



New Jersey 2020 Strategic Highway Safety Plan

Emphasis Area

PEDESTRIANS & BICYCLISTS

Team Leader: Elise Bremer-Nei
Room 225 East ●



Safety Summit #2
Emphasis Area Breakout Session (90 minutes)

Agenda

- 1. Review Goals of the Session (5 minutes)**
- 2. Review Data and Identify Key Data Questions (20 minutes)**
- 3. Review Existing Strategies (20 minutes)**
- 4. Identify Additional Potential Strategies (15 minutes)**
- 5. Discuss Prioritization of Strategies (30 minutes)**

**Driving
Toward ZERO
Deaths**



Pedestrians & Bicyclists Crash Data Sheet

Summit #2

January 21, 2020

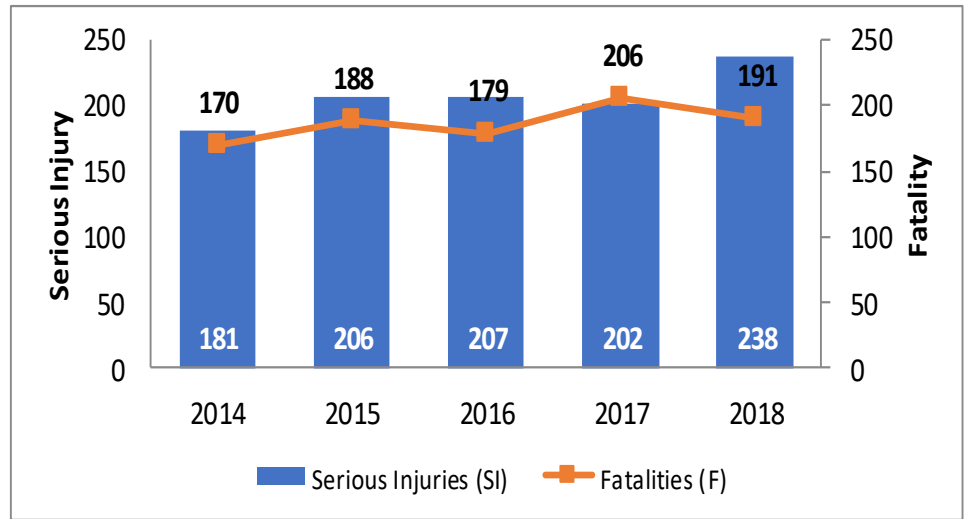


Pedestrians and Bicyclists Crash Quick Facts

- Accounts for 25% of all NJ fatalities and serious injuries.
- Data from 2014-2018
- 934 fatalities
- Increase of 6% from 2015 SHSP
- 1,034 serious injuries
- Decrease of 26% from 2015 SHSP
- 23%—At Signalized
- 67%—At Unsignalized

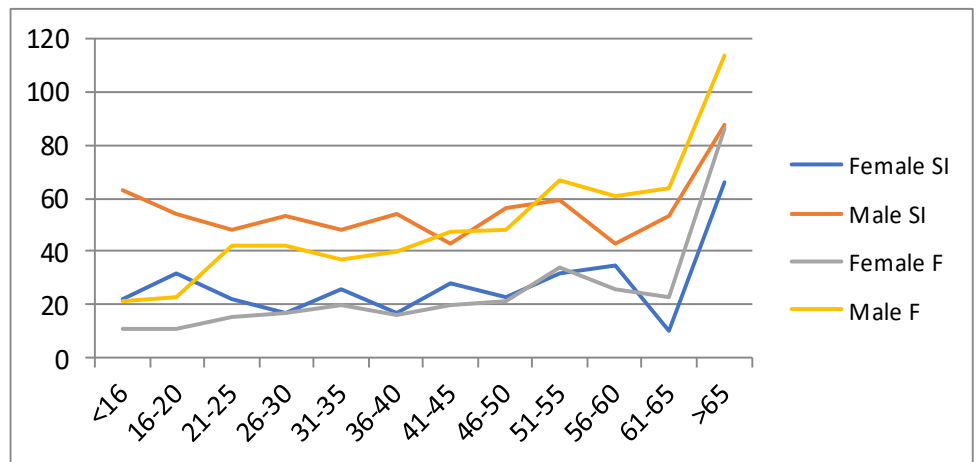
Summary

This fact sheet provides many details of pedestrians and bicyclists crash fatalities and serious injuries (FSI). It also provides suggested strategies to reduce fatalities and serious injuries in NJ.



