



# STRATEGIC HIGHWAY SAFETY PLAN

*2016 Revision*

As required by 23 U.S.C. § 148 (c)(1), the Indiana Strategic Highway Safety Plan (SHSP) identifies significant highway safety problems and opportunities for saving lives, reducing suffering, and limiting economic losses resulting from traffic crashes. It guides the types of roadway infrastructure countermeasures that are preferred for use of federal Highway Safety Improvement Program funding to reduce the risks associated with the physical environment. It is coordinated with the traffic safety activities of state agencies, municipal entities, and other highway safety interests.

Indiana Department of Transportation

3/1/2016

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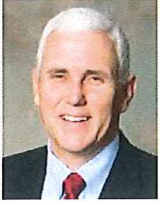
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## SIGNATORY'S LETTER



Michael R. Pence,  
Governor of Indiana

Improving highway traffic safety is essential, not only for the health of those that travel Indiana's roads and highways but also for our state's economic well-being. Traffic crashes in Indiana during 2015 claimed more than 800 lives and sent more than 18,000 others to hospitals for treatment. Those facts alone are staggering, but when long-term healthcare costs and lost productivity due to these crashes are calculated, the comprehensive societal costs to our state are in excess of five billion dollars.

Indiana's Strategic Highway Safety Plan serves as a data-driven assessment of the condition of traffic safety to inform multidisciplinary efforts designed to make our highway system safer to travel. Its central purpose is to guide application of infrastructure countermeasures to reduce the risks of crashes that result in deaths and serious injuries by preventing their occurrence or reducing their severity. It coordinates with other efforts, to educate our drivers, to make and enforce our traffic laws, and to ensure a speedy emergency medical response that brings those injured in crashes to appropriate care so that we may save more lives and ease suffering when crashes do occur.

Indiana traffic safety professionals work every day to save lives, reduce suffering, and minimize economic loss. The disciplines of engineering, education, enforcement, and emergency medical response, need the support of everyone on the road. Please join in the move toward zero deaths effort and always exercise care and consideration when driving, biking, or walking our Hoosier roadways.

A handwritten signature in black ink that reads "Michael R. Pence". The signature is fluid and cursive, with a long horizontal stroke at the end.



National Strategy On Highway Safety™

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[TowardZeroDeaths.org](http://TowardZeroDeaths.org)

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# 1 EXECUTIVE SUMMARY

## Why is this plan necessary?

Indiana's authority to expend federal Highway Safety Improvement Program (HSIP) funds requires implementing a Strategic Highway Safety Plan (SHSP). It is a statewide coordinated safety plan for reducing highway fatalities and serious injuries on all public roads. As a living document, it provides decision makers with information related to the safety performance of the Indiana highway system. This enables consideration of safety issues as part of highway project planning. With a vision of reducing the risk of fatal and serious injury crashes, and a goal of moving toward zero highway crash deaths, the SHSP seeks improvement of travel safety for all users of our public streets, roads, and highways. It is one of the guides supporting Indiana's mission to build, maintain, and operate a superior transportation system enhancing safety, mobility, and economic growth.

In this plan, Indiana adopts language specifically identifying its highway traffic safety goal as a move Toward Zero Deaths (TZD). This language mirrors the branding of the national goal, adopted by both the American Association of State Highway and Transportation Officials (AASHTO) and the Federal Highway Administration (FHWA). Although incredibly difficult, some might say impossible, the only acceptable way to approach highway traffic safety is with a goal of eliminating highway traffic deaths.

## What the Strategic Highway Safety Plan (SHSP) is and is not

The Strategic Highway Safety Plan (SHSP) is not a standard, policy, or legal document that makes or mandates specific traffic safety decisions. The Indiana SHSP informs decision-makers by providing data related to the safety of the highway system. Decision makers can then consider safety issues explicitly along with all other factors that influence highway project management.

Motor vehicle crashes result from combinations of various contributing factors that fall into general groups, the person, the vehicle (or mode of transportation choice), and the physical environment. Another group of contributing factors is related to the cultural environment, essentially how people and society view and respond to road use choices and crashes.

The Indiana SHSP describes broad strategies to eliminate or reduce roadway safety hazards identified through analysis of traffic crash data as well as the risk of severe crashes due to changes in road use. This is accomplished by examining where, how, with what motor vehicles crash. Specifically, it aids in prioritizing the types of projects for which federal HSIP funding is used. It does not identify individual projects, nor does it establish policy for the application of specific countermeasures.

## The Indiana Highway Safety Improvement Program of projects (HSIP)

The Indiana HSIP is the listing of individual safety projects that utilize Highway Safety Improvement Program funding. Indiana is required to report annually to the FHWA on the safety projects in development as well as progress made implementing highway safety improvements and their effectiveness in reducing fatalities and serious injuries on all public roads, which it reports to Congress. The FHWA establishes the intent and purpose of these individual state generated reports. It makes the state's reports available to the public on the FHWA Web site.

<http://safety.fhwa.dot.gov/hsip/reports/>

## Partners in traffic safety

The SHSP coordinates with other highway safety plans utilizing funding regulated by other US Department of Transportation agencies. This is to promote complimentary efforts. For example, a vehicle running off the roadway could be addressed by:

- Educational outreach regarding driver inattention or impairment
- Law enforcement of speeding, texting-cell phone use, or driving under the influence
- Engineering of lane boundaries that provide improved driver visual and tactile feedback



A single approach to address the problem by one traffic safety discipline is often not as effective as multiple countermeasures applied by several disciplines.

### **The Indiana Highway Safety Plan (HSP)**

The Indiana Criminal Justice Institute (ICJI) administers the HSP, which has a focus primarily on driver behavior issues and funds education and targeted law enforcement countermeasure activities. The HSP establishes an annual program of activities that utilize funds regulated by the National Highway Transportation Safety Administration (NHTSA) for awareness and enforcement projects, such as speed enforcement, drug and alcohol detection, seat belt and child seat use, as well as other unsafe driver choices.

### **The Commercial Vehicle Safety Plan (CVSP)**

Indiana State Police administers the CVSP, which is a specialized enforcement plan targeting safety of commercial vehicles. It is an annual program of inspection and enforcement activities, which utilize funds granted by the Federal Motor Carrier Safety Administration (FMCSA) to enforce commercial truck and bus regulations.

### **Other Stakeholders in Traffic Safety**

Other state agencies, local public agencies, and others are stakeholders in working toward the safe use of roadways by people driving, riding, or walking. Some include, but are not limited to:

*The Indiana Department of Homeland Security (IDHS)*  
*The Indiana Department of Health (DOH)*

The advancement of emergency medical response as a means to improve the survival and recovery of those people seriously injured in traffic crashes is a rapidly developing traffic safety discipline. Currently, DOH and the IDHS are partners providing transport and treatment data for a trauma registry, as well as fire and EMS reporting systems. Both of these data systems receive federal funding support through the HSP. One strategy of the National TZD initiative is to develop and improve coordination between the rescue, medical transport, and public health communities, to improve injury surveillance practices that better develop, implement, and evaluate state, regional, and local safety plans.

### *Indiana Operation Lifesaver (OLI)*

Operation Lifesaver's mission is to end collisions, deaths, and injuries at highway-rail grade crossings and on rail property through a nationwide network of volunteers who work to educate people about rail safety. Indiana Operation Lifesaver works toward educating the public about the dangers at highway-rail grade crossings and railroad rights-of-way through free presentations made by trained and certified volunteer presenters. The program strives to improve driver and pedestrian behavior at railroad crossings by encouraging compliance with traffic laws relating to crossing signs and signals. In addition to its education program, OLI encourages the enforcement of existing traffic and trespassing laws.

### *Indiana Local Transportation Assistance Program (LTAP)*

A partnership between LTAP and INDOT created the Hazard Elimination Project for Existing Roads and Streets (HELPERs) program. The goal of HELPERs is to reduce the number and severity of crashes in Indiana by identifying traffic safety concerns on local roads and providing low-cost solutions to address them. HELPERs provides free assistance to local public agencies seeking federal funds to implement traffic safety improvements. Agencies eligible for HELPERs assistance are towns, cities (with a population less than 50,000), and counties located outside of Metropolitan Planning Organizations (MPO) areas.

### *Indiana Metropolitan Planning Organization (MPO) Council*

The Indiana MPO Council is a peer group for MPOs to discuss issues, share solutions, and to provide consensus for MPO interests regarding transportation and planning issues. It is important that the emphasis areas in the SHSP focus appropriately on the widest variety of roadway safety needs, as MPO member local public agencies are major users of HSIP funding.

### **What crash data is used to determine emphasis areas?**

Input from consulting parties indicate the need to answer certain frequently asked questions regarding results of the crash data analysis that leads to selection of Indiana's Traffic Safety Emphasis Areas.

Crash records for the most recently ended five-year period (between January 1, 2010 and December 31, 2014) in the state's traffic crash database as of July 2015 serve as the raw data used to assess the state's highway safety performance for this SHSP. This "Snapshot" of data includes every crash from across the state regardless of severity. Approximately, 80 percent of all crashes resulted in no injury. The remaining roughly 20 percent of crashes resulted in at least one injury of varying severity.

