Attendance
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TRB ACS20 Thursday Meeting

Chair: Karen Dixon

Research Topics for TRB Safety and Performance Analysis Committee

Doug Harwood

January 2023

Review of Research Topics

- Our Committee sent 11 research problem statements to the AASHTO Committee on Safety last year as potential candidates for the FY24 NCHRP program

- Decisions on funding will be made by the AASHTO R&I Committee in Spring 2023

- We can resubmit statements that we believe remain important if they are not funded

Review of Research Topics

- Our Committee generated 10 new research topics in a brainstorming session in August 2022

- Committee members have provided preliminary descriptions for 7 of these 10 topics

- We will discuss and evaluate these topics today.

- We will provide selected topics to the AASHTO Committee on Safety for their consideration in Spring 2023

Review of Research Topics

- The AASHTO Committee on Safety has asked that we only send them topics that:
  - We consider to be high priorities AND
  - We believe that State DOTs will be interested in funding

Research Problem Statements Provided to AASHTO Committee on Safety in April 2022

- **Practical Application Guide to the HSM (Lead Author: Tim Barnett)**

- **Safety Performance Effects of Traffic Signal Control Technology and Timing Practices (Lead Author: Jerry Roche)**

- **Pavement Friction and Safety Performance Integration (Lead Author: Priscilla Tobias)**

- Intersection Crash Prediction Models for Future Editions of the HSM (Lead Author: Darren Torbic)

- Developing SPFs and CMFs for Weather-Related Crashes (Lead Author: Tim Barnett)

- Modernizing the Network Screening Process Using Machine Learning and Artificial Intelligence (Lead Author: Jonathan Wood)

Research Problem Statements Provided to AASHTO Committee on Safety in April 2022

- **Commercial Motor Vehicle Safety Performance Models (Lead Author: Tim Barnett)**

- **Frontage Road Safety Performance Functions for the HSM (Lead Author: Tim Barnett)**

- **Safety Performance Effects of Ramp Metering (Lead Author: Jerry Roche)**

- **Developing SPFs and CMFs for Light, Medium, and Heavy Rail and Roadway Interfaces (Lead Author: Tim Barnett)**

- **Safety Performance of Intersection Right-Turn Lanes (Lead Author: Jason Hershock)** **funded by PennDOT**

New Research Topics Suggested in August 2023

- Crash Prediction for Pedestrian Crashes at Roundabouts
- Developing and Validating SPFs that Combine Multiple Existing SPFs
- Development and Refinement of Motorcycle Crash Modification Factors and Functions
- Effect of Type of Jurisdiction in Crash Prediction Modeling
- Effects of Signalization on the Safety of Intersections and Ramp Terminals
- Equity Considerations and Application of Socioeconomic Factors in Safety Management
- HSM Predictive Method Definitions Picture Book

Crash Prediction for Pedestrian Crashes at Roundabouts

- Lead Author: Darren Torbic/Doug Harwood

- Need to resolve contradictory information and provide a method to quantify pedestrian crashes at roundabouts with various characteristics

- Need to compare pedestrian crashes at roundabouts to conventional intersections

Developing and Validating SPFs That Combine Multiple Existing SPFs

- Lead Author: Raul Avelar

- How should multiple SPFs for a given facility type be combined?

- When is it appropriate to combine multiple SPFs?

Development and Refinement of Motorcycle Crash Modification Factors and Functions

- Lead Author: Tim Barnett
- Need more and better information about the effects of infrastructure elements on motorcycle crashes

Effect of Type of Jurisdiction in Crash Prediction Modeling

- Lead Author: Daniel Carter

- Are SPFs and calibration factors transferrable from one state to another?

- Are SPFs for certain features more transferrable than others (e.g., intersections vs. roadway segments)?

- Can area-wide characteristics be used as adjustment factors to increase the reliability of transferred SPFs?

Effects of Signalization on the Safety of Intersections and Ramp Terminals

▶ Lead Author: Mike Dimaiuta

▶ Some SPFs show that signalized intersections have more crashes that stop-controlled intersections at comparable volume levels

▶ Comparisons show inconsistent results

Effects of Signalization on the Safety of Intersections and Ramp Terminals

Background

- HSM Part C includes crash predictive methods for a host of intersections on rural two-lane highways, rural multilane highways, urban/suburban arterials, and freeway ramp terminals.

- Agencies use HSM Part C results to evaluate the appropriateness of traffic control devices at intersections – often whether a given intersection should be stop-controlled (ST) or signalized (SG).

- However, some agencies have struggled in applying HSM results to make such decisions, due to "unexpected" and/or mixed results.

Effects of Signalization on the Safety of Intersections and Ramp Terminals

Background

- FHWA Safety R&D recently performed an initial analysis of the HSM models, and then extended the investigation to include some state agency-developed SPFs and calibration factors for HSM intersection models developed by various agencies. Results were mixed.

- Bonneson et al. (2014) noted that CMFs generally show a tendency for intersections undergoing conversion from ST to SG to experience a reduction in crash frequency. However, the wide variation in CMF values and that several CMFs exceed 1.0 (i.e., converting to SG increases crashes) is not particularly helpful when practitioners need to establish what the safety performance change would be in a ST to SG conversion.

- Based upon a review of past studies, the evidence seems inconclusive on the safety effect of adding a traffic control signal (where no other changes are made at the intersection).

Effects of Signalization on the Safety of Intersections and Ramp Terminals

Research Need

- To determine the safety performance change for an ST to SG conversion.

Research Objective

- To develop CMFs or CMFunctions that describe the change in safety associated with the installation of a signal at an intersection that is currently stop-controlled.

- Focus on the various 3- and 4-leg intersections and freeway ramp terminal configurations represented in HSM Part C, for both rural and urban areas.

- The research should recognize that other changes are often made at the intersection when it is signalized and (1) isolate the safety effect of signal installation and (2) develop additional factors or functions that describe the safety effect of common combinations of changes made in conjunction with signal installation (e.g., add signal and add through lane, left-turn bay, protected-permissive left-turn operation).

Effects of Signalization on the Safety of Intersections and Ramp Terminals

Research questions to be addressed include:

- Under what conditions are SG intersections expected to provide a safety performance benefit compared to ST intersections, particularly when considering crash severity?