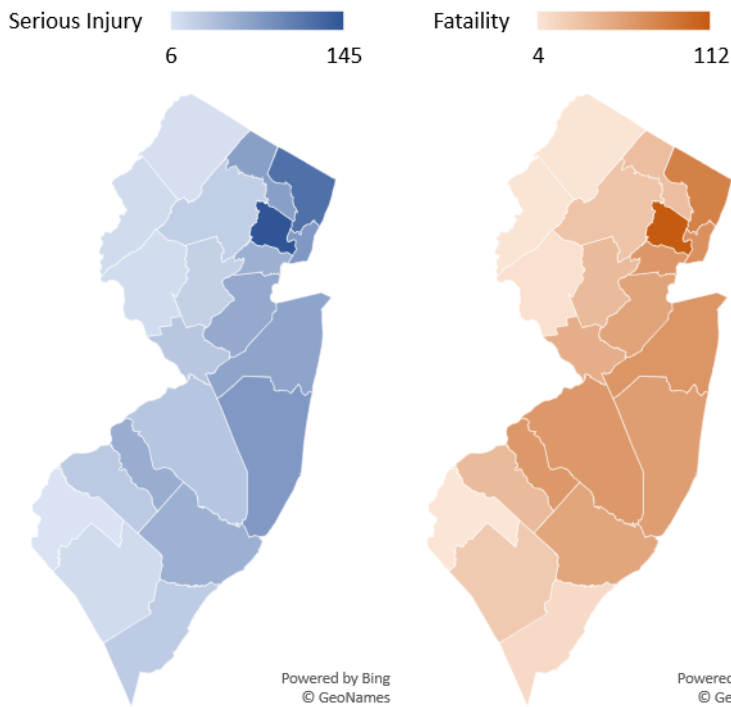
Who Was Involved?

In all cases, fatalities and serious injuries were highest for pedestrians and bicyclists in the 65 and older age range.



- Who was Involved **1**
- Where did Crashes Occur **2**
- When did Crashes Occur **2**
- Contributing Factors **3**
- Crash Types / Conditions **3**
- Strategies **4**

Where Did Crashes Occur?



FSI by County (top) and MPO (bottom)

MPO	Fatality	Serious Injury
DVRPC	159	212
NJTPA	770	627
SJTPO	105	95

Seventy-one percent (71%) of pedestrians and bicyclists fatalities and serious injuries

FSI by Roadway Type

Roadway	Rural	Urban
Interstate	4	43
State	12	602
County	19	551
City	0	210
Other	0	0
Total	35	1,406

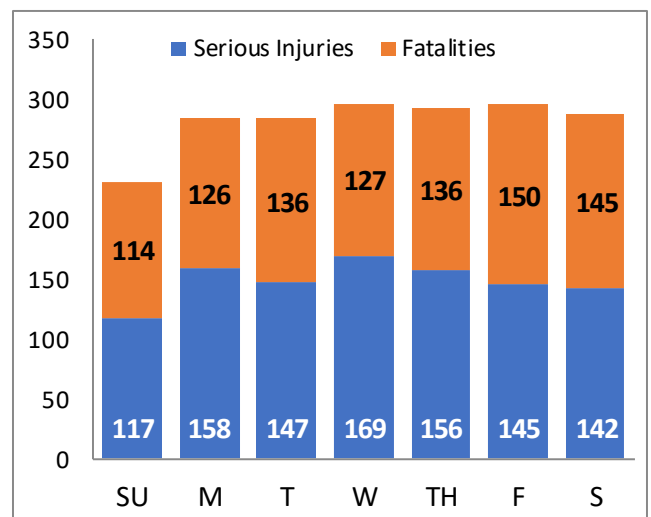
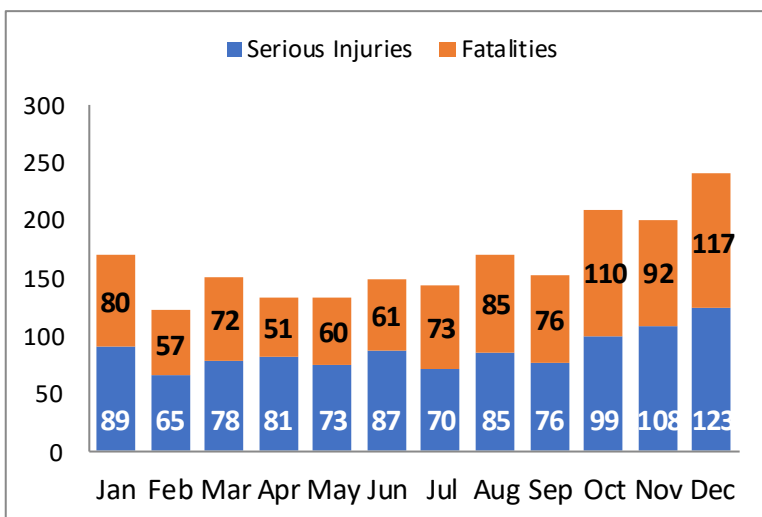
27% FSI - Unknown Roadway Type