**Q - With what do drivers collide most frequently?**

**A - Another motor vehicle (two out of every three crashes)**

**Q - What is the most frequent manner of collision when two vehicles crash?**

**A - One vehicle crashes into the rear of another (about one crash in four)**

**Q - Where on roadways are vehicle vs. vehicle crashes occurring?**

**A - 53% have no junction involved, 41% at an intersection of 3 or more approaches**

**What else does the pool of all crashes reveal?**

Just over one out of five crashes involves a vehicle leaving the roadway and colliding with a wide range of roadside objects ranging from road signs and trees, to concrete barriers and buildings.

Other than crashes with another motor vehicle or running off road into an object of some kind, striking a deer is the most frequently occurring type of collision.

**On what should the SHSP focus?**

The Indiana SHSP is not intended to address every traffic safety problem; instead, it seeks to identify the combination of contributors, crash types, and roadway environments that combine to result in the greatest frequency and severity of crashes. The focus of the SHSP is on reducing crashes that result in death or serious injuries on publicly maintained roadways. Rather than attempt to eliminate all crashes resulting in property damage only or minor injuries (those not requiring immediate transport from the scene for treatment), focus is placed on "Severe Crashes," those resulting in either a fatality or incapacitating injury. The most frequently occurring severe crash types, manners of collision, and locations of these is slightly different.

**Q - With what do drivers collide most frequently in severe crashes?**

**A - Among severe crashes, approximately half are with another motor vehicle.**

**Q - What is the most frequent manner of collision in vehicle-to-vehicle severe crashes?**

**A - The most frequent manner of severe collision with another motor vehicle is a right-angle crash.**

**Q - Where on roadways do vehicle-to-vehicle severe crashes occur most frequently?**

**A - The most frequently occurring location of severe vehicle-to-vehicle collisions is at an intersection.**

**Q - What else does the pool of severe crashes reveal?**

**A - Two out of five severe crashes involve a single vehicle leaving the roadway.**

**After examination of the crash data, what emphasis areas are in the SHSP?**

- 1. Data and Information Systems for Traffic Safety Decision Making**
- 2. Roadway Departure Crashes**
- 3. Intersection Crashes**
- 4. Motorcycle Involved Crashes**
- 5. Bicycle Involved Crashes**
- 6. Pedestrian involved Crashes**
- 7. Highway-Rail Grade Crossing Crashes**
- 8. Large Truck Involved Crashes**
- 9. High-Speed Multi-Lane Roadway Rear-End Collisions**
- 10. Work Zone Involved Crashes**
- 11. Human Behavior Contributors to Crashes**
- 12. Older Drivers & Pedestrians**



## 2 TOWARD ZERO DEATHS

The Strategic Highway Safety Plan (SHSP) is not a standard, policy, or legal document that makes or mandates specific traffic safety decisions. The Indiana SHSP informs decision makers by providing data related to the safety of the highway system. Decision makers can then consider safety issues explicitly along with all other factors that influence highway project management.

Most states have adopted a mission, vision, or goal to reduce fatal traffic crashes to zero. Many of the programs to reach that goal carry names such as Vision Zero, Target Zero, or Toward Zero Deaths (TZD). The national highway traffic safety strategy now adopted by the American Association of State Highway and Transportation Officials (AASHTO) as well as other transportation and safety groups uses the TZD branding. These organizations lead the national TZD effort:

- American Association of Motor Vehicle Administrators (AAMVA)
- American Association of State Highway and Transportation Officials (AASHTO)
- Commercial Vehicle Safety Alliance (CVSA)
- Governors Highway Safety Association (GHSA)
- International Association of Chiefs of Police (IACP)
- National Association of County Engineers (NACE)
- National Local Technical Assistance Program Association (NLTAPA)
- National Association of State Emergency Medical Services Officials (NASEMSO)

With this SHSP, Indiana joins with other states and these organizations by adding language for its traffic safety program adopting the overarching objective of moving toward zero deaths.

The intended results are:

- Safer drivers, passengers, cyclists, and pedestrians
- Safer infrastructure
- Safer vehicles
- Enhanced emergency medical services and response
- Improved management of traffic safety programs

### **Mission**

**Reduce travel risk for all users of Indiana's streets, roads, and highways.**

### **Vision**

**Reduce the risk of death or serious injury resulting from traffic crashes.**

### **Goal**

**Move toward zero deaths resulting from traffic crashes.**

### 3 PERFORMANCE MEASURE

At the national level, the desired progress traffic safety practitioners hope to attain is, by 2027, to have cut the number of fatalities recorded in 2007 by one-half. For Indiana, that 2027 target is 450 traffic deaths.

This SHSP's performance measure of moving toward zero deaths evaluates the 5-year moving average of fatality crashes. The desired reduction in the 5-year moving average of fatality crashes over the period of this plan is a target of 544 by 2020.

### 4 CRASH DATA ANALYSIS

#### Common Source for Crash Data

The raw crash data analyzed to determine the emphasis areas for the Indiana SHSP is contained in the Electronic Vehicle Crash Reporting System (eVCRS) maintained by the Indiana State Police. Public agency users commonly refer to the database as "ARIES," which stands for Automated Reporting Information Exchange System, which is the acronym of the Internet portal providing access to the data. ICJI and ISP use the ARIES crash report database in developing the HSP and CVSP. Additionally, it is the original data source used by ISP to report crashes into the Fatality Analysis Reporting System (FARS) national database maintained by NHTSA, which serves as the standardized federally recognized count of fatalities.

Two other federally maintained crash databases supplement Indiana crash report data, for developing the SHSP. The Railroad Accident/Incident Reporting System (RAIRS) maintained by the Federal Railroad Administration (FRA) Office of Safety Analysis, which contains information on highway-rail grade crossing collisions, and the Motor Carrier Management Information System (MCMIS) maintained by the FMCSA, which tracks commercial vehicle collisions.

#### Severe Crash

The federal code enabling the funds for the Highway Safety Improvement Program directs that states use the money to reduce the risk of deaths and serious injuries resulting from traffic crashes. Unlike fatalities however, as of the writing of this SHSP, there is no nationally standardized definition for what constitutes a "Serious Injury," consequently the FHWA has left that for individual states to determine.

Indiana uses the definition of "Incapacitating Injury" based upon the 3<sup>rd</sup> edition (2008) of the Minimum Model of Uniform Crash Criteria, "Any injury, other than a fatal injury, which prevents the injured person from walking, driving or normally continuing the activities the person was capable of performing before the injury occurred," as the criteria for a serious injury. This provides the reporting officer an immediate and easily ascertainable criteria for assessing severity of the crash (was a crash participant transported from the scene for immediate medical treatment). [Note that the fourth edition of the MMUCC revised the names and criteria of injury severity] ISP implemented this criterion for incapacitating injury in the most recent ARIES crash report client software in October 2014, after review with the Traffic Records Coordinating Committee (TRCC).

By combining the count of fatal crashes with a count of crashes producing an incapacitating injury, Indiana has a uniform unit (Severe Crash) with which to evaluate contributing factors generating Indiana's greatest crash problems. When traffic crash reports in ARIES are analyzed for contributing factors, the total number of severe crashes for a given contributor is divided by the total number of severe crashes over the period examined, which produces the percentage that factor contributes toward all severe crashes.



## 5 EMPHASIS AREAS

1. **Data and Information Systems for Traffic Safety Decision Making**
2. **Roadway Departure Crashes**
3. **Intersection Crashes**
4. **Motorcycle Involved Crashes**
5. **Bicycle Involved Crashes**
6. **Pedestrian Involved Crashes**
7. **Highway-Rail Grade Crossing Crashes**
8. **Large Truck Involved Crashes**
9. **High-Speed Multi-Lane Roadway Rear-End Collisions**
10. **Work Zone Involved Crashes**
11. **Human Behavior Contributors to Crashes**
12. **Older Drivers & Pedestrians**

The SHSP's intent is to focus attention on emphasis areas that represent the state's greatest roadway crash prevention or mitigation needs. INDOT used a simplified Failure Modes and Effects Analysis (FMEA) to examine police crash reports, first classifying them by the "crash type." This classification includes an examination of:

- With what does the motor vehicle crash (an object, another motor vehicle, pedestrian, etc.)
- How the motor vehicle crashes (turning, rear-end, head-on, etc.)
- Where the motor vehicle crashes (intersection, non-junction, etc.)
- What unit or mode of travel is involved (vehicle type, pedestrian, bicycle, etc.)

The respective counts of occurrences of these crash types are then ranked by frequency of occurrence and the likelihood of death or serious injury.

For example, one of the most frequent types of crashes is a collision with a deer. However, those crashes do not often result in death or serious injury. Consequently, deer crashes are not identified as an emphasis area. Conversely, there are few collisions between a train and a motor vehicle, bicycle, or pedestrian at grade crossings. However, there is a high likelihood that a death or serious injury will result from those crashes, therefore grade crossing crashes are identified as an emphasis area.