- How does the safety performance effect vary by intersection type? By facility type? By intersection entering AADT? By distribution of major vs. minor road AADT? By directions traveled on the major and minor road (i.e., one-way or two-way)?

- Is the effect on higher severity crashes different than for total crashes; i.e., how do the severity of crashes change?

- Is the effect of signalization universal or are there differences by jurisdiction?

Effects of Signalization on the Safety of Intersections and Ramp Terminals

Research Approach

- A before-after study design is likely to provide the most reliable results. The research approach could be similar to that by Srinivasan et al. (2014), but expanded to include national representation, larger sample size (especially in urban area), and closer agreement with the scope of this research topic.

  - Safety Evaluation of Signal Installation With and Without Left Turn Lanes on Two Lane Roads in Rural and Suburban Areas (NCDOT). (http://www.cmfclearinghouse.org/study_detail.cfm?stid=444)

Thank you!

Equity Considerations and Application of Socioeconomic Factors in Safety Management

▶ Lead Author: April Renard

▶ What socioeconomic factors influence crash frequency?

▶ Are age, race, and sex causal factors in crashes or do they just represent correlations with other variables?

▶ AASHTO has a closely related topic under consideration.

HSM Predictive Method Definitions Picture Book

- Lead Author: Jacob Farnsworth

- Companion document to HSM2 to assist practitioners

- Show photos or drawings to define key terms including facility types, facility features, input values

Priority Rating of Research Topics by Meeting Attendees

▶ On-line poll will ask meeting attendees to rank each of the seven new research topics based on:

1. your assessment of the overall importance of research on this topic

2. will State DOTs consider research on this topic to be important?

Overall Importance of Research Topic

Please rate the overall importance of conducting research on this topic:

       5—Very Important

       4—Important

       3—Moderately Important

       2—Somewhat Important

       1—Not Important

Will State DOTs Consider This Research Topic to be a Priority

Do you believe that State DOTs will consider completion of research on this topic to be a key priority:

> 5—Very High Priority

> 4—High Priority

> 3—Moderate Priority

> 2—Low Priority

> 1—Not a Priority

Agenda

9:00 am   **Call to Order and Introductions**, Karen Dixon

9:15 am – 10:15 am
        Research Problem Needs Statements
        Discussion, Doug Harwood

Rate the topics at Menti.com
3853 3663

10:15 am – 10:30 am
        Break

Business Meeting 10:30am - Noon
TRB 2023 Annual Meeting   trbacs20.org

COS research problem statements submitted for FY24

1. Practitioner's Application Guide to the Highway Safety Manual

2. Incorporating the Safe System Approach into Road Safety Audits

3. Intersection Crash Prediction Models for Future Editions of the HSM

4. Implementation Plan for the Human Factors Guide

5. Strategies for Improving Pedestrian Safety near Transit Stops

6. Utilizing Meaningful Equity Elements to Evaluate Safety Improvements

Business Meeting Agenda

10:30 am   **Call to Order**, Karen Dixon

10:30 am   **Secretary and Communications Report**, Derek Troyer
Approval of Previous Meeting Minutes

10:35 am   **TRB Staff Report/Section Update**, Bernardo Kleiner

10:50 am   **Reports – Committee Activities**
- Subcommittee Updates, Subcommittee Chairs
- Status of Research Needs Statements, Doug Harwood
- [Paper Reviews](), Pete Savolainen
- Paper Award Process, Daniel Carter

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Communications

TRB ACS20 Safety Performance and Analysis

A technical standing committee

Time for the TRB Annual Meeting! : Please join us this January in Washington D.C. for the TRB Annual Meeting. We have a whole bunch of exciting meetings and sessions we're hosting or co-sponsoring. Schedule of Events Continue Reading→

Ready for the TRB Annual Meeting 2023?

Posted on January 5, 2023 by Communications Coordinator

Visit the TRB ACS20 meetings page to see what's up this annual meeting.

Continue Reading→

https://trbacs20.org

NATIONAL ACADEMIES
Sciences
Engineering
Medicine

TRB
TRANSPORTATION RESEARCH BOARD

→] Log in

Welcome to MyTRB!

Log in or create an account to access the follo...

Connect	Convene	Publications

TRB's work relies on volunteers and seeks to involve transportation professionals at involved with TRB today.

- Become a TRB Affiliate
- Update Your Interests
- Become a Friend of a Technical Committee

- Manage Your M
- Visit the Career
- Search and Vie Statements (RN

Trbacs20.org → meetings (right menu)

Synthesis of Safety Related Papers for TRB Annual Meetings

Thank you to:

Committee reports

Safety Analytical Methods
TRB ACS20(1)

Ida van Schalkwyk/ Xiao Quin

Safety Analytical Methods
TRB ACS20(1)

- 32 Attendees

- Update on NCHRP 17-100: Leveraging Artificial Intelligence and Big Data to Enhance Safety Analysis

- Facilitated discussion: Performance-based design: Safety analysis needs for future editions of the Green Book

- Research ideas

Meeting materials available at

https://trbacs20.org/index.php/about/subcommittees/acs201-safety-analytical-methods-subcommittee/

Pedestrian and Bicycle Safety Subcommittee Report
TRB ACS20(4)

Shane Turner

Pedestrian and Bicyclist Safety Subcommittee
TRB ACS20(4)

- We had record numbers – at least 90 attendees – a full room
- Discussion was focused around VRU safety assessments – required for state safety plans form this year onwards
- Two excellent speakers on systemic and predictive safety assessment tools – Wes Kumfer and Darren Torbic.
- FHWA input through Darren Buck – talking about equity and climate change aspects
- Great discussion and one new research needs statement topic on disabled pedestrians suggested

Meeting materials available at:
https://trbacs20.org/index.php/about/subcommittees/pedestrian-and-bicycle-safety-analysis/

Sharing of Safety Applications

- **FHWA Update**
  - Jerry Roche discussed My Street
  - Evidence based tool that helps decision makers see safety issues from the perspective of the pedestrian
  - Available at mystreetpedsafety.org
- **Application Case Studies**
  - Ian Hamilton
  - Developed 20 case studies on noteworthy practices for safety data management, governance, and analysis

Initatives

- **Part C Tools**
  - **Discussion**
    - Current storing of excel spreadsheets that have been customized by agencies
    - Where are they being stored, where should they be stored
    - Do we need Clearinghouse-style listing of all the tools available with some description?
  - **Webinar**
    - Coordinating with AASHTO to discuss existing Part C tools
  - **Volunteers** to conduct survey to better understand future needs and potentially draft language for future tool development