FSI by Functional Class

Functional Class	<=25 mph	30-45mph	45+ mph
Interstate	1	0	65
Freeways	0	7	38
Principal Arterial	114	331	232
Minor Arterial	195	226	24
Major Collector	69	27	20
Minor Collector	5	3	2
Local	27	10	1
Other	361	108	17

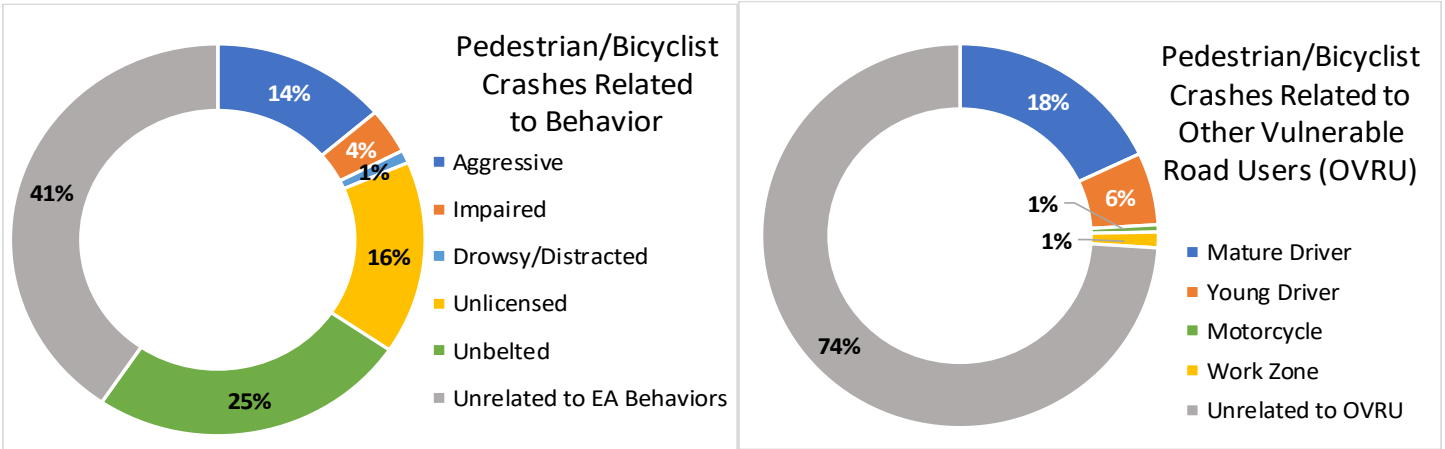
When Did Crashes Occur?

Fatalities occurred mostly on Fridays and Saturdays, while serious injuries occurred on Wednesdays. Fatalities and serious injuries happened primarily in October, November and December.



Contributing Factors

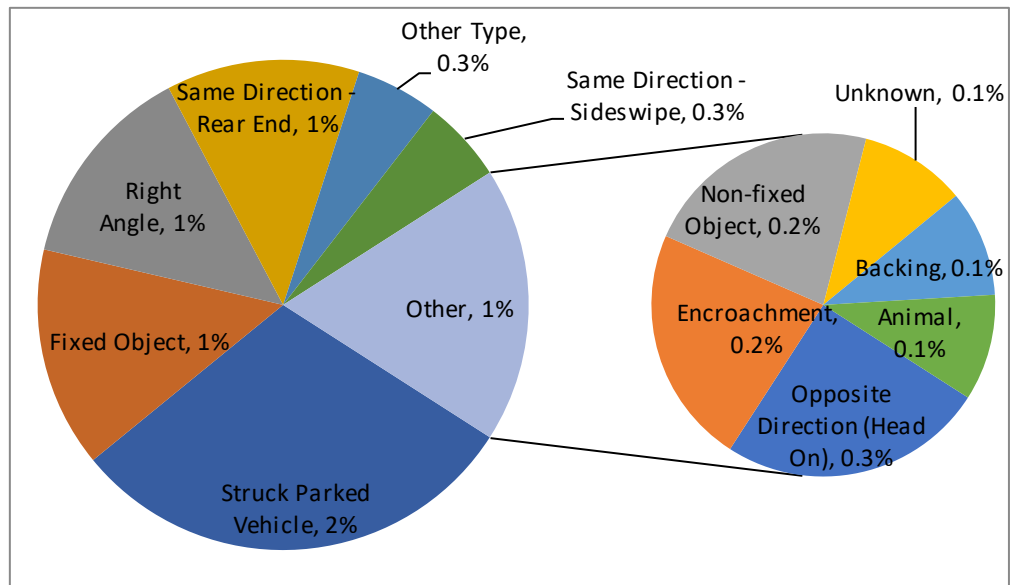
Relationship to Other SHSP Emphasis Areas