A single crash may be counted as contributing to several emphasis areas. For example, a motorcycle that runs off road striking a fence would appear in counts of motorcycle-involved crashes, run-off-road crashes, and any environmental or driver behavior contributors, etc.

Countermeasures or mitigations for a crash type can be combinations of actions or projects directed at the roadway environment, the travel mode (vehicle or non-vehicle) involved, and the individuals involved. For example, when a vehicle departs the roadway and collides with an object (assuming this was not the result of a mechanical failure of the vehicle) roadway infrastructure countermeasures could include visual and tactile warning of the roadway or lane boundaries. Mitigation for such a crash could include making the roadside more forgiving, by marking or removing obstacles, or placing crash attenuating barriers between the vehicle and obstructions. Human behavior countermeasures could encompass education and or law enforcement regarding actions that result in a driver losing control of the vehicle, including excess speed, impairment, or distraction.

Strategies noted in the SHSP are representative of those being pursued at the national level as part of TZD. Specific infrastructure, education, and enforcement projects or activities are identified for funding annually by their respective plans or programs.

Projects eligible for FHWA regulated HSIP funding are covered by Highway Safety Improvement Program project selection guidance (<http://www.in.gov/indot/files/LocalHSIPProjectSelectionGuidance.pdf>), which details how projects seeking HSIP funding must:

- Address an emphasis area of the SHSP
- Provide a data-driven analysis of need

- Provide evidence of cost effectiveness such as the safety benefits versus the project's lifecycle cost

Some types of low-cost improvement projects, that treat a roadway condition on a system-wide basis rather than at a single location, have demonstrated to provide a very great benefit to safety. Due to that fact, certain pre-selected types of systematic improvements require less documentation as a means to encourage their application. Examples include:

- Replacing dated warning and regulatory signage with new signage meeting Manual of Uniform Traffic Control Devices (MUTCD) retroreflectivity standards
- Improving traffic signal yellow interval, or all red timing or system interconnection
- Adding FHWA recommended High Friction Surface Treatments (HFST) to spot locations at intersections or curves

The Indiana Criminal Justice Institute determines education and enforcement activities eligible for NHTSA regulated funding annually in the HSP. It should be noted that non-infrastructure projects of certain types might also be eligible for HSIP funds. Traffic safety non-infrastructure projects are those that do not result in construction and might include road safety audits, improvements in the collection and analysis of data, education and outreach efforts, or targeted law enforcement activities. Similar to infrastructure-related projects, non-infrastructure traffic safety projects must be consistent with this SHSP, be based on crash experience, crash potential, crash rate, or other data-supported means, and support Indiana's traffic safety performance targets.

The Traffic Safety Division of the Indiana Criminal Justice Institute (ICJI), in conjunction with the Indiana Governor's Council on Impaired and Dangerous Driving, annually develops a set of benchmarks as part of the Highway Safety Plan (HSP) to assess the state of traffic safety in Indiana. These benchmarks correspond to priority program areas established by the National Highway Traffic Safety Administration (NHTSA), targeting the occurrence of fatal and injury collisions as they relate to injuries overall, impaired driving, safety equipment usage, young drivers, motorcycle safety, dangerous driving, children, and non-motorist injuries in collisions. Within each area, ICJI establishes specific annual goals and performance measures that relate to the occurrence of collisions and their impact on Indiana. ICJI also works closely with INDOT to ensure consistency in goal setting exists between the ICJI HSP, which approaches traffic safety from a policy and law enforcement perspective, and INDOT's SHSP, a document that approaches traffic safety from an engineering and transportation planning perspective.

Each year, ICJI develops a set of specific short-term and long-term goals to be included in the HSP for each Indiana problem area, and consistent with NHTSA's priority program areas. To assist with this effort, ICJI contracts with the Indiana University Public Policy Institute to prepare a set of baseline measures annually, utilizing that year's most recent crash data, as well as historical data, maintained in the Indiana State Police in ARIES. Additionally, ICJI contracts for the annual production of traffic safety fact sheets on specific issues of special concern. <https://secure.in.gov/cji/index.htm>

Enforcement activities eligible for FMCSA regulated funding are included in the CMVSP produced annually by the ISP. By identifying corridors exhibiting high numbers of commercial vehicle involved crashes, ISP endeavors to target aggressive traffic enforcement. This identification of problem areas and behaviors for the motoring public is an effort to increase voluntary compliance with traffic laws. <https://secure.in.gov/isp/index.htm>

The SHSP, as a multi-year plan, looks at multiple years of crash data. In the case of this plan, the most recent five full years of data, 2010 through 2014. The data represents the officer's official recording of the data. This allows for an evaluation of, not only the crashes, but of the data elements and their manner of collection as well.



**Table 1 Crash Emphasis Area Percentage Contribution to All Severe Crashes (ARIES)**

	2010	2011	2012	2013	2014	Average
Roadway Departure*	48.6%	48.4%	50.9%	45.7%	47.9%	48.30%
Intersections	25.6%	22.9%	22.9%	21.8%	25.4%	23.72%
Motorcycle/Mopeds	15.3%	17.2%	20.1%	15.6%	16.4%	16.92%
Pedestrians	8.3%	9.6%	9.1%	9.9%	11.3%	9.64%
HS Multi-Lane Rear-End	2.9%	2.7%	2.0%	3.4%	3.8%	2.96%
Bicycle	1.9%	1.8%	1.8%	2.0%	1.8%	1.86%
Work Zones	1.7%	2.5%	1.4%	1.9%	1.4%	1.78%

\*Includes Run Off Road and Head-on/Sideswipe w/another motor vehicle

**Table 2 Highway-Rail Grade Crossing Crashes (FRA)**

	2010	2011	2012	2013	2014
All Highway-Rail Crashes	114	119	111	92	122
Public Crossing Crashes	110	117	108	85	118
Private Crossing Crashes	4	2	3	7	4
Injuries	42	43	31	34	50
Deaths	9	10	13	15	9
Public Crossing Crashes w/Active Warning	71	79	83	67	85
Flashing Lights Only	19	22	24	15	27
Gated	52	57	57	52	58
% Public Crossing Crashes w/Active Warning	64.55%	67.52%	76.85%	78.82%	72.03%
% at Gated	47.27%	48.72%	52.78%	61.18%	49.15%
% at Flashing Light Only	16.67%	18.49%	21.62%	16.30%	22.13%

**Table 3 Large Truck Crashes (FMCSA/FARS)**

	2010	2011	2012	2013	2014
# of Large Truck involved fatal crashes	101	121	107	94	111
% of all fatal crashes Large Truck involved	14.45%	17.90%	14.56%	12.63%	15.68%
# of Fatalities in Large Truck involved crashes	115	149	118	110	127
% of all fatalities Large Truck involved	15.29%	19.87%	14.77%	13.46%	16.87%



## 5.1 Data and Information Systems for Traffic Safety Decision Making

The first emphasis area selected focuses attention not on any specific crash type, but rather improving the scope, quality, and quantity of available data that helps identify the problems themselves. The "Moving Ahead for Progress in the 21st Century Act" (MAP-21) (P.L. 112-141), directs all states to improve their capabilities of safety data collection, integration, and system-wide analysis to support traffic safety program planning and performance management.

Further, the data systems must complement the National Highway Traffic Safety Administration's Highway Safety Program (HSP) under 23 U.S.C. 402, and the Federal Motor Carrier Safety Administration's Commercial Vehicle Safety Plan (CVSP) under 49 U.S.C. 31102. [23 U.S.C. 148 (c)(2)(D)(i)]. Review of highway traffic safety data needs and funding projects in the Indiana Traffic Records Strategic Plan is the responsibility of Indiana's Traffic Records Coordinating Committee (TRCC). Indiana TRCC includes representatives from the ICJI, ISP, and INDOT, as well as the Indiana Department of Health (DOH), The Indiana Department of Education (DOE) and Bureau of Motor Vehicles (BMV) and others.

Indiana's traffic crash reporting system is electronic after decades as a paper-based system. It is undergoing a complete revision, not only of the computer code that operates it, but also of the information collected by law enforcement officers at the crash scene. Changes in the makeup of roadway users reveal the need for improvement. For example, there are vehicles now regularly using public roads that were not considered when paper-based motor vehicle crash reports were established. At some locations on Indiana roadways today one can find every sort of vehicle (or transportation mode) from large trucks to pedestrians, as well as from golf carts to bicycles, and also conventional internal combustion powered vehicles to nearly silent all-electric powered vehicles. Reporting officers today can only code these as "vehicle type unknown" reducing the information available for system-wide crash analysis.

Connected systems are in development nationally that will likely change vehicles and roadway infrastructure in the near future. Crash reports need to anticipate vehicle to vehicle and infrastructure to vehicle systems that provide real-time information to drivers or if there is even a human driver controlling a vehicle at all.

Additionally, methods are in development to link crash reports to other traffic safety related databases, which will offer new insights into crash countermeasures and their relative effectiveness.