Initatives

- **Practical Applications**
  - **Bonnie Polin led discussion**
    - Progress is being made in each of the 11 items identified
    - ULSC is supporting the draft language for RFPs

- **User Forum**
  - Daniel Carter and Tariq Shihadah leading
  - Coordinating with AASHTO, Policy and Legal Aspects

- **Local Road Safety Implementation**
  - **Tim Colling led discussion**
    - Developed draft synthesis
    - Encouraging local implementation of data-driven safety analysis

Initatives

- **Policy and Legal Aspects**
  - **Webinar**
    - Tort Liability and Risk Management Committee on Legal and Risk Management Considerations Related to Safe Systems and Road to Zero Strategies.
    - Tort Liability Neutral Language, coordinate with AASHTO
  - **Training**
    - Tort Liability and Risk Management training; Coordinating with the Tort Liability and Risk Management Committee to provide training on appropriate use of engineering judgement, documenting processes and decision making.

Initatives

- **HSM Part C Information Guide**

- **International Safety Research**
  - Effort led by Jennifer Ogle; working on re-engaging with User Liaison to move efforts forward
  - Volunteers to assist with identifying next steps, moving initiatives forward

Applying the Safe System Approach to Overcome Challenges

- Sunday Jan. 8, 1:30 – 4:30 pm

- Sponsors:
  - ACS10 - Transportation Safety Management Systems (lead)
  - ACS20 – Safety Performance and Analysis
  - ACH20 - Bicycle Transportation

- Description:
  - The SSA is a priority in the Infrastructure Investment and Jobs Act (IIJA) and the National Roadway Safety Strategy (NRSS). Agencies are grappling with defining policies and procedures to integrate SSA into practice. Building on the TRB 2022 Making Safe System a Reality workshop, this session will engage participants via breakout groups to examine real-world case studies, discuss challenges and opportunities, and identify research needs for incorporating and measuring SSA for all users, accounting for equity and competing system needs.

Follow-up Activities

- Solicit feedback on **Safe System Alignment Framework** tool:
  - Input from participants during workshop
    - What is the one thing you liked best about the tool?
    - What is the one thing you would change about the tool?
    - What research needs/gaps did you identify while going through this exercise?
  - Feedback Form sent to participants on Mon. 1/9.

- **Now:** any additional feedback on the workshop and/or tool from those who participated?

User Liaison Subcommittee Meeting

January 12, 2023

www.trbacs20.org

- Daniel Carter (dlcarter4@ncdot.gov)

- Kim Kolody (kim.kolody@jacobs.com)

Lectern Session 2117
Doctoral Student Research in Transportation Safety
Pete Savolainen

TRB 2023 ACS20
Paper Review Summary

Overview

- 231 papers submitted(!!!!)

  - 116 for presentation-only
    - 71 accepted for presentation (61.2%)
    - 45 rejected (38.8%)

  - 115 for presentation and publication
    - 41 accepted for presentation (35.7%)
    - 33 accepted for presentation and editorial board review (28.7%)
    - 41 rejected (35.7%)

TRB 2023 ACS20
Paper Review Summary (cont.)
Thanks to this year's paper review coordinators!!!!

- Raul Avelar, Texas A&M Transportation Institute
- Vikash Gayah, Pennsylvania State University
- Srinivas Geedipally, Texas A&M Transportation Institute
- Juan Medina, University of Utah
- Peter Savolainen, Michigan State University
- Jonathan Wood, Iowa State University
- George Yannis, National Technical University of Athens

TRB 2023 ACS20
Paper Review Summary (cont.)

Thanks to this year's numerous volunteers who served as paper reviewers!

Special thanks to those who reviewed extra papers near the deadline!

TRB 2023 ACS20
Paper Review Summary (cont.)

General Comments and Concerns

- Assignments generally balanced between committee members and friends in consideration of technical competency.

- Review quality varied considerably.

- Particular concerns included rejecting (and also accepting) papers with little commentary of justification.

- ACS20 will send a survey out to assist in updating inventory of reviewer background, availability, and expertise.

- Additional paper review coordinators and reviewers are welcome!

Doctoral Student Research

Overview

- AED60 - Statistical Methods & ACS20 - Safety Performance Analysis Committees continue to sponsor a special session that highlights work by Ph.D. students who are nearing the completion of their doctoral research on transportation safety.

- Format
  - 11 presenters
  - 3-minute presentations from each person
  - Posters that provide greater detail

Lectern Session 2117: **Doctoral Student Research in Transportation Safety: A Lectern-Poster Session**

Mon., Jan. 9, 1:30 PM - 3:15 PM | Convention Center, Salon B

Peter Savolainen, Michigan State University, presiding

Doctoral Student Research (cont.)

The Process

1. Students submit, via e-mail, an abstract that summarizes their research. A template is provided for their use. Submission occurs after, and separate from, the TRB call.

2. Students copy their faculty advisor on the e-mail to allow for confirmation of the anticipated graduation date. Priority is given to students who are nearest to graduation.

3. A group of volunteers from AED60 and ACS20 reviews and rates the abstracts. Selections are made after consultation with committee chairs.

4. The event is held during the TRB Annual Meeting and a group of volunteers rate the presentations, culminating in a Best Presentation Award.

Doctoral Student Research (cont.)

Thanks to this year's volunteers who assisted with abstract review!

- Timothy Gates, Michigan State University

- Woon Kim, AAA Foundation for Traffic Safety

- Mary Martchouk, MMTAM

- Juan Medina, University of Utah

- Michael Pawlovich, South Dakota State University

- Peter Savolainen, Michigan State University

- Natalie Zuniga, Argonne National Laboratory

Doctoral Student Research (cont.)

Thanks to this year's numerous volunteers who served as judges!

