermeasures Workshop
- NY: Walk Bike Symposium, Pedestrian Action Implementation Plan

This is the thirteenth consecutive year ASAP has assisted States with implementing innovations in safety.

For more information, please visit the ASAP web page at <https://safety.fhwa.dot.gov/asap/>.

Please direct additional questions about ASAP to Esther Strawder at [esther.strawder@dot.gov](mailto:esther.strawder@dot.gov).

## ► ANNOUNCEMENTS

### TPCB Offers New RSP Certification!

*By Mike Griffith, FHWA Office of Safety*

The Transportation Professional Certification Board (TPCB), a certification body associated with the Institute of Transportation Engineers, inaugurated the Road Safety Professional (RSP) Level 1 Certification program in October 2018. Developed in collaboration with a wide array of transportation- and safety-related organizations in the United States and Canada, this certification is designed to support professionals in highway disciplines to establish their competency in providing for the safety of the traveling public.

Those achieving Level 1 certification will have demonstrated proficiency in the foundations of road safety principles. The exam is for a broad audience of professionals who in the performance of their work make decisions or take actions that potentially impact the safety of the traveling public. This includes those in the engineering, motor vehicle, behavioral, law enforcement, and emergency response communities.

This year, the program continues to grow, with the TPCB announcing the availability of a follow-on RSP Level 2 Certification. While the RSP Level 1 Certified Safety Professional demonstrates expertise in road safety's multidisciplinary dimensions, those who hold a Level 1 Certification, possess the necessary years of experience, and pass the Level 2 examination will have demonstrated a deeper level of understanding and proficiency in road safety science. The Level 2 certification is geared toward professionals whose primary job functions are directed at improving the safety performance of the surface transportation system. It is for professionals responsible for developing and implementing engineering or behavioral programs aimed at reducing the number of fatalities and injuries due to road crashes. Those seeking certification will select between a Level 2 certification with a "behavioral specialty" or Level 2 certification with an "infrastructure specialty."

For those wishing to become Level 1-certified, the Institute of Transportation Engineers is offering an [RSP Level 1 Refresher Course](#), which is an overview of topics, key

references, and independent study materials by topic for individuals in the transportation, safety, and public health professions who intend to take the RSP Level 1 certification exam. This course includes a suite of five (5) 90-minute, on-demand webinars on foundational elements of road safety, the collection and application of crash data and associated safety measures, human factors and their impact on roadway safety, safety management and the use of countermeasures, and the development and implementation of strategic safety plans. A different refresher course will be available for the Level 2 certification.

Computer-based exams for RSP, as well as other professional certifications (Professional Traffic Operations Engineer® [PTOE] and Professional Transportation Planner® [PTP]), may be taken at approved testing sites during the following upcoming timeframes:

- February 1 to 28, 2020 (Applications must be received by midnight, December 5, 2019.)
- June 1 to 30, 2020 (Applications must be received by midnight, April 2, 2020.)



For a list of available exam cities, please visit:

<http://castleworldwide.com/mainsite/btsites/default.aspx>. For more information about this training or to submit an application, please visit the [TPCB Road Safety Professional web page](#).

## Upcoming Conferences and Events

### **2019 American Association of State Highway Transportation Officials (AASHTO) Annual Meeting, October 5 – 9, 2019, St. Louis, Missouri.**

This annual week-long meeting addresses various transportation issues. The meeting offers opportunities for professionals

and executives to network and share innovative ideas.

### **American Society of Civil Engineers (ASCE) 2019 International Conference on Transportation and Development,**

**October 10 – 13, 2019, Miami, Florida.**

This annual conference offers an opportunity for public agencies, private industry, and researchers to exchange ideas, share experiences, collaborate on innovations and developments, and showcase latest transportation solutions.

### **National League of Cities (NLC) City Summit, November 20 – 23, 2019, San Antonio, Texas.**

The annual summit is a conference for local leaders to meet and collaborate

about challenges faced in their cities. Topics include finance, advocacy, civic engagement, communications, community and housing, economic development, education, energy, city government, and many more!

### **Transportation Research Board (TRB) 2020 Annual Meeting,**

**January 12 – 16, 2020,**

**Washington, D.C.**

The annual meeting features expositions and speakers presenting the most cutting-edge transportation strategies. The meeting will cover all transportation modes and will feature more than 5,000 presentations and 800 sessions. The theme for 2020 is “A Century of Progress: Foundation for the Future.”

The *Safety Compass Newsletter* is a publication of the U.S. Department of Transportation, Federal Highway Administration (FHWA).

FHWA publishes the Safety Compass Newsletter three times a year. We can be reached at:

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1200 New Jersey Ave., SE  
Room E71-320  
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The Safety Compass Newsletter is available online at the FHWA Office of Safety website at:

<http://safety.fhwa.dot.gov/newsletter/safetycompass/>.

We welcome your comments and highway safety-related articles. The purpose of this newsletter is to increase highway safety awareness and information and to provide resources to help save lives.

We encourage readers to submit highway safety articles that might be of value to the highway safety community. Send your comments, questions, and articles for review electronically to Tara McLoughlin at: [tara.mcloughlin@dot.gov](mailto:tara.mcloughlin@dot.gov).