### *National Toward Zero Deaths Strategies*

- *Improve the accuracy and completeness of crash location information for all public roads*
- *Establish and maintain data clearinghouses*
- *Broaden data collection practices to capture different system users (pedestrians, bicyclists, motorcyclists, older drivers, teen drivers, etc.)*
- *Implement "One Driver, One Record" and implement system to notify proactively commercial vehicle companies when there is a status change to a truck or bus driver's record*
- *Implement the National Emergency Medical Services Information System (NEMSIS) at state and local levels*
- *Maintain and link data systems from different stakeholders and improve access to linked data*
- *Adopt and implement for nationwide use data dictionaries, guidelines and standards, including Model Minimum Uniform Crash Criteria, Model Inventory of Roadway Elements, NEMSIS and the Fundamental Roadway and Traffic Data Elements to Improve the Highway Safety Improvement Program*
- *Collect and analyze real-time ITS data to support fatality reduction*
- *Develop data analysis methods and tools for use at the state, regional, and local levels across different stakeholders, including cost benefit analysis for behavioral programs*



- *Implement analysis tools that support data-driven decision making, including the Highway Safety Manual, the Interactive Highway Safety Design Model, road safety assessment programs, and mapping tools*
- *Develop and implement enhanced analysis tools for determining factors contributing to crashes*
- *Improve the injury severity reporting of persons involved in motor vehicle crashes*
- *Advance the science of crash data analysis and modeling (including crash prediction models, severity distribution prediction, and risk-based modeling)*
- *Implement and integrate injury surveillance practices into the evaluation and monitoring of safety plans at the national, state, and local levels*
- *Assess and track motor vehicle crash-related traumatic brain injury (TBI)*

## 5.2 Roadway Departure Crashes

The FHWA defines a roadway departure crash as a non-intersection crash that occurs after a vehicle crosses an edge line, a median, or a centerline, or otherwise leaves the traveled way. Over the most recent five full years, roadway departure crashes contributed about 50% of the total annual severe crashes.

### *National Toward Zero Deaths Strategies*

- *Install shoulder and centerline rumble stripes to reduce the risk of lane departure fatalities*
- *Install median barrier systems, crash cushions, and guardrail end-treatments to reduce the severity of lane departure fatalities*
- *Install retroreflective signing and pavement markings to reduce the risk of lane departures*
- *Install high friction surfacing, in particular at curves*
- *Create physical separation of oncoming traffic on high crash potential two-lane roads (2+1 designs)*
- *Implement landscaping policies that prevent planting of new trees in the clear zone in urban or rural areas, or in the median of divided highways where cable barriers have been installed (or will be installed)*
- *NOTE: Safety Edge® (an angled surface at the roadway edge to improve control for drivers that turn back on the road after drifting off a roadway) has been adopted as a standard practice for paving in Indiana*

## 5.3 Intersection Crashes

Between 2010 and 2014, on average, intersection crashes contributed 25% of the total annual severe crashes.

### *National Toward Zero Deaths Strategies*

- *Improve signing, markings, and lighting to increase driver awareness of intersections*
- *Improve signal timing by adding protective left-turn phases, improving clearance intervals, and coordinating signals*
- *Redesign intersections to reduce conflicts and to reduce exposure to crashes, including constructing restricted crossing U-turn intersections, roundabouts or removing skews*
- *Install technologies that warn drivers of potential conflicts and/or assist them in choosing appropriate gaps in traffic at intersections*
- *Implement innovative intersection (e.g., median U-turn forms) and interchange (e.g., diverging diamond) designs to reduce the risk of fatalities*
- *Consider implementation of roundabouts where appropriate*

## 5.4 Highway-Rail Grade Crossing Crashes

A highway-rail grade crossing is a special intersection of two modes of transportation that must share the crossing. Indiana has roughly 57-hundred public highway-rail grade crossings, which ranks it among the top ten states with the most public grade crossings. Note that Indiana has no authority to regulate or protect an additional nearly 19-hundred private grade crossings.

The Rail Safety Improvement Act of 2008 required Indiana to create a five-year action plan to identify specific solutions for improving safety at highway-rail grade crossings. The FRA approved Indiana's action plan in 2012. The act directs the plan to consider crossing closures or grade separations as countermeasures, and further requires a focus on crossings that either have experienced multiple crashes or are at high risk for crashes.

In recent years, three out of four grade crossing crashes in Indiana take place where train-activated warning devices (highway traffic signals, flashing lights, or flashing lights and gates) are in operation. Half of all grade crossing crashes take place at gated crossings.

It is imperative that local agencies responsible for maintaining roads crossing railroads at grade not rely solely on INDOT administered funding set aside under 23 U.S.C. § 130, for addition of train-activated warning devices. Use of this program, while highly desirable because a local match for federal funds is not required, is limited to crossings determined to be most at risk for collisions. Given the funding levels at the time of this document's writing, INDOT can only address twenty to thirty crossings annually with this fund.

### *National Toward Zero Deaths Strategies*

- *None*

### *Infrastructure Countermeasures:*

- *Close redundant crossings*
- *Grade separation where cost-effective*
- *Grade crossing warning device improvements*
- *Define and identify rail corridor improvement priorities*

## 5.5 Large Truck Crashes

In recent years, large trucks have typically been involved in 15-20% of all fatal crashes.

### *National Toward Zero Deaths Strategies*

- *Create adequate truck and bus parking facilities, and develop a nationwide system to provide truck parking availability to assist truck and bus drivers in locating available facilities*

## 5.6 Motorcycle/Moped Involved Crashes

In 2013, motorcycles made up just 4% of vehicle registrations in Indiana, and less than 1% of vehicle miles of travel, yet motorcycles and mopeds have typically been involved in 15-20% of all severe crashes.

### *National Toward Zero Deaths Strategies*

- *Implement infrastructure/roadway improvements to reduce conflicts with motorcyclists*
- *Improve roadway and intersection design to reduce risk of motorcyclist fatalities*
- *Improve traffic control devices to reduce risk of motorcyclist fatalities*
- *Develop and use new design guidelines to reduce risk of motorcyclist fatalities*



## 5.7 Bicycle Involved Crashes\*

In recent years, bicycles have typically been involved in about 1-2% of all severe crashes.

### *National Toward Zero Deaths Strategies*

- *Implement infrastructure improvements to reduce factors contributing to crashes with bicyclists*
- *Improve roadway and intersection design to reduce risk of bicyclist fatalities*
- *Improve traffic control devices to reduce risk of bicyclist fatalities*
- *Develop and use new design guidelines to reduce risk of bicyclist fatalities*
- *Implement infrastructure/roadway improvements to support speed management to reduce risk of bicyclist fatalities*
- *Implement infrastructure/roadway improvements to reduce conflicts with bicyclists*

## 5.8 Pedestrian Involved Crashes\*

In recent years, pedestrians have typically been involved in just under 10% of all severe crashes.

### *National Toward Zero Deaths Strategies*

- *Consider pedestrians with disabilities in the design of pedestrian facilities*
- *Implement infrastructure/roadway improvements to support speed management to reduce risk of pedestrian fatalities*
- *Implement infrastructure/roadway improvements to reduce factors contributing to crashes with pedestrians*
- *Improve traffic control devices to reduce risk of pedestrian fatalities*
- *Develop and use new design guides and guidelines to reduce risk of pedestrian fatalities*
- *Implement infrastructure/roadway improvements to reduce factors contributing to crashes with bicyclists*
- *Improve roadway and intersection design to reduce risk of bicyclist fatalities*
- *Improve traffic control devices to reduce risk of bicyclist fatalities*
- *Develop and use new design guidelines to reduce risk of bicyclist fatalities*
- *Implement infrastructure/roadway improvements to support speed management to reduce risk of bicyclist fatalities*
- *Implement infrastructure/roadway improvements to reduce conflicts with bicyclists*

\*In 2015, FHWA named Indiana a Pedestrian/Bicycle Focus State. FHWA evaluated the 50 cities with the largest number of pedestrian/bicycle-involved fatalities (those with an annual average of approximately 10 or more fatalities). Indianapolis was among those designated a Pedestrian/Bicycle Focus City. These Focus Cities are among the top 20 cities for number of fatalities or have a fatality rate per population greater than the average of the top 50 cities. States that contain a Pedestrian/Bicycle Focus City are designated Pedestrian/Bicycle Focus States.

## 5.9 High-Speed Multi-Lane rear-end collisions

High-speed multi-lane rear-end collisions are those occurring on both divided and undivided multiple lane roads having a posted speed limit of 55 mph or above. In recent years, these crashes have typically been involved in 3-4% of all severe crashes.

### *National Toward Zero Deaths Strategies*

- *Advance the practice of multidisciplinary incident management planning and training, involving EMS, fire, law enforcement, public works, transportation, towing and recovery, hazardous materials, and other personnel*
- *Include EMS agencies in traffic incident management planning and training*
- *Provide and improve real time route access awareness for emergency medical response agencies*
- *Plan and designate landing zones for air medical helicopters in high crash frequency/severity area*
- *Consider traffic signal pre-emption (for Emergency Vehicle Operations)*
- *Improve interoperability between 9-1-1 centers and traffic management centers Improve Incident Detection*

## 5.10 Work Zone Crashes

In recent years, work zone crashes have typically contributed 3-4% of all severe crashes.