Doctoral Student Research (cont.)
This Year's Presenters and Topics

| Name	University	Presentation Title
Smrithi Ajit	Iowa State University	Evaluation of the Real-World Impacts of Crash Safety Ratings on Crash Severity
Asim Alogaili	University of South Florida	Statistical Models of Traffic Injury Severities: The Effects of Driver Nationality and the Time-of-day on Pedestrian Injuries
Carolina Baumanis	The University of Texas at Austin	Enhancing Active Transportation Safely
Chris Bic Byaruhanga	University of Birmingham	Analysis of Crash/casualty Unit Costs Used in Road Safety Investment Appraisal Models
Morgan Dean	Virginia Tech	Applications of Event Data Recorder Derived Crash Severity Metrics to Injury Prevention
Md Rakibul Islam	University of Central Florida	Real-Time Safety Assessment Framework Incorporating Crash Likelihood, Severity, and Types Prediction, and Traffic Restoration Time Estimation
Asif Mahmud	Pennsylvania State University	Estimation of Crash Type Frequency Accounting for Misclassification in Crash Data
Nitesh Shah	University of Tennessee	Scrutinizing e-scooter Crashes and Crash Risk
Scott Shea	University of Utah	Approach-level Statistical Road Safety Modeling for Estimating Road, Vehicle, and Occupant Characteristics on Crash Type and Injury Severity Outcomes at Intersections
Oliver Stover	Vanderbilt University	A Risk-based Data-driven Decision Framework to Improve Pedestrian Safety
Archana Venkatachalapathy	Iowa State University	Investigating the Relation Between User's Physiology and Traffic Environment to Identify Its Impact on Their Road Behavior

Doctoral Student Research (cont.)
The Session
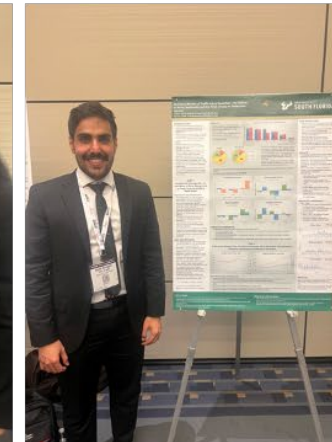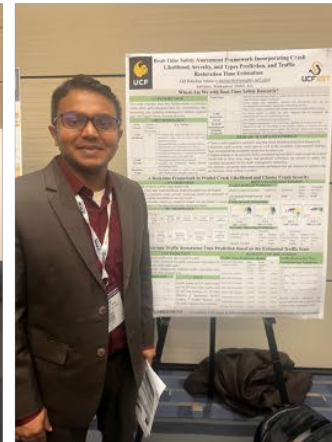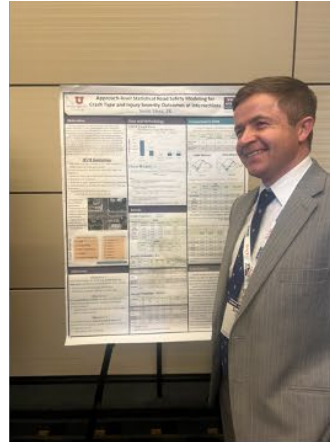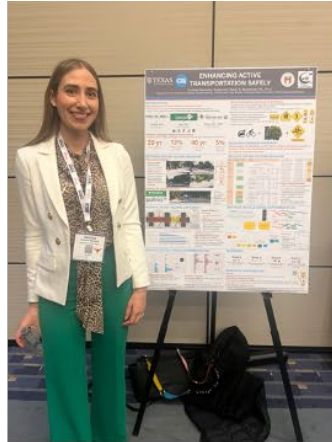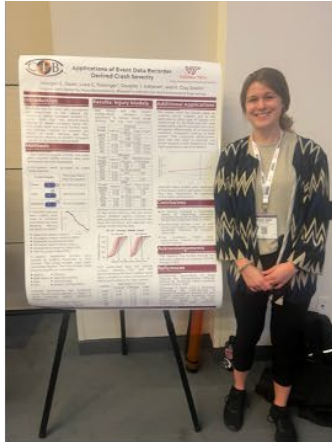
Best Presentation Award
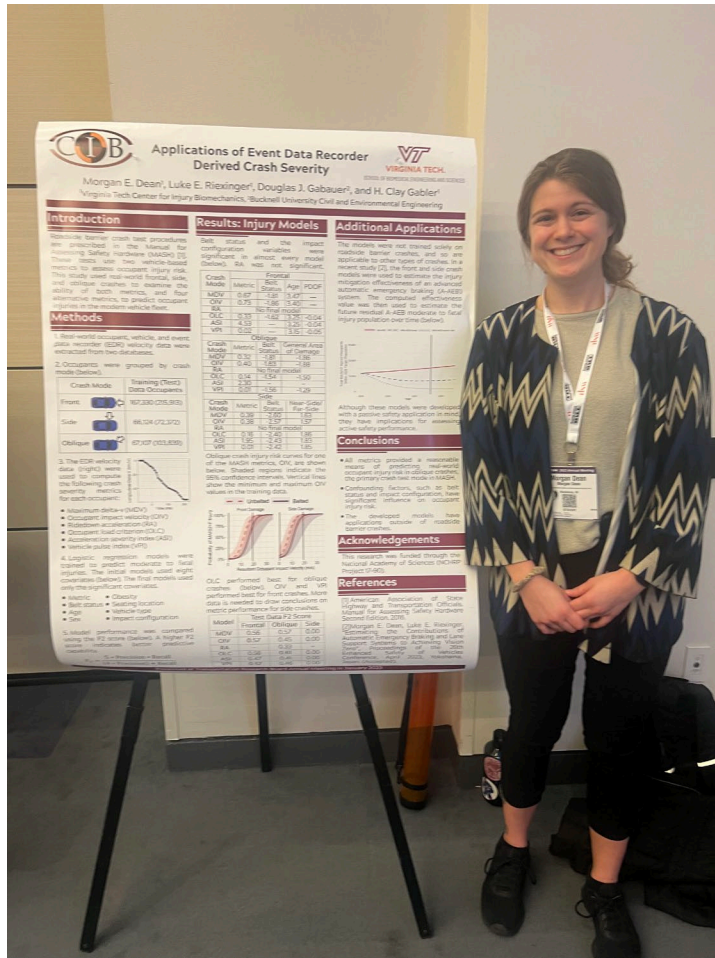
- Morgan Dean, Virginia Tech
- Applications of Event Data Recorder Derived Crash Severity

Business Meeting Agenda (2)

11:30 am   Organizational Updates
- USDOT Updates, Jerry Roche or Carol Tan (FHWA)
- AASHTO Update, Stephen Read

