



SAFETY

Research and Development R&D

Turner-Fairbank Highway Research Center

The Federal Highway Administration (FHWA) Office of Safety Research and Development (R&D) helps reduce highway crashes and related fatalities and injuries by developing and implementing safety innovations through a program of nationally coordinated research and technology development. Selections from this broad research portfolio are highlighted below.

SAFETY DATA AND ANALYSIS

The Safety Data and Analysis team's purpose is to support positive safety resource allocation decisions through consistent high-quality data collection and analysis to transform data into actionable information through analytical tool development and to formally evaluate the effectiveness of potential safety improvements.

Safety Training and Analysis Center (STAC)/ Strategic Highway Research Program 2 (SHRP2)

The mission of the STAC is to work with highway safety data stakeholders and others in the transportation community to improve roadway safety performance by providing training, technical assistance, and analytical tools to support safety research. The STAC will enable the U.S. Department of Transportation to make the best use of high-value safety datasets, such as those developed under the SHRP2, which includes Naturalistic Driving Study (NDS) data and the Roadway Information Database (RID). Key services of STAC include the following:

- **Training:** Design, develop, and conduct training to support research and analysis focused on addressing the safety of the roadway environment, in particular the impact of roadway features on driving behavior, through analysis of SHRP2, NDS, RID, and other datasets.
- **Technical Assistance:** Provide technical assistance to highway safety data stakeholders. Subject matter experts at the Turner-Fairbank Highway Research Center will provide guidance on how to approach and analyze a particular problem using NDS, RID, and other data.
- **Tools Development:** Develop analytical tools to assist researchers and others in using safety datasets. Tools, such as reduced datasets, as well

as automated feature extraction algorithms and automated identity masking algorithms, will enable users to more quickly address many research questions without using sensitive information and will support the consistent use of the data.

Highway Safety Information System

The Highway Safety Information System (HSIS) includes a safety database in which crash, roadway inventory, and traffic volume data are combined to help users study current highway safety issues, to direct research efforts, and to make the best decisions about safety improvements. Presently, seven States and one urban center actively provide data to the system. HSIS also provides analytical support for highway safety research.

Interactive Highway Safety Design Model

The Interactive Highway Safety Design Model (IHSDM) is a suite of software tools that support project-level geometric design decisions by providing quantitative information on the expected safety and operational performance of roadways. The IHSDM currently includes six evaluation modules (Crash Prediction, Design Consistency, Intersection Review, Policy Review, Traffic Analysis, and Driver/Vehicle). The crash prediction module of IHSDM is a software implementation of Part C of the American Association of State Highway and Transportation Officials *Highway Safety Manual* (HSM), which includes crash prediction methodologies for rural two-lane and multilane highways, urban/suburban arterials, and freeways/interchanges.⁽¹⁾

Evaluation of Low-Cost Safety Improvements Pooled Fund Study (ELCSI-PFS) and Development of Crash Modification Factors (CMFs)

FHWA has partnered with 38 States to conduct the ELCSI-PFS. This study, which has been active for more than 10 years, evaluates unproven priority safety improvements. The Development of Crash Modification Factors (DCMF) study is a major long-term study that also evaluates unproven low- to high-cost priority safety countermeasures to develop high-quality CMFs that meet the criteria for inclusion in the HSM.⁽¹⁾

Motorcycles

Motorcycle rider fatalities comprise about 14 percent of motor vehicle fatalities. FHWA is currently concluding a motorcycle crash causation study. FHWA and other researchers will use these data to study potential causes of motorcycle crashes and to develop possible countermeasures to prevent or lessen the severity of these crashes.

Geographic Information System (GIS) Safety Analysis Tools

State and local transportation departments are moving much of their crash, roadway, and traffic data to GIS platforms. Currently, FHWA is conducting research to identify the resources needed to advance the use and capabilities of GIS as part of a safety program for State and local governments.

HUMAN FACTORS

Human factors studies help researchers better understand transportation user needs and limitations. By taking into account driver capabilities when designing roadways, human errors will be minimized and public safety will be enhanced by decreasing crashes and fatalities. Human factors research supports many of the research projects and programs undertaken within the other R&D focus areas.

Pedestrian Safety

Pedestrians account for nearly 13 percent of traffic fatalities nationally. Accordingly, FHWA's Pedestrian Safety Program develops pedestrian safety-related products, research documents, and technologies to help improve conditions for pedestrians. From safer crosswalks and sidewalks to growing educational and safety initiatives, the program strives to cultivate safer roadways for some of the most vulnerable users of U.S. roadways.

ROADWAY

The Roadway Safety Research Program emphasizes the following two fundamental objectives:

- Keeping vehicles on the roadway.
- Minimizing the consequences of a vehicle leaving the roadway.

Roadway safety studies are conducted in the following five focus areas:

- Roadway departure.
- Speed management.

- Intersection safety and design.
- Visibility.
- Intelligent transportation systems (ITS).

Roadway Departure

Roadway departure research considers ways to provide better information to drivers about their vehicle's position on the road surface and to indicate to drivers when their vehicles are straying toward a potentially dangerous situation. Measures such as rumble strips and rumble stripes provide drivers with a clear warning that their vehicles are approaching potentially unsafe conditions.

Speed Management

Speed management focuses on how to set and enforce speed limits. It is a complex issue involving both engineering and behavioral factors. Ultimately, motorists decide what speed to travel in a given circumstance. As a result, a significant aspect of speed management research is to investigate how motorists arrive at that decision.

Intersection Safety and Design

More than 50 percent of the combined fatal and injury crashes occur at or near intersections. FHWA's intersection safety and design research facilitates the implementation of short-term safety improvements and defines and evaluates long-term higher payoff strategies to improve intersection safety.

ITS

ITS safety applications research involves developing the technologies and protocols necessary for vehicles and infrastructure to securely communicate information to each other to prevent crashes and roadway departures. ITS safety applications have the potential to improve safety across many of the R&D focus areas, such as at intersections, in dangerous curves, and in reduced speed zones and work zones.

REFERENCE

1. American Association of State Highway and Transportation Officials. (2010). *Highway Safety Manual*, First Edition. American Association of State Highway and Transportation Officials, Washington, DC.