### *National Toward Zero Deaths Strategies*

- *Improve work zone design and operations to reduce the risk of work zone fatalities*
- *Improve work zone speed management and enforcement to reduce the risk of work zone fatalities*



## 5.11 Human Behavior Factors

Traffic safety practitioners generally regard human factors, those that involve the driver's actions, as primary contributing factors in most crashes. These would include contributors such as:

- speeding and other moving violations or traffic laws
- use of alcohol or drugs, inattention, fatigue, decision errors
- inexperience or recklessness of youthful or new drivers

The traffic safety division of ICJI administers federal funds apportioned by NHTSA to support education and enforcement activities designed to reduce the number of people injured and killed in traffic crashes resulting from human factor contributors.

ICJI annually produces the HSP required by 23 U.S.C. § 402 (k) identifying the goals, objectives and strategies that will have the greatest impact on highway safety improvement. These measures can change based upon federal guidance and state initiatives. They are subject to annual amendment to adapt quickly to any emerging issues.

ICJI performs an annual detailed analysis of crash reports with findings summarized in a series of fact sheets on various aspects of traffic crashes, including alcohol-related crashes, light and large trucks, dangerous driving, children, motorcycles, occupant protection, and drivers. Additionally, ICJI publishes an annual Indiana crash fact book as well as a breakdown of crash facts at the county and municipal level. These publications assist stakeholders in making recommendations for effective policies, regulations, and laws.

## 5.12 Older Drivers & Pedestrians

MAP-21 directs states to assess safety performance of drivers and pedestrians aged 65 and older. FHWA regulations establishes a prescribed formula for making the assessment. If FARS fatalities and state defined incapacitating injuries per capita for drivers and pedestrians over age 65 increases during the most recent 2-year period for which data are available, a state is required to incorporate strategies focused on older drivers and pedestrians in its SHSP.

**Table 4 Older Drivers/Pedestrians Assessment\***

	2010			2011			2012			2013		
	Fatal	Incap	Total	Fatal	Incap	Total	Fatal	Incap	Total	Fatal	Incap	Total
Drivers & Pedestrians 65+ killed or incapacitated	110	209	319	100	237	337	104	217	321	102	249	351
People 65 Years of Age and Older (Per 1,000 Total Population)			130			131			136			139
Rate of Fatal and Serious Injuries per capita			2.5			2.6			2.4			2.5
5-Year Moving Average of Fatalities and Serious Injuries			2.4			2.4			2.4			2.4

\* As reported to FHWA August 31, 2015

With a population that is aging, it is advisable to approach adding considerations in highway infrastructure and safety countermeasures for older drivers and pedestrians proactively. This SHSP supports the implementation of design accommodations recommended in 'Handbook for Designing Roadways for the Aging Population' (FHWA-SA-14-015), and dated June 2014, or as subsequently revised and updated, such as pedestrian traffic signal timing, increased sign sizes, lighting, and other modifications as part of HSIP project countermeasure deployment.

[http://safety.fhwa.dot.gov/older\\_users/handbook/](http://safety.fhwa.dot.gov/older_users/handbook/)

### *National Toward Zero Deaths Strategies*

- *Implement roadway enhancements for older drivers*
- *Update design policies and practices for roadways and vehicles to reflect the needs of older drivers*

## 6 HIGH RISK RURAL ROADS (HRRR)

MAP-21 directs states to define the characteristics of their own HRRRs. Limited to rural major and minor collectors and rural local roads, states must define in their SHSPs what constitutes "significant safety risks".

### HRRR "Significant Safety Risks" Definition

Indiana defines a High Risk Rural Road as any rural major collector, rural minor collector, or rural local road by its roadway and intersection characteristics that have an association to severe crash types identified as emphasis areas of the SHSP, regardless of recorded frequency. For example, but not limited to:

- narrow lane and shoulder width
- steep or non-traversable roadsides
- substandard horizontal or vertical alignment
- roadside hazards (trees, utility poles, or sight-distance reducing vegetation)
- substandard warning and or regulatory signage (including advance RR warning)
- Inadequate or missing signs and or pavement markings (including advance RR warning)
- high-skew or otherwise unsafe intersections (with roadways, railroads, or bicycle-pedestrian paths)

### HRRR Special Rule

MAP-21 does not set aside funds for a HRRR program. However, a special rule requires states with an increase in fatality rates on rural roads to obligate 200% of its FY 2009 high-risk rural roads set-aside for HRRRs.

## 7 SHSP IMPLEMENTATION AND EVALUATION

Federal law directs state departments of transportation to develop and maintain SHSPs. In Indiana, the leadership of the respective agencies charged with administering US DOT apportioned federal funding are; the Commissioner of INDOT, the Superintendent of the ISP, and the Executive Director of ICJI. Together, they serve as the SHSP executive policy group.

INDOT, through the office of traffic safety, within the division of traffic engineering, is responsible for monitoring and facilitating the implementation and evaluation of the Indiana SHSP. The SHSP manager serves as the central coordinator and facilitator for the Indiana SHSP.

Several action plans, or programs of projects, address implementation of SHSP emphasis area countermeasures:

- Highway Safety Improvement Program (Per 23 CFR 924)
- Highway-Rail Grade Crossing Safety Action Plan (Per 49 U.S.C. § 202)
- Highway Safety Plan (Per 23 U.S.C. § 402)
- Commercial Vehicle Safety Plan (Per 49 CFR 350)

The agencies required by federal law to produce the various reports determine the necessary data needs, resources, timelines, performance measures, and periods of evaluation.

Using the Indiana eVCRS as the common source of crash data for performance measurement, the Indiana traffic safety managing agencies will monitor the database to ensure the accuracy of data, priority of proposed improvements, and effectiveness of the projects and plan regardless of the funding source or agency responsible for the implementation. INDOT will fully evaluate traffic safety progress, vet revisions with stakeholders and secure executive approval of a reauthorized Indiana SHSP every five years as required by 23 U.S.C. 148(d)(1)(A).



## 8 GLOSSARY

### Definitions

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- FATAL INJURY
  - A fatal injury is any injury that results in death within 30 days after the motor vehicle crash in which the injury occurred.
- HIGH RISK RURAL ROAD
  - The term 'high risk rural road' means any rural major collector, rural minor collector, or rural local road with roadway and intersection characteristics that have a correlation to severe crash types identified as emphasis areas in the SHSP, regardless of recorded frequency.
- HIGHWAY SAFETY IMPROVEMENT PROGRAM
  - The term 'highway safety improvement program' means a program of highway safety improvement projects, activities, plans and reports carried out as part of the statewide transportation improvement program under U.S.C. 23 135(g).
- INCAPACITATING INJURY
  - An incapacitating injury (suspected serious injury) is any injury other than fatal that results in one or more of the following:
    - Severe laceration resulting in exposure of underlying tissues/muscle/organs or resulting in significant loss of blood
    - Broken or distorted extremity (arm or leg)
    - Crush injuries
    - Suspected skull, chest or abdominal injury other than bruises or minor lacerations
    - Significant burns (second and third degree burns over 10% or more of the body)
    - Unconsciousness when taken from the crash scene
    - Paralysis
    - Transported from the crash scene for immediate medical treatment
- KABCO SEVERITY
  - Means the police crash reported severity level of injury for a person involved in a crash. [NOTE: Some attribute names and definitions in the fourth Edition of MMUCC have changed. Regardless, Indiana's crash report system maintains the third Edition names.]
    - Fatal Injury (K)
    - Incapacitating Injury (A)
    - Non-Incapacitating Injury (B)
    - Possible (C)
    - No Apparent Injury (O)
- NO APPARENT INJURY
  - No apparent injury is a situation where there is no reason to believe that the person received any bodily harm from the motor vehicle crash, there is no physical evidence of injury and the person does not report any change in normal function.
- NON-INCAPACITATING INJURY
  - A non-incapacitating (minor) injury is any injury that is evident at the scene of the crash, other than fatal or serious injuries. Examples include lump on the head, abrasions, bruises, minor lacerations (cuts on the skin surface with minimal bleeding and no exposure of deeper tissue/muscle).