11:45 am   State of the Committee and a Look Forward, Karen Dixon
- 2023 Midyear Meeting, June 28-30, 2023 – Beckman Center (Irvine, CA)
- 2024 Annual Meeting, January 7-11, 2024 – Walter E. Washington Convention Center (Washington, DC)
- 2024 Midyear Meeting (to be held in Boston, MA in conjunction with the National Conference on Access Management – exact date TBD)

FHWA Update

Jerry Roche

FHWA Office of Safety

National Roadway Safety Strategy

Safe System Approach – Safer Roads, Safer Users, Safer Speeds

- Increase safety funding, aligned with the Safe System Approach

- Change law or policy at all levels of government, to make safety the preferred and easiest option in transportation planning, projected development, and operations

- Expand deployment of safety countermeasures

- Take actions supporting safety and equity

- Making technology deployments that align with the SSA

- Work with partners to achieve a truly systemic approach

Complete Streets

- [Moving to a Complete Streets Design Model: A Report to Congress on Opportunities and Challenges](#) notes five opportunity areas:

- **Improve data collection and analysis** to advance safety for all users;
- **Support rigorous safety assessment** during project development and design to help prioritize safety outcomes across all project types;
- **Accelerate adoption of standards and guidance** that promote safety and accessibility for all users and support innovation in design;
- **Reinforce the primacy of safety for all users** in the interpretation of design standards, guidelines, and project review processes; and,
- **Make Complete Streets FHWA's default approach** for funding and designing non-access-controlled roadways.

Vulnerable Road User Safety Assessment

- Include pedestrians, bicyclists, and persons on personal conveyance
- Requires a data-driven process of fatal and serious injury crashes:
  - Includes data such as location, roadway functional classification, design speed, speed limit and time of day;
  - Considers demographics of the locations of fatalities and serious injuries, including race, ethnicity, income and age; and
  - Based on the data, identifies areas as high-risk to vulnerable road users
- Consultation including local agencies, local and regional planning organizations, and advocacy groups
- Results in a program of projects or strategies
- Required to be completed by all states by November 15, 2023, and updated with subsequent publication of a state's strategic highway safety plan

EDC7

- **Nighttime Visibility for Safety**

- **Next Generation TIM: Technology for Saving Lives**

MIRE – Sarah Weissman Pascual
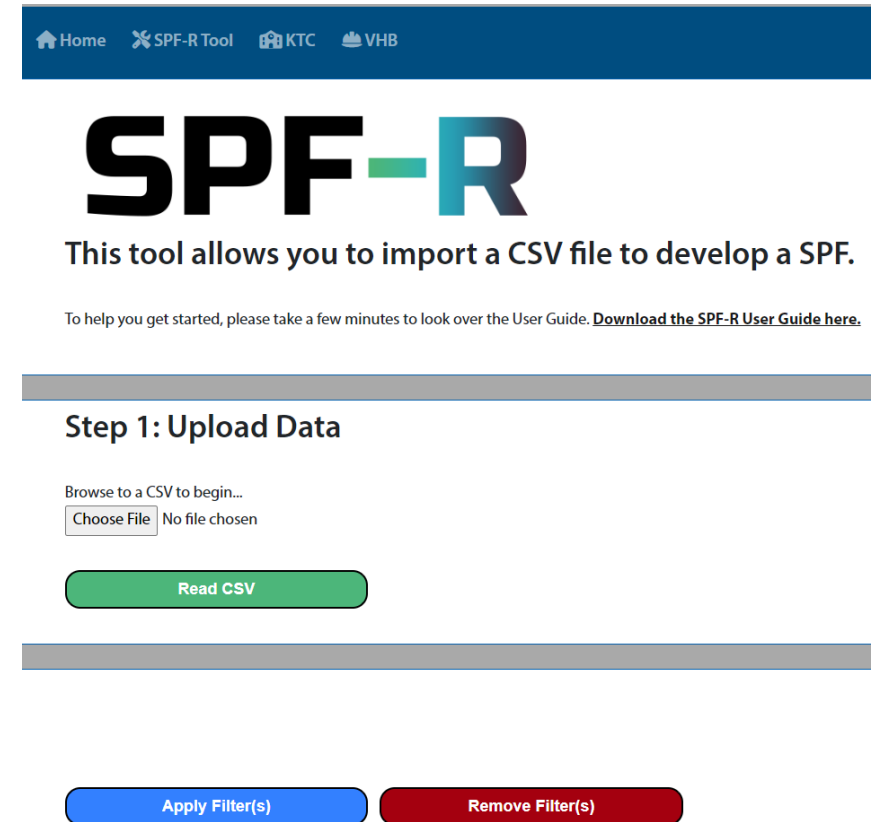
2007
MMIRE
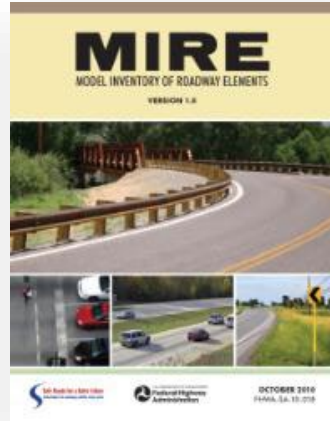
2017

MIRE 2.0

**September
2026**

2010
MIRE 1.0

2023-2024
MIRE 2.1

Source: FHWA   8
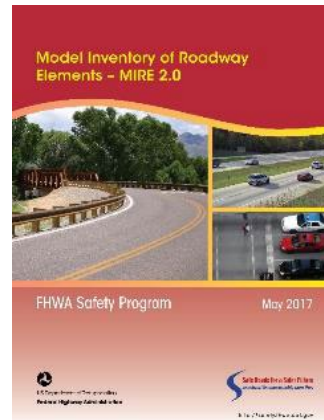
SPF-R Online

Making Performance Function Development Easier and More Accessible

- Read about the updated tool in the [Winter 2023 issue of Safety Compass](#)

- SPF-R online is still free and open source, and in this current form is more accessible than before. It may be accessed by visiting https://spfr.uky.edu.