Approximately 12% of pedestrian and bicyclist fatalities and serious injuries were Hit and Run crashes. 21% crashes involved crossing at intersection crosswalks and 20% of the crashes involved crossing/jaywalking.

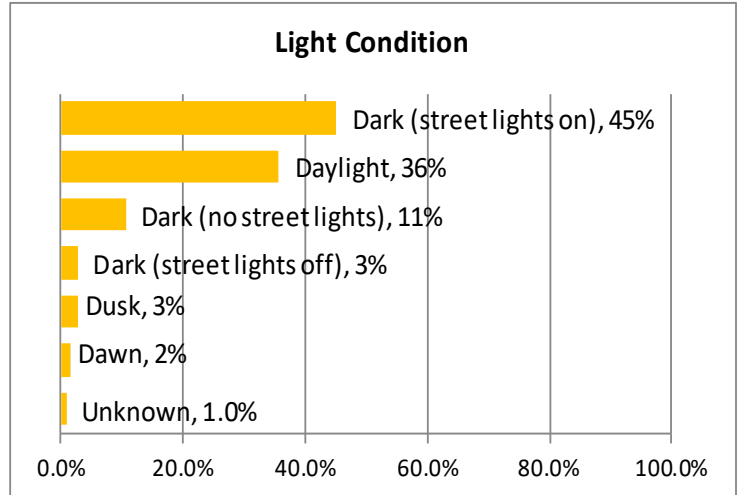
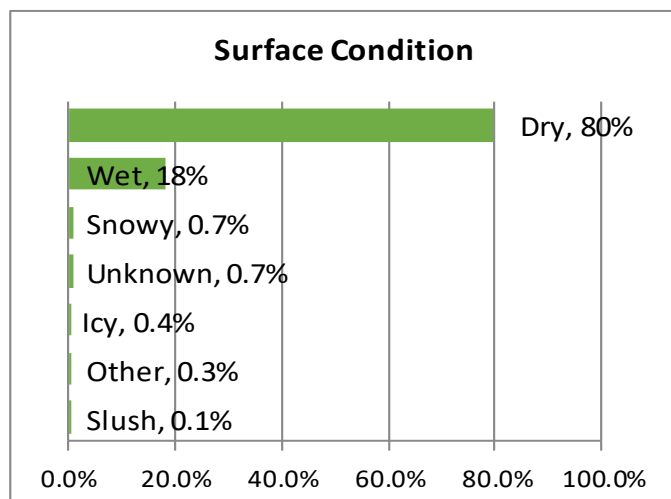
Crash Type

While pedestrian and bicyclist crashes account for 95% of the total (i.e. coded as this crash type), pedestrian and bicyclist fatalities and serious injuries were also caused by the crashes shown.



Surface and Light Conditions

Pedestrians and bicyclists fatalities and serious injuries mainly occurred at night and on dry pavement conditions.



Strategies

The NJ SHSP identified several strategies that have the greatest potential to reduce pedestrians and bicyclists fatalities and serious injuries.