- POSSIBLE INJURY
  - A possible injury is any injury reported or claimed which is not a fatal, incapacitating (serious) or non-incapacitating (minor) injury. Examples include momentary loss of consciousness, claim of injury, limping, or complaint of pain or nausea. Possible injuries are those that a person reports or are indicated by his/her behavior, but no wounds or injuries are readily evident.
- ROAD USERS
  - The term 'road user' means a motorist, passenger, public transportation operator or user, truck driver, bicyclist, motorcyclist, or pedestrian, including a person with disabilities.
- SAFETY DATA
  - The term 'safety data' means crash, roadway, and traffic volume data on a public road, licensing and vehicle data, as well as the characteristics of highway and train traffic at railway-highway grade crossings.
- SIGNIFICANT SAFETY RISKS
  - The term 'significant safety risks' for the purposes of High Risk Rural Road funding eligibility are roadway and intersection characteristics that have a correlation to severe crash types identified as emphasis areas in the SHSP.
- SUSPECTED MINOR INJURY
  - The term 'suspected minor injury' is equivalent to a non-incapacitating injury (B).
- SUSPECTED SERIOUS INJURY
  - The term 'suspected serious injury' is equivalent to incapacitating injury (A).
- SERIOUS CRASH
  - The term 'serious crash' means any crash resulting in a fatal injury (K), an incapacitating injury (A), or non-incapacitating injury (B).
- SEVERE CRASH
  - The term 'severe crash' means any crash resulting in a fatal injury (K) or an incapacitating injury (A).

## *Codes and Regulations*

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23 U.S.C. § 130: Railway-Highway Crossings  
23 U.S.C. § 148: Highway Safety Improvement Program  
23 U.S.C. § 402: Highway Safety Programs  
23 U.S.C. § 406: Grants for Primary Safety Belt Use Laws  
23 CFR 924: Highway Safety Improvement Program  
23 CFR 1200: Uniform Procedures for State Highway Safety Programs  
49 CFR 234.11: Highway-Rail Grade Crossing Safety Action Plans  
49 CFR 350: Commercial Motor Carrier Safety Assistance Program

## *Acronyms*

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AASHTO: American Association of State Highway Transportation Officials  
ARIES: Automated Reporting Information Exchange System  
CFR: Code of Federal Regulations  
CVSP: Commercial Vehicle Safety Plan  
INDOT: Indiana Department of Transportation  
EMS: Emergency Medical Services  
eVCRS: Electronic Vehicle Crash Record System  
FARS: Fatality Analysis Reporting System  
FHWA: Federal Highway Administration  
FMCSA: Federal Motor Carrier Safety Administration  
FRA: Federal Railroad Administration  
HSIP: Highway Safety Improvement Program  
HSP: Highway Safety Plan (Section 402)  
MAP-21: Moving Ahead for Progress in the 21st Century Act  
MMIRE: Model Minimum Inventory of Roadway Elements  
MMUCC: Minimum Model Uniform Crash Criteria  
NCHRP: National Cooperative Highway Research Program  
NHTSA: National Highway Traffic Safety Administration  
SHSP: Strategic Highway Safety Plan  
U.S.C.: United States Code  
US DOT: United State Department of Transportation

## 9 SUPPLEMENTARY RESOURCES

### *NCHRP 500 Series Reports*

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Volume 1: A Guide for Addressing Aggressive-Driving Collisions

Volume 2: A Guide for Addressing Collisions Involving Unlicensed Drivers and Drivers with Suspended or Revoked Licenses

Volume 3: A Guide for Addressing Collisions with Trees in Hazardous Locations

Volume 4: A Guide for Addressing Head-On Collisions

Volume 5: A Guide for Addressing Unsignalized Intersection Collisions

Volume 6: A Guide for Addressing Run-Off-Road Collisions

Volume 7: A Guide for Reducing Collisions on Horizontal Curves

Volume 8: A Guide for Reducing Collisions Involving Utility Poles

Volume 9: A Guide for Reducing Collisions Involving Older Drivers

Volume 10: A Guide for Reducing Collisions Involving Pedestrians

Volume 11: A Guide for Increasing Seatbelt Use

Volume 12: A Guide for Reducing Collisions at Signalized Intersections

Volume 13: A Guide for Reducing Collisions Involving Heavy Trucks

Volume 14: A Guide for Reducing Crashes Involving Drowsy and Distracted Drivers

Volume 15: A Guide for Enhancing Rural Emergency Medical Services

Volume 16: A Guide for Reducing Alcohol-Related Collisions

Volume 17: A Guide for Reducing Work Zone Collisions

Volume 18: A Guide for Reducing Collisions Involving Bicycles

Volume 19: A Guide for Reducing Collisions Involving Young Drivers

Volume 20: A Guide for Reducing Head-on Crashes on Freeways

Volume 21: Safety Data and Analysis in Developing Emphasis Area Plans

Volume 22: A Guide for Reducing Collisions Involving Motorcycles

Volume 23: A Guide for Reducing Speeding-Related Crashes

### *Other Federal Resources*

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Handbook for Designing Roadways for the Aging Population (FHWA- SA-14-015)

Bicycle Road Safety Audit Guidelines and Prompt Lists (FHWA-SA-12-018)

Pedestrian Road Safety Audit Guidelines and Prompt Lists (FHWA-SA-07-007)

How to Develop a Pedestrian Safety Action Plan (HWA-SA-05-12)

A Guide for Maintaining Pedestrian Facilities for Enhanced Safety (FHWA-SA-13-037)



## Crash Counts

**Table 5 Crashes 2010-2014**

	2010	2011	2012	2013	2014
# of Collisions	183,613	175,863	177,884	183,283	195,224
# of Property Damage Collisions	148,414	142,818	143,295	149,678	160,639
% Property Damage Collisions	80.83%	81.21%	80.56%	81.66%	82.28%
# of Injury Collisions	35,199	33,045	34,589	33,605	34,585
% Injury Collisions	19.17%	18.79%	19.44%	18.34%	17.72%
# of Incapacitating Collisions	2,917	2,812	3,187	2,906	4,396
% Incapacitating Collisions	1.59%	1.60%	1.79%	1.59%	2.25%
# of Fatal Collisions	699	676	735	744	708
% Fatal Collisions	0.38%	0.38%	0.41%	0.41%	0.36%
# of Severe Collisions	3,616	3,488	3,922	3,650	5,104
% Severe Collisions	1.97%	1.98%	2.20%	1.99%	2.61%
Fatalities	752	750	799	817	753
Incapacitating Injuries	3,447	3,353	3,760	3,411	5,475
Non-incapacitating Injuries	39,344	36,684	38,558	38,497	37,610
Possible Injuries	4,866	4,529	4,402	3,373	3,219



**Table 6 Intersection Crashes 2010-2014**

	2010	2011	2012	2013	2014
# of Collisions	58,726	56,738	59,373	59,749	63,296
# of Property Damage Collisions	44,880	43,819	45,522	46,200	49,600
# of Injury Collisions	13,846	12,919	13,851	13,549	13,696
# of Incapacitating Collisions	954	962	1,101	1,001	1,465
# of Fatal Collisions	179	155	168	162	180
# of Severe Collisions	1,133	1,117	1,269	1,163	1,645
Fatalities	190	171	183	179	194
Incapacitating Injuries	1,156	1,160	1,300	1,199	1,883
Non-incapacitating Injuries	16,194	14,984	16,251	16,504	16,047
Possible Injuries	2,321	2,231	2,169	1,600	1,339
% of Collisions	31.98%	32.26%	33.38%	32.60%	32.42%
% of Property Damage Collisions	30.24%	30.68%	31.77%	30.87%	30.88%
% of Injury Collisions	39.34%	39.10%	40.04%	40.32%	39.60%
% of Incapacitating Collisions	32.70%	34.21%	34.55%	34.45%	33.33%
% of Fatal Collisions	25.61%	22.93%	22.86%	21.77%	25.42%
% of Severe Collisions	31.33%	32.02%	32.36%	31.86%	32.23%
% Fatalities	25.27%	22.80%	22.90%	21.91%	25.76%
% Incapacitating Injuries	33.54%	34.60%	34.57%	35.15%	34.39%
% Non-incapacitating Injuries	41.16%	40.85%	42.15%	42.87%	42.67%
% Possible Injuries	47.70%	49.26%	49.27%	47.44%	41.60%

**Table 7 Run Off Road Crashes 2010-2014**

	2010	2011	2012	2013	2014
# of Collisions	23,072	21,302	21,672	22,353	25,982
# of Property Damage Collisions	16,809	15,480	15,427	16,317	19,458
# of Injury Collisions	6,263	5,822	6,245	6,036	6,524
# of Incapacitating Collisions	693	663	806	678	1,218
# of Fatal Collisions	209	202	246	211	221
# of Severe Collisions	902	865	1,052	889	1,439
Fatalities	217	214	260	227	231
Incapacitating Injuries	784	749	908	770	1,415
Non-incapacitating Injuries	5,980	5,629	5,846	5,934	5,720
Possible Injuries	615	531	628	493	544
% of Collisions	12.57%	12.11%	12.18%	12.20%	13.31%
% of Property Damage Collisions	11.33%	10.84%	10.77%	10.90%	12.11%
% of Injury Collisions	17.79%	17.62%	18.05%	17.96%	18.86%
% of Incapacitating Collisions	23.76%	23.58%	25.29%	23.33%	27.71%
% of Fatal Collisions	29.90%	29.88%	33.47%	28.36%	31.21%
% of Severe Collisions	24.94%	24.80%	26.82%	24.36%	28.19%
% Fatalities	28.86%	28.53%	32.54%	27.78%	30.68%
% Incapacitating Injuries	22.74%	22.34%	24.15%	22.57%	25.84%
% Non-incapacitating Injuries	15.20%	15.34%	15.16%	15.41%	15.21%
% Possible Injuries	12.64%	11.72%	14.27%	14.62%	16.90%