SPF-R web interface. (Source: KTC)

Interactive Highway Safety Design Model

Software

- Concluded software development in October 2021

- Tech Support by FHWA Geometric Design Lab (GDL) will continue through **at least September 2024**, but essentially as long as agencies are still using the IHSDM 2021 (version 17.0.0) software

Training (FHWA-NHI-380100)

- Virtual training in a blended web-conference training format (self-paced modules + instructor-led modules via webinar)

- Est. course length is 14 hours

- Cost is $75

- **LINK**

New NHI Introduction to DDSA Course

- New web-based, self-paced 9-hour course on an introduction to data-driven safety analysis (DDSA).

- Currently available **at $0** and open to the public.

- Course Description

- Flyer

Coming Soon!

FHWA Resource Center Courses – Derek Troyer
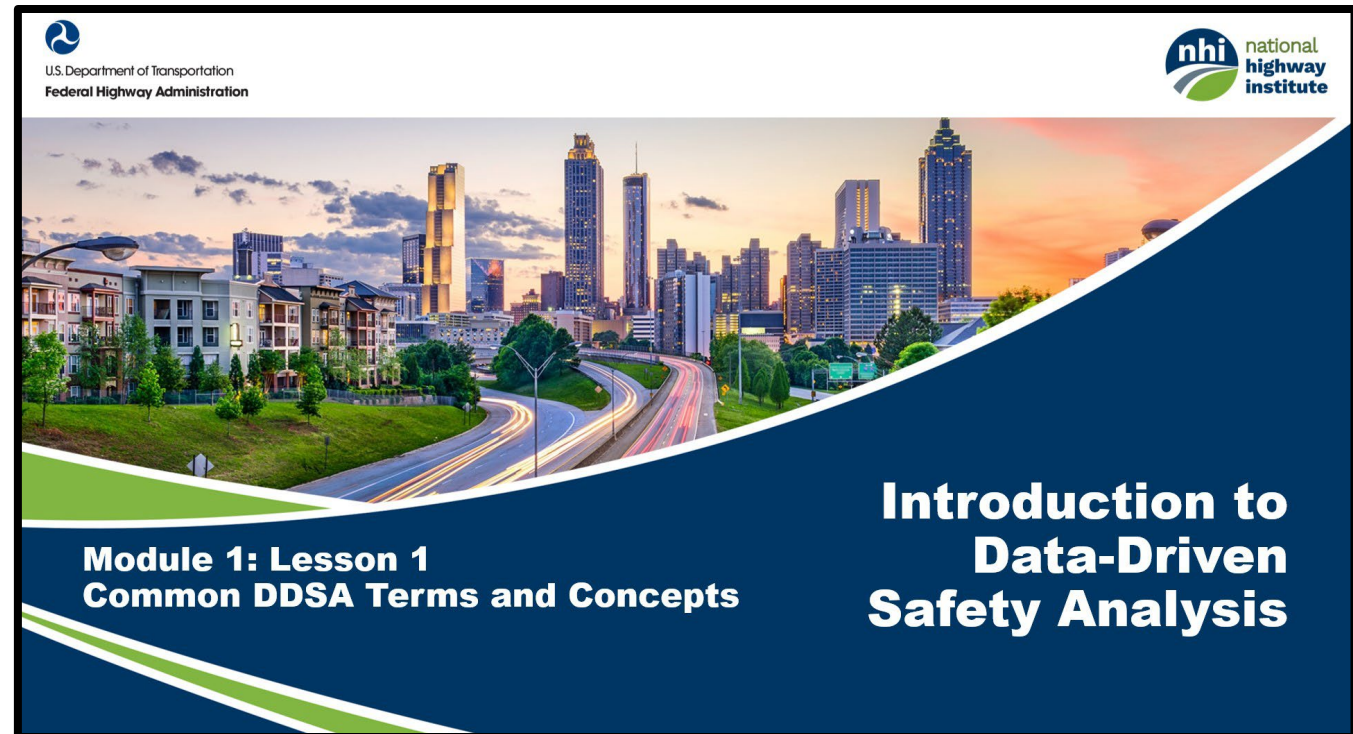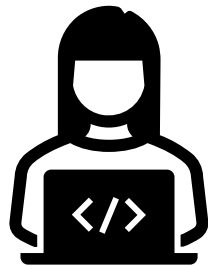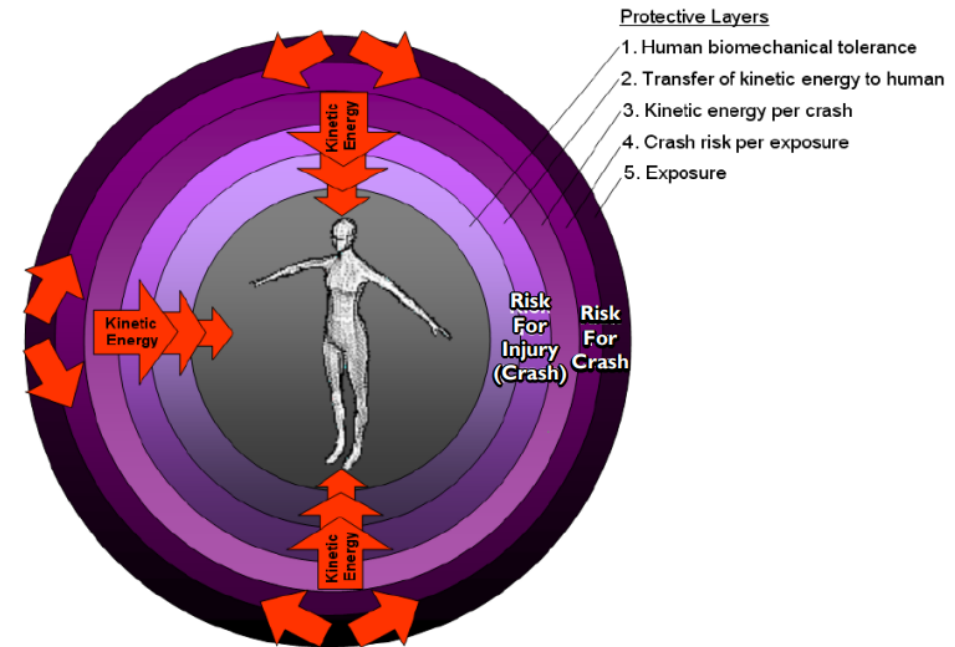
- **New Low-Cost Safety Improvements (LCSI) – Safe System Approach**
- **Systemic Safety 4-Hour Course**