Pedestrians

Reduce Pedestrian Exposure to Vehicular Traffic

- Provide sidewalks/walkways and curb ramps. ★
- Install or upgrade traffic and pedestrian signals.
- Construct pedestrian refuge islands and raised medians.
- Install countdown timers.
- Install Lead Pedestrian Interval. ★

Improve Sight Distance and/or Visibility Between Motor Vehicles and Pedestrians

- Provide crosswalk enhancements, including curb extensions/bump-outs.
- Implement lighting/crosswalk illumination measures.
- Eliminate physical objects that interfere with lines of sight between drivers and pedestrians.
- Signals to alert drivers that pedestrians are crossing (HAWK signal). ★

Improve Pedestrian and Driver Safety Awareness and Behavior

- Provide education, outreach, and training.
- Implement enforcement campaigns.
- Perform Pedestrian Safety Audit (Similar to Road Safety Audit but with a pedestrian focus). ★

Overview of the Pedestrians and Bicyclists Crash Query

- NJDOT Crash Records Database (100% of records)
- Any fatality or serious injury of a pedestrian or bicyclist

Bicyclists

Reduce Bicycle Crashes at Intersections

- Improve visibility at intersections.
- Improve signal timing and detection.
- Improve signing.
- Improve pavement markings at intersections.
- Improve geometry of intersections.
- Restrict right turn on red movements.
- Addition of bike boxes.

Reduce Bicycle Crashes Along Roadways

- Provide safe bicycle facilities for parallel travel – on/off-road facilities, shoulders, dedicated.

Reduce Motor Vehicle Speeds

- Implement traffic calming techniques.
- Implement speed enforcement.
- Implement road diets where appropriate. ★

Improve Safety Awareness and Behavior

- Provide bicyclist skill education.
- Improve enforcement of bicycle-related laws.

Increase Use of Bicycle Safety Equipment

- Increase use of bicycle helmets.
- Increase rider and bicycle conspicuousness.

Additional Considerations

Develop Local Road Safety Plans ★

- ★ FHWA Proven Safety Countermeasure

Disclaimer: The 2020 SHSP data is based upon a programmatic analysis of statewide data supplied by third party sources. Because of limitations in the data supplied and the method used to develop the charts contained in this fact sheet, users should be aware that data may be incorrect and/or incomplete. NJDOT makes no guarantees as to the accuracy, completeness, or content of the information. Data is subject to update as more information becomes available. NJDOT, its officers, employees or agents shall not be liable for damages or losses of any kind arising out of or in connection with the use or performance of information, including but not limited to, damages or losses caused by reliance upon the accuracy or timeliness of any such information, or damages incurred from the viewing, distributing, or copying of these materials. The materials and information provided herein are provided "as is." No warranty of any kind, implied, expressed, or statutory, including but not limited to the warranties of non-infringement of third-party rights, title, merchantability, and fitness for a particular purpose, is given with respect to the contents of this fact sheet.



Leading Pedestrian Intervals

SAFETY BENEFIT:

60%

Reduction in pedestrian-vehicle
crashes at intersections



LPIs are beneficial at intersections with high left-turning volumes.

Source: pedbikeimages.org / Burden

A leading pedestrian interval (LPI) gives pedestrians the opportunity to enter an intersection 3-7 seconds before vehicles are given a green indication. With this head start, pedestrians can better establish their presence in the crosswalk before vehicles have priority to turn left.

LPIs provide the following benefits:

- Increased visibility of crossing pedestrians.
- Reduced conflicts between pedestrians and vehicles.
- Increased likelihood of motorists yielding to pedestrians.
- Enhanced safety for pedestrians who may be slower to start into the intersection.



An LPI allows a pedestrian to establish presence in the crosswalk before vehicles are given a green indication.

Source: FHWA

FHWA's *Handbook for Designing Roadways for the Aging Population* recommends the use of the LPI at intersections with high turning-vehicle volumes. Transportation agencies should refer to the *Manual on Uniform Traffic Control Devices* for guidance on LPI timing. Costs for implementing LPIs are very low, since only signal timing alteration is required. This makes it an easy and inexpensive countermeasure that can be incorporated into pedestrian safety action plans or policies and can become routine agency practice.



Pedestrians wait for the walk signal.

Source: pedbikeimages.org / Burden

Source: Aaron C. Fayish and Frank Gross, "Safety Effectiveness of Leading Pedestrian Intervals Evaluated by a Before-After Study with Comparison Groups," *Transportation Research Record* 2198 (2010): 15-22. DOI: 10.3141/2198-03

→ For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://safety.fhwa.dot.gov/provencountermeasures>.





Medians and Pedestrian Crossing Islands in Urban and Suburban Areas



Median and pedestrian crossing islands near a roundabout.

Source: www.pedbikeimages.org / Dan Burden

SAFETY BENEFITS:

RAISED MEDIAN

46%

Reduction in pedestrian crashes

PEDESTRIAN CROSSING ISLAND

56%

Reduction in pedestrian crashes

Source: *Desktop Reference for Crash Reduction Factors*, FHWA-SA-08-011, September 2008, Table 11.