**Table 8 Head-On/Sideswipe Crashes 2010-2014\***

	2010	2011	2012	2013	2014
# of Collisions	23,568	23,169	23,099	23,569	26,552
# of Property Damage Collisions	20,139	19,933	19,828	20,349	22,997
# of Injury Collisions	3,429	3,236	3,271	3,220	3,555
# of Incapacitating Collisions	328	296	371	320	521
# of Fatal Collisions	131	125	128	129	118
# of Severe Collisions	459	421	499	449	639
Fatal	150	159	151	148	124
Incapacitating	465	427	504	449	740
Non-incapacitating	4,267	3,881	3,994	4,024	4,215
Possible	519	450	422	345	332
% of Collisions	12.84%	13.17%	12.99%	12.86%	13.60%
% of Property Damage Collisions	13.57%	13.96%	13.84%	13.60%	14.32%
% of Injury Collisions	9.74%	9.79%	9.46%	9.58%	10.28%
% of Incapacitating Collisions	11.24%	10.53%	11.64%	11.01%	11.85%
% of Fatal Collisions	18.74%	18.49%	17.41%	17.34%	16.67%
% of Severe Collisions	12.69%	12.07%	12.72%	12.30%	12.52%
% Fatalities	19.95%	21.20%	18.90%	18.12%	16.47%
% Incapacitating Injuries	13.49%	12.73%	13.40%	13.16%	13.52%
% Non-incapacitating Injuries	10.85%	10.58%	10.36%	10.45%	11.21%
% Possible Injuries	10.67%	9.94%	9.59%	10.23%	10.31%

\*With another motor vehicle

**Table 9 Motorcycle Crashes 2010-2014**

	2010	2011	2012	2013	2014
# of Collisions	3,359	3,412	3,951	3,438	3,337
# of Property Damage Collisions	827	889	927	867	851
# of Injury Collisions	2,532	2,523	3,024	2,571	2,486
# of Incapacitating Collisions	490	501	574	537	527
# of Fatal Collisions	107	116	148	116	116
# of Severe Collisions	597	617	722	653	643
Fatal	110	117	155	121	121
Incapacitating	530	546	614	582	564
Non-incapacitating	1,979	1,946	2,407	2,060	2,013
Possible	203	203	223	129	117
% of Collisions	1.83%	1.94%	2.22%	1.88%	1.71%
% of Property Damage Collisions	0.56%	0.62%	0.65%	0.58%	0.53%
% of Injury Collisions	7.19%	7.64%	8.74%	7.65%	7.19%
% of Incapacitating Collisions	16.80%	17.82%	18.01%	18.48%	11.99%
% of Fatal Collisions	15.31%	17.16%	20.14%	15.59%	16.38%
% of Severe Collisions	16.51%	17.69%	18.41%	17.89%	12.60%
% Fatalities	14.63%	15.60%	19.40%	14.81%	16.07%
% Incapacitating Injuries	15.38%	16.28%	16.33%	17.06%	10.30%
% Non-incapacitating Injuries	5.03%	5.30%	6.24%	5.35%	5.35%
% Possible Injuries	4.17%	4.48%	5.07%	3.82%	3.63%



**Table 10 Pedestrian Crashes 2010-2014**

	2010	2011	2012	2013	2014
# of Collisions	1,728	1,700	1,656	1,600	1,668
# of Property Damage Collisions	172	157	175	190	196
# of Injury Collisions	1,556	1,543	1,481	1,410	1,472
# of Incapacitating Collisions	241	223	208	191	286
# of Fatal Collisions	58	65	67	74	80
# of Severe Collisions	299	288	275	265	366
Fatal	60	66	68	78	83
Incapacitating	252	234	215	196	295
Non-incapacitating	1,102	1,156	1,104	1,086	1,060
Possible	186	156	142	106	93
% of Collisions	0.94%	0.97%	0.93%	0.87%	0.85%
% of Property Damage Collisions	0.12%	0.11%	0.12%	0.13%	0.12%
% of Injury Collisions	4.42%	4.67%	4.28%	4.20%	4.26%
% of Incapacitating Collisions	8.26%	7.93%	6.53%	6.57%	6.51%
% of Fatal Collisions	8.30%	9.62%	9.12%	9.95%	11.30%
% of Severe Collisions	8.27%	8.26%	7.01%	7.26%	7.17%
% Fatalities	7.98%	8.80%	8.51%	9.55%	11.02%
% Incapacitating Injuries	7.31%	6.98%	5.72%	5.75%	5.39%
% Non-incapacitating Injuries	2.80%	3.15%	2.86%	2.82%	2.82%
% Possible Injuries	3.82%	3.44%	3.23%	3.14%	2.89%

**Table 11 Bicycle Crashes 2010-2014**

	2010	2011	2012	2013	2014
# of Collisions	1,035	926	1,093	1,026	921
# of Property Damage Collisions	170	162	214	196	205
# of Injury Collisions	865	764	879	830	716
# of Incapacitating Collisions	79	79	96	86	90
# of Fatal Collisions	13	12	13	15	13
# of Severe Collisions	92	91	109	101	103
Fatal	14	13	14	15	13
Incapacitating	82	81	96	87	90
Non-incapacitating	693	621	715	690	580
Possible	81	50	61	40	35
% of Collisions	0.56%	0.53%	0.61%	0.56%	0.47%
% of Property Damage Collisions	0.11%	0.11%	0.15%	0.13%	0.13%
% of Injury Collisions	2.46%	2.31%	2.54%	2.47%	2.07%
% of Incapacitating Collisions	2.71%	2.81%	3.01%	2.96%	2.05%
% of Fatal Collisions	1.86%	1.78%	1.77%	2.02%	1.84%
% of Severe Collisions	2.54%	2.61%	2.78%	2.77%	2.02%
% Fatalities	1.86%	1.73%	1.75%	1.84%	1.73%
% Incapacitating Injuries	2.38%	2.42%	2.55%	2.55%	1.64%
% Non-incapacitating Injuries	1.76%	1.69%	1.85%	1.79%	1.54%
% Possible Injuries	1.66%	1.10%	1.39%	1.19%	1.09%



**Table 12 Work Zone Crashes 2010-2014**

	2010	2011	2012	2013	2014
# of Collisions	4,636	4,206	3,418	2,833	3,931
# of Property Damage Collisions	3,858	3,508	2,777	2,338	3,300
# of Injury Collisions	778	698	641	495	631
# of Incapacitating Collisions	68	40	52	51	75
# of Fatal Collisions	12	17	10	14	10
# of Severe Collisions	80	57	62	65	85
Fatal	13	20	11	14	12
Incapacitating	83	52	61	57	91
Non-incapacitating	892	793	699	547	732
Possible	80	84	74	55	52
% of Collisions	2.52%	2.39%	1.92%	1.55%	2.01%
% of Property Damage Collisions	2.60%	2.46%	1.94%	1.56%	2.05%
% of Injury Collisions	2.21%	2.11%	1.85%	1.47%	1.82%
% of Incapacitating Collisions	2.33%	1.42%	1.63%	1.75%	1.71%
% of Fatal Collisions	1.72%	2.51%	1.36%	1.88%	1.41%
% of Severe Collisions	2.21%	1.63%	1.58%	1.78%	1.67%
% Fatalities	1.73%	2.67%	1.38%	1.71%	1.59%
% Incapacitating Injuries	2.41%	1.55%	1.62%	1.67%	1.66%
% Non-incapacitating Injuries	2.27%	2.16%	1.81%	1.42%	1.95%
% Possible Injuries	1.64%	1.85%	1.68%	1.63%	1.62%

**Table 13 (≥ 55 mph) Rear-End Crashes on Multilane Roadways 2010-2014**

	2010	2011	2012	2013	2014
# of Collisions	3,213	3,217	3,304	3,755	3,975
# of Property Damage Collisions	2,515	2,547	2,626	2,990	3,145
# of Injury Collisions	698	670	678	765	830
# of Incapacitating Collisions	62	43	60	60	88
# of Fatal Collisions	20	18	15	25	27
# of Severe Collisions	82	61	75	85	115
Fatal	20	18	15	25	27
Incapacitating	66	46	65	61	94
Non-incapacitating	592	565	588	671	699
Possible	54	75	55	56	51
% of Collisions	1.75%	1.83%	1.86%	2.05%	2.04%
% of Property Damage Collisions	1.69%	1.78%	1.83%	2.00%	1.96%
% of Injury Collisions	1.98%	2.03%	1.96%	2.28%	2.40%
% of Incapacitating Collisions	2.13%	1.53%	1.88%	2.06%	2.00%
% of Fatal Collisions	2.86%	2.66%	2.04%	3.36%	3.81%
% of Severe Collisions	2.27%	1.75%	1.91%	2.33%	2.25%
% Fatalities	2.66%	2.40%	1.88%	3.06%	3.59%
% Incapacitating Injuries	1.91%	1.37%	1.73%	1.79%	1.72%
% Non-incapacitating Injuries	1.50%	1.54%	1.52%	1.74%	1.86%
% Possible Injuries	1.11%	1.66%	1.25%	1.66%	1.58%