Safe System-based Framework for Intersections

- **Safe System Methodology for Intersections Tech Brief**
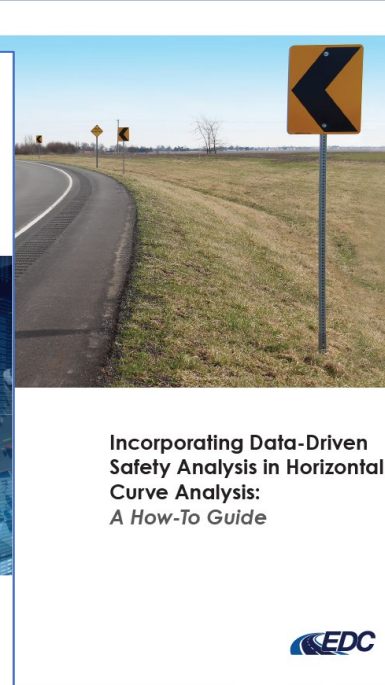- **Safe System Methodology for Intersections Final Report**

Protective Layers
1. Human biomechanical tolerance
2. Transfer of kinetic energy to human
3. Kinetic energy per crash
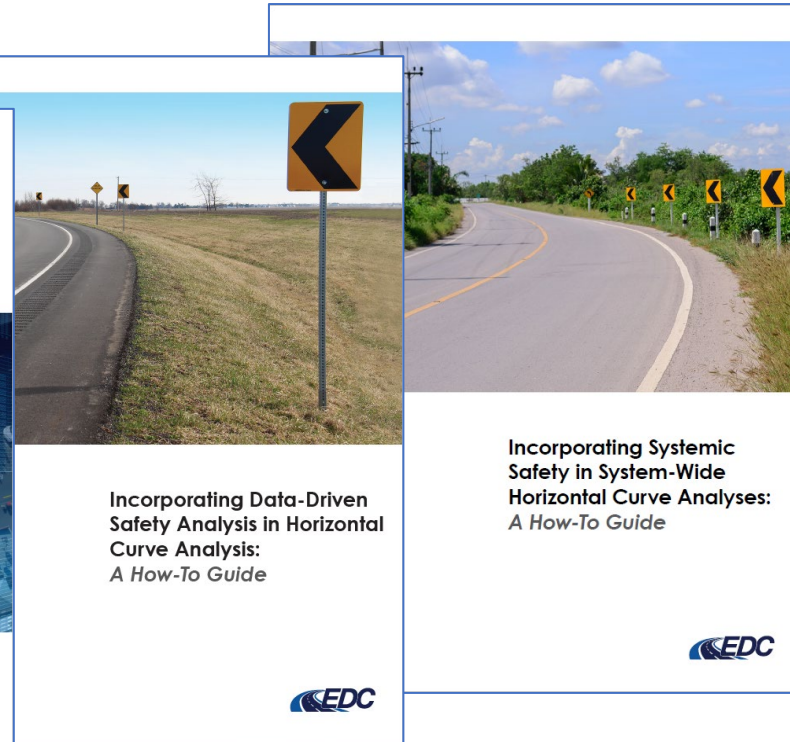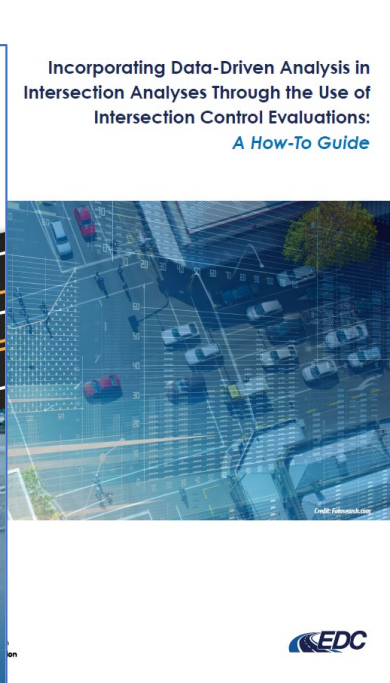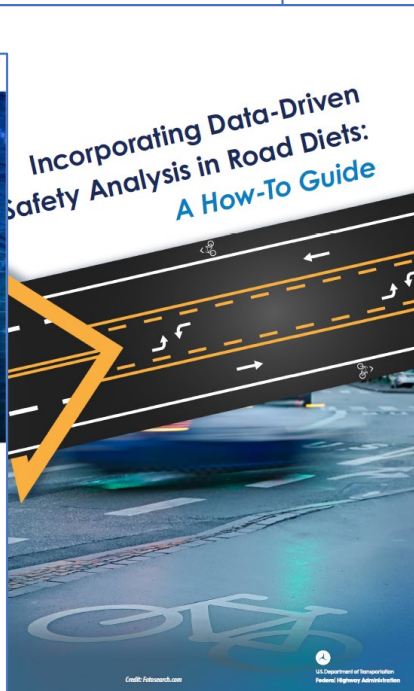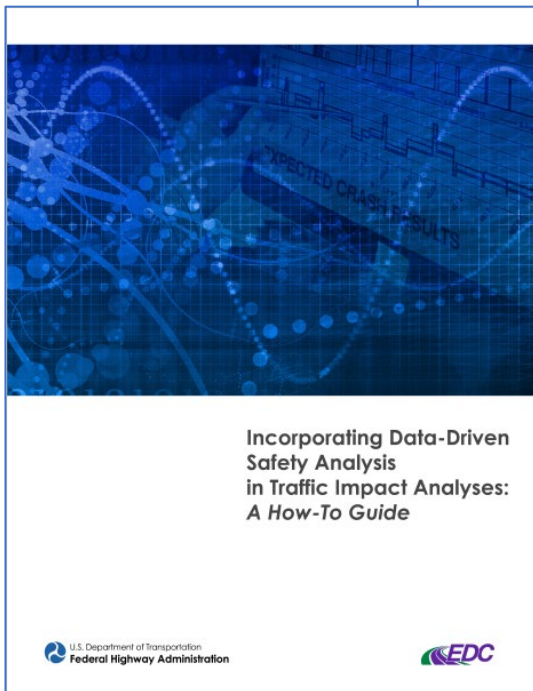4. Crash risk per exposure
5. Exposure