Example of a road with a median and pedestrian crossing islands.

Source: City of Charlotte, North Carolina



Example of a pedestrian crossing island.

Source: pedbikeimages.org / Dan Burden

A **median** is the area between opposing lanes of traffic, excluding turn lanes. Medians in urban and suburban areas can be defined by pavement markings, raised medians, or islands to separate motorized and non-motorized road users.

A **pedestrian crossing island** (or refuge area) is a raised island, located between opposing traffic lanes at intersection or midblock locations, which separate crossing pedestrians from motor vehicles.

Pedestrian crashes account for approximately 15 percent of all traffic fatalities annually, and over 75 percent of these occur at non-intersection locations.¹ For pedestrians to safely cross a roadway, they must estimate vehicle speeds, adjust their walking speed, determine gaps in traffic, and predict vehicle paths. Installing raised medians or pedestrian crossing islands can help improve safety by simplifying these tasks and allowing pedestrians to cross one direction of traffic at a time.

Transportation agencies should consider medians or pedestrian crossing islands in curbed sections of urban and suburban multi-lane roadways, particularly in areas with a significant mix of pedestrian and vehicle traffic and intermediate or high travel speeds. Some example locations that may benefit from raised medians or pedestrian crossing islands include:

- Mid-block areas.
- Approaches to multi-lane intersections.
- Areas near transit stops or other pedestrian-focused sites.

¹ National Highway Traffic Safety Administration, *Traffic Safety Facts - 2015 Data - Pedestrians*. Report DOT HS 812 375, (Washington, DC: 2017).

→ For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://safety.fhwa.dot.gov/provencountermeasures>.



Pedestrian Hybrid Beacons

SAFETY BENEFITS:

69%

Reduction in pedestrian crashes

29%

Reduction in total crashes

15%

Reduction in serious injury and fatal crashes



Pedestrians cross the roadway at a PHB location.

Source: City of Tuscon, Arizona

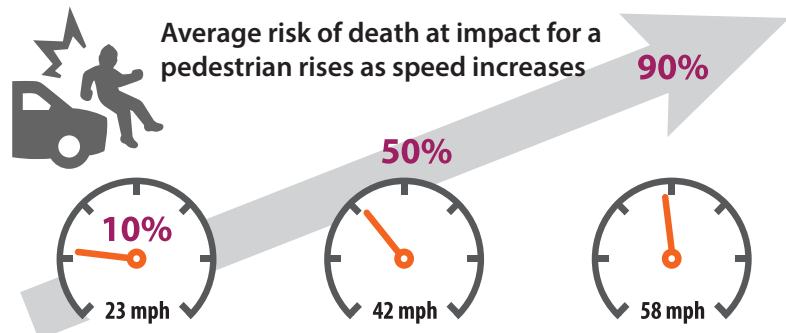
The pedestrian hybrid beacon (PHB) is a traffic control device designed to help pedestrians safely cross busy or higher-speed roadways at midblock crossings and uncontrolled intersections. The beacon head consists of two red lenses above a single yellow lens. The lenses remain “dark” until a pedestrian desiring to cross the street pushes the call button to activate the beacon. The signal then initiates a yellow to red lighting sequence consisting of steady and flashing lights that directs motorists to slow and come to a stop. The pedestrian signal then flashes a WALK display to the pedestrian. Once the pedestrian has safely crossed, the hybrid beacon again goes dark.



Example of PHBs mounted on a mast arm.

Source: FHWA

More than 75 percent of pedestrian fatalities occur at non-intersection locations, and vehicle speeds are often a major contributing factor.¹ As a safety strategy to address this pedestrian crash risk, the PHB is an intermediate option between a flashing beacon and a full pedestrian signal because it assigns right of way and provides positive stop control. It also allows motorists to proceed once the pedestrian has cleared their side of the travel lane, reducing vehicle delay.



Data from the AAA Foundation for Traffic Safety, Impact Speed and a Pedestrian's Risk of Severe Injury or Death, September 2011.

Transportation agencies should refer to the *Manual on Uniform Traffic Control Devices* for information on the application of PHBs. In general, PHBs are typically used when gaps in traffic are not large enough or vehicle speeds are too high for pedestrians to cross safely. PHBs are not widely implemented, so agencies should consider an education and outreach effort when implementing a PHB within a community.