**Table 14 All Crashes by Crash with & Manner of Collision**

All Crashes	Jan 1, 2010 through Dec 31, 2014				Time run: July 2015											
Crash With by Manner	Backing	Head On	Left Turn	Left/Right Turn	Non-Collision	Opposite Direction Sideswipe	Other	Ran off Road	Rear End	Rear to Rear	Right Angle	Right Turn	Same Direction Sideswipe	Unknown	Total	
Animal Drawn Vehicle	134	672	128	40	8	110	125	37	590	2	421	23	249	41	2,580	
Animal Not Deer	136	2,481	87	28	124	79	506	356	531	10	1,238	24	199	137	5,936	
Another Motor Vehicle	81,137	21,924	40,770	9,061	437	20,160	11,077	2,909	221,204	1,607	123,787	10,286	75,384	778	620,519	
Bicycle	68	462	309	113	27	98	394	14	309	2	2,165	257	323	6	4,547	
Bridge Overhead Structure	9	325	5	3	32	4	396	37	9		14	4	30	3	871	
Bridge Parapet End	2	60	1		4	1	14	59	4		5	1	14		165	
Bridge Pier or Abutment	6	195	5	4	10	4	55	306	4		33	7	97	2	728	
Bridge Rail	5	465	9	9	32	43	299	742	26	1	92	4	270	3	2,000	
Cable Barrier	1	113	5		22	12	46	571	16		22	3	159	1	971	
Cargo Shift or Loss	8	270	16	5	353	27	336	85	21	2	31	13	37	9	1,213	
Concrete Barrier	41	1,009	46	17	90	34	347	875	49	1	216	40	736	14	3,515	
Culvert	20	189	11	12	61		53	1,378	1		11	7	12		1,755	
Curb	145	1,460	299	112	482	85	917	4,107	103	5	171	195	338	15	8,434	
Deer	70	37,514	43	26	1,153	392	5,115	766	89	16	23,748	92	527	4,178	73,729	
Ditch	63	959	46	29	606	70	448	12,715	71	2	116	24	101	5	15,255	
Embankment	23	395	22	12	147	16	186	4,125	16	1	42	14	49	1	5,049	
Fell From Vehicle	6	206	37	10	1,474	14	581	88	27		26	28	26	17	2,540	
Fence	270	918	86	33	88	21	262	3,207	22	2	60	55	120	5	5,149	
Fire/Explosion	1	1			445		114	8	2						571	
Guardrail End	37	669	25	25	28	24	134	1,175	5	1	67	29	203	5	2,427	
Guardrail Face	51	1,644	61	34	135	126	712	3,797	85	3	363	65	1,232	8	8,316	
Highway Traffic Sign Post	77	717	134	66	61	21	173	2,037	21		90	107	140	14	3,658	
Immersion	10	13	2	1	47	1	30	66	2		3	2	7		184	
Impact Attenuator	31	160	19	28	6	16	47	129	101	1	28	6	46	2	620	
Jackknife	20	43	4	1	161	9	146	308	17	1	32	4	39		785	
Light/Luminaire Support	318	1,026	180	64	50	13	256	821	13		39	107	151	21	3,059	
Mailbox	320	749	23	17	56	52	209	3,055	22		77	16	234	5	4,835	
Median Barrier	5	703	27	9	75	33	301	1,098	37	1	169	15	541	1	3,015	
Off Roadway	133	1,888	80	45	566	95	491	15,569	125	5	297	48	336	1	19,679	
Other	1,665	4,316	636	287	2,816	469	5,670	3,212	1,619	13	835	371	1,205	170	23,284	
Other Post/Pole or Support	955	2,293	561	209	146	71	789	2,420	43	2	152	299	602	31	8,573	
Other barrier	20	194	21	12	22	7	79	83	11		17	12	63	7	548	
Overhead Sign Post	28	84	14	11	5		67	86	4		6	12	27		344	
Overturn/Rollover	6	39	57	27	789	1	495	1,559	18	1	33	41	25	1	3,092	
Pedestrian	816	1,740	568	108	301	82	1,461	51	88	2	873	152	408	37	6,687	
Railway Vehicle	2	41	1	1	1	7	63	54	12		244	2	5	2	435	
Ran Off Roadway	134	4,233	116	59	817	181	630	32,533	232	10	601	89	774	14	40,423	
Tree	249	3,511	53	20	188	36	637	6,006	35		236	24	177	35	11,207	
Unknown	2,725	3,854	1,292	392	1,014	934	3,204	1,580	1,715	19	3,977	623	2,377	243	23,949	
Utility Pole	767	3,833	267	159	143	90	606	6,426	37	2	273	227	538	12	13,380	
Wall/Building/Tunnel	776	2,194	116	61	91	31	877	1,052	33	1	98	76	368	11	5,785	
Work Zone Equipment	31	115	3		19	12	59	46	33		21	1	69	2	411	
<b>Total</b>	<b>89,956</b>	<b>99,918</b>	<b>44,822</b>	<b>10,770</b>	<b>12,151</b>	<b>22,365</b>	<b>35,160</b>	<b>114,381</b>	<b>224,187</b>	<b>1,684</b>	<b>155,957</b>	<b>12,848</b>	<b>85,906</b>	<b>5,762</b>	<b>915,862</b>	



**Table 15 Severe Crashes by Crash with & Manner of Collision**

Severe Crashes	Jan 1, 2010 through Dec 31, 2014				Time run: July 2015			Other	Ran off Road	Rear End	Rear to Rear	Right Angle	Right Turn	Same Direction Sideswipe	Unknown	Total
	Backing	Head On	Left Turn	Left/Right Turn	Non-Collision	Opposite Direction Sideswipe										
Animal Drawn Vehicle		4								3		4		1		12
Animal Not Deer		22	1		2	1	11	22	4			13	1	1	3	81
Another Motor Vehicle	50	1,593	803	96	13	292	242	66	2,609	12	3,518	54	363	4	9,715	
Bicycle		1						1				1				3
Bridge Overhead Structure		6						3	2			1		1		13
Bridge Parapet End		6						2				1		1		10
Bridge Pier or Abutment		19			1		1	21						1		43
Bridge Rail		5			3		7	19	1			2		3		40
Cable Barrier								4						1		5
Cargo Shift or Loss		3			2			3	1							9
Concrete Barrier		18			2		15	25	1			6	1	13		81
Culvert	1	9			4		3	92				1				110
Curb	2	53	5	1	24		38	198				9	4	4	2	340
Deer		65			3		15	26	2			40			20	171
Ditch		39			14	2	26	481		1		4	1	1		569
Embankment		13			7		11	202	1			1				235
Fell From Vehicle	1	6	6	2	159		60	13	2			2	5	1		257
Fence	1	18		1	1		5	59				1	1	1		88
Fire/Explosion					2											2
Guardrail End		22			3	2	6	53				1		2		89
Guardrail Face		34	1		6	1	16	130	2			9	1	13		213
Highway Traffic Sign Post		10						2	30	1		1				44
Immersion		1			1			2	6							10
Impact Attenuator		6				1	2	5	1					1	1	17
Jackknife		1			1			1				2				5
Light/Luminaire Support	1	12	1		1	1	3	23							2	44
Mailbox	1	16			2		8	70						4	1	102
Median Barrier		22			2	1	6	15				2		9		57
Off Roadway		71	2	3	17	3	31	786	2			16		6		937
Other	2	59	11	6	118	10	154	85	22			20	3	8	4	502
Other Post/Pole or Support	1	41	1	1	1		12	47		1		3	1	1	1	111
Other barrier		7						3						1		11
Overhead Sign Post								8						1		9
Overturn/Rollover		5	2	2	77		62	101	3			2	3	6		283
Pedestrian	11	10	1		4	1	14	2	1	1		2			1	48
Railway Vehicle		3						10	3			43				59
Ran Off Roadway	2	242	4	1	48	4	36	1,828	7			34	2	15	2	2,225
Tree	3	190			9	1	19	362	1			8		3	1	597
Unknown	129	655	108	19	81	37	428	131	148	1		361	29	122	32	2,281
Utility Pole	1	111	1	1	2	1	11	199	1			12	3	3	1	347
Wall/Building/Tunnel	5	49			3		9	32	2			3	1	3		107
Work Zone Equipment		3							1					1		5
<b>Total</b>	<b>210</b>	<b>3,408</b>	<b>945</b>	<b>133</b>	<b>613</b>	<b>356</b>	<b>1,265</b>	<b>5,147</b>	<b>2,807</b>	<b>16</b>	<b>4,104</b>	<b>110</b>	<b>591</b>	<b>75</b>	<b>19,780</b>	