Source: CMF Clearinghouse, CMF IDs: 2911, 2917, 2922.

¹ National Highway Traffic Safety Administration, *Traffic Safety Facts - 2015 Data - Pedestrians*. Report DOT HS 812 375, (Washington, DC: 2017).

→ For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://safety.fhwa.dot.gov/provencountermeasures>.



Safe Roads for a Safer Future
Investment in roadway safety saves lives



Road Diets

(Roadway Reconfiguration)

A “Road Diet,” or roadway reconfiguration, can improve safety, calm traffic, provide better mobility and access for all road users, and enhance overall quality of life.

SAFETY BENEFIT:

**4-LANE → 3-LANE
ROAD DIET
CONVERSIONS**

19-47%

Reduction in total crashes



BEFORE



AFTER

Before and after photos of a Road Diet project.

Source: City of Orlando, Florida

A Road Diet typically involves converting an existing four-lane undivided roadway to a three-lane roadway consisting of two through lanes and a center two-way left-turn lane (TWLTL).

Benefits of Road Diet installations may include:

- An overall crash reduction of 19 to 47 percent.
- Reduction of rear-end and left-turn crashes due to the dedicated left-turn lane.
- Reduced right-angle crashes as side street motorists cross three versus four travel lanes.
- Fewer lanes for pedestrians to cross.
- Opportunity to install pedestrian refuge islands, bicycle lanes, on-street parking, or transit stops.
- Traffic calming and more consistent speeds.
- A more community-focused, “Complete Streets” environment that better accommodates the needs of all road users.



Road Diet project in Honolulu, Hawaii.

Source: Leidos

A Road Diet can be a low-cost safety solution when planned in conjunction with a simple pavement overlay, and the reconfiguration can be accomplished at no additional cost.

Source: Evaluation of Lane Reduction “Road Diet” Measures on Crashes, FHWA-HRT-10-053.

→ For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://safety.fhwa.dot.gov/provencountermeasures>.



Walkways

SAFETY BENEFITS:

SIDEWALKS

65-89%

Reduction in crashes involving pedestrians walking along roadways

PAVED SHOULDERS

71%

Reduction in crashes involving pedestrians walking along roadways



Example of a shared use path.

Source: pedbikeimages.org / Burden

A walkway is any type of defined space or pathway for use by a person traveling by foot or using a wheelchair. These may be pedestrian walkways, shared use paths, sidewalks, or roadway shoulders.¹

With more than 5,000 pedestrian fatalities and 70,000 pedestrian injuries occurring in roadway crashes annually, it is important for transportation agencies to improve conditions and safety for pedestrians and to integrate walkways more fully into the transportation system.²



Source: pedbikeimages.org / Burden



Paved shoulder used as a walkway.

Source: pedbikeimages.org / Burden

Well-designed pedestrian walkways, shared use paths, and sidewalks improve the safety and mobility of pedestrians. In some rural or suburban areas, where these types of walkways are not feasible, roadway shoulders provide an area for pedestrians to walk next to the roadway.

Transportation agencies should work towards incorporating pedestrian facilities into all roadway projects unless exceptional circumstances exist. It is important to provide and maintain accessible walkways along both sides of the road in urban areas, particularly near school zones and transit locations, and where there is pedestrian activity. Walkable shoulders should also be considered along both sides of rural highways routinely used by pedestrians.

¹ FHWA defines a pedestrian walkway as a continuous way designated for pedestrians and separated from motor vehicle traffic by a space or barrier. By contrast, sidewalks are walkways that are paved and separated from the street, generally by a curb and gutter.

² National Highway Traffic Safety Administration, *Traffic Safety Facts - 2015 Data - Pedestrians*. Report DOT HS 812 375, (Washington, DC: 2017).

Source: *Desktop Reference for Crash Reduction Factors*, FHWA-SA-08-011, Table 11.

→ For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://safety.fhwa.dot.gov/provencountermeasures>.





Road Safety Audits

A road safety audit is a proactive, formal safety performance examination of an existing or future road or intersection by an independent and multi-disciplinary team.

SAFETY BENEFIT:

10-60%

Reduction in total crashes

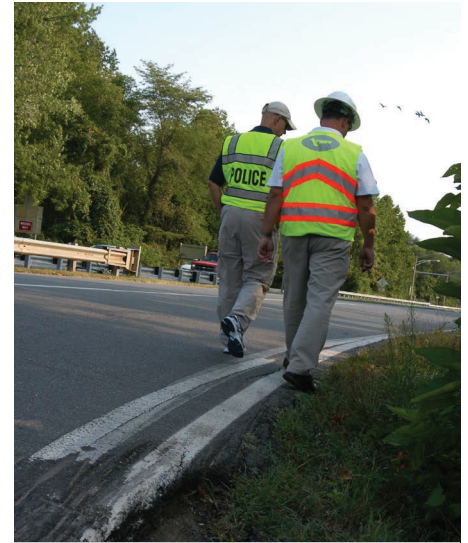
Source: *Road Safety Audits: An Evaluation of RSA Programs and Projects*, FHWA-SA-12-037; and *FHWA Road Safety Audit Guidelines*, FHWA-SA-06-06.

While most transportation agencies have established traditional safety review procedures, a road safety audit (RSA) is unique. RSAs are performed by a multi-disciplinary team independent of the project. RSAs consider all road users, account for human factors and road user capabilities, are documented in a formal report, and require a formal response from the road owner. (See the eight steps for conducting an RSA below.)

RSAs provide the following benefits:

- Reduced number and severity of crashes due to safer designs.
- Reduced costs resulting from early identification and mitigation of safety issues before projects are built.
- Improved awareness of safe design practices.
- Increased opportunities to integrate multimodal safety strategies and proven safety countermeasures.
- Expanded ability to consider human factors in all facets of design.

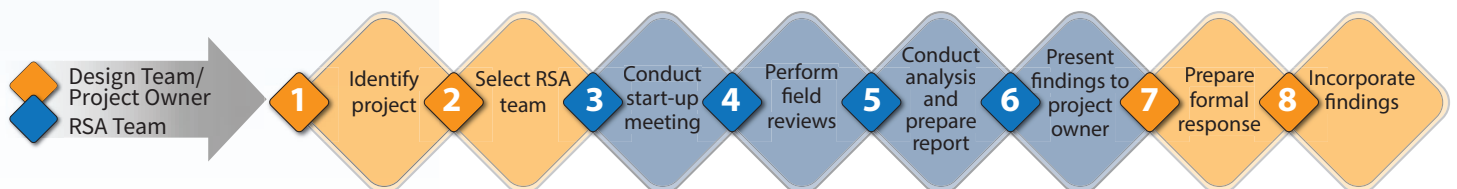
RSAs can be performed in any phase of project development, from planning through construction. RSAs can also be conducted on any size project, from minor intersection and roadway retrofits to large-scale construction projects. Agencies are encouraged to conduct an RSA at the earliest stage possible, as all roadway design options and alternatives are being explored.



Multi-disciplinary team performs field review during an RSA.

Source: FHWA

CONDUCTING AN RSA



→ For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://safety.fhwa.dot.gov/provencountermeasures>.





Local Road Safety Plans

Local roads experience

3x the fatality rate
of the
Interstate Highway System.

Source: FARS and FHWA Highway Statistics Series (2014)



Source: Delaware Valley Regional Planning Commission

A local road safety plan (LRSP) provides a framework for identifying, analyzing, and prioritizing roadway safety improvements on local roads. The LRSP development process and content are tailored to local issues and needs. The process results in a prioritized list of issues, risks, actions, and improvements that can be used to reduce fatalities and serious injuries on the local road network.

While local roads are less traveled than State highways, they have a much higher rate of fatal and serious injury crashes. Developing an LRSP is an effective strategy to improve local road safety for all road users and support the goals of a State's overall strategic highway safety plan.

Although the development process and resulting plan can vary depending on the local agency's needs, available resources, and targeted crash types, aspects common to LRSPs include:

- Stakeholder engagement representing the 4E's – engineering, enforcement, education, and emergency medical services, as appropriate.
- Collaboration among municipal, county, Tribal, State and/or Federal entities to leverage expertise and resources.
- Identification of target crash types and crash risk with corresponding recommended proven safety countermeasures.
- Timeline and goals for implementation and evaluation.

Local road agencies should consider developing an LRSP to be used as a tool for reducing roadway fatalities, injuries, and crashes.¹ The plan should be viewed as a living document that can be updated to reflect changing local needs and priorities.

¹ *Developing Safety Plans: A Manual for Local Rural Road Owners*, FHWA-SA-12-017, provides guidance on developing an LRSP.



→ For more information on this and other FHWA Proven Safety Countermeasures, please visit <https://safety.fhwa.dot.gov/provencountermeasures>.