© Corben et al. 2010

Figure 1. Graphic. The five layers of protection in the KEMM.
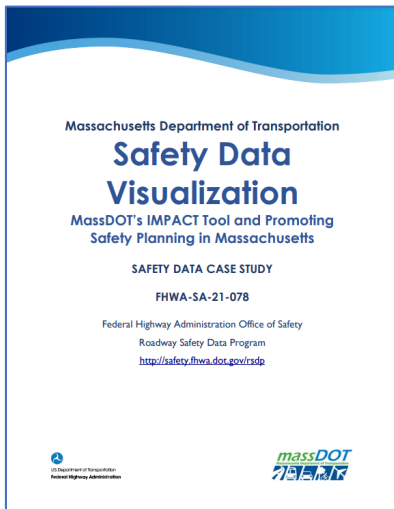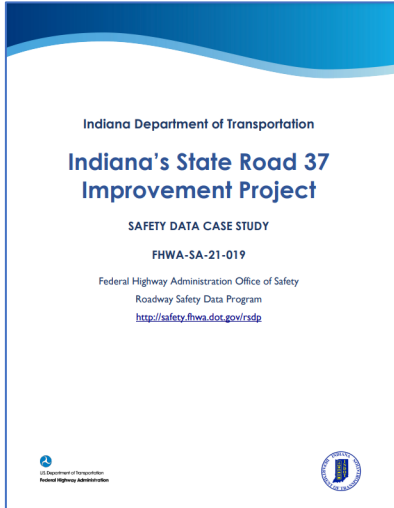
DDSA How-To Guides

Traffic Impact Analyses

Intersection Control Evaluation

Road Diets

Horizontal Curves (site-specific)

Horizontal Curves (systemic)

Re-Allocation of Existing Roadway Widths

15

Safety Data and Analysis Case Studies

Indiana Department of Transportation

Indiana's State Road 37 Improvement Project

SAFETY DATA CASE STUDY

FHWA-SA-21-019

Federal Highway Administration Office of Safety
Roadway Safety Data Program
http://safety.fhwa.dot.gov/rsdp

Massachusetts Department of Transportation

Safety Data Visualization

MassDOT's IMPACT Tool and Promoting Safety Planning in Massachusetts

SAFETY DATA CASE STUDY

FHWA-SA-21-078

Federal Highway Administration Office of Safety
Roadway Safety Data Program
http://safety.fhwa.dot.gov/rsdp

Partially Funded by the HSM Implementation Pooled Fund, TPF-5(255)

- 22 total case studies with 12 focused on HSM related applications

- Case Study Template provided by User Liaison Subcommittee ACS20(1)

- Various applications, methods, tools, and facility types

- HSM Implementation Pooled Fund Members ranked and prioritized potential case studies

- AL: Roadway Redesign for Ped Safety
- AZ: Data Management on LRS
- CA: High Injury Network & Planning for Zero
- CT: Enterprise Data System & Processes
- FL: Safe Strides 2 Zero
- FL: MIRE Data Collection
- IN: IN SR37 Improvement
- KY: Network Screening Process
- LA: MPO Data Governance
- MA: Safety Data Visualization
- MI: I-94 Interchange Alternatives
- MN: I-35 Planning Study
- MO: Data Mgmt & Spatial Integration
- NY: Data Integration
- OH: Data Governance
- OH: Intersection Inventory
- SC: SC61 Rural Safety Project
- TX: I-37 Interstate Access Justification
- WFL: Road Safety & Traffic Assessment
- WI: SR75 Intersection Screening
- VT: Intersection MIRE Data

https://highways.dot.gov/safety/data-analysis-tools/rsdp/safety-data-case-studies

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Pedestrian and Bicycle Crash Analysis Tool

Version 3 now available!

TECHBRIEF

PBCAT–PEDESTRIAN AND BICYCLE CRASH ANALYSIS TOOL VERSION 3.0

FHWA Publication No.: FHWA-HRT-22-038

FHWA Contact: Ana Maria Eigen, D.Sc., Safety Data and Analysis Team, 202-493-3168, ana.eigen@dot.gov

OBJECTIVE

Pedestrians, bicyclists, and other nonmotorist road users account for a growing share of all U.S. traffic fatalities in recent decades (National Highway Traffic Safety Administration 2019). An even larger number of nonmotorists are seriously injured each year in collisions involving motor vehicles. Addressing these issues requires a national, collaborative, and comprehensive approach to nonmotorized road user safety.

The Federal Highway Administration (FHWA) supports a systemic safety approach and proven safety countermeasures to develop cost-effective projects and programs that address safety risk (FHWA 2021a; FHWA 2021b). Foundational to this approach is a better understanding of nonmotorized road user safety risks, which requires high-quality, objective data. Crash data are a primary data source for analyzing and understanding these crash risks. However, crash data are often not as complete or descriptive for crashes involving nonmotorists as for crashes that involve only motorists. The Pedestrian and Bicycle Crash Analysis Tool (PBCAT) Version 3.0 is the latest iteration of a tool that helps road safety professionals improve crash data about nonmotorist crashes to better understand and address nonmotorist road user safety risks (FHWA n.d.a).

WHAT IS PBCAT?

PBCAT assists agencies in categorizing or crash typing nonmotorist road user crashes and is now in its third version (PBCAT 3). PBCAT allows users to apply an analysis technique known as "crash typing" to derive consistent and objective data from crash report inputs and narratives (Harkey et al. 2006).

PBCAT version 1 (FHWA 1999) and PBCAT version 2 (FHWA 2006), which was released in 2006, served for many years as a national resource for pedestrian and bicyclist crash typing and data enhancement. However, previous versions of the software, which were desktop applications, are no longer compatible with a large proportion of current computer operating systems, and an update was needed. In addition to the functionality issue, there were other reasons to consider an overhaul of the crash-typing logic. A well-defined crash type variable has historically been missing in crash databases for crashes involving nonmotorists. PBCAT 3 is designed to meet the needs of new operating systems and provide a better crash-typing logic.

PBCAT 3 incorporates extensive stakeholder input on the needs and uses for the data. PBCAT 3 builds on previous versions by creating a more accessible, browser-based application available to all users via FHWA's Highway Safety Information System (HSIS) website (FHWA n.d.b). The crash typing workflow also builds on

This document is a technical summary of the Federal Highway Administration report PBCAT Version 3.0 User Guide (Thomas et al. 2021).

U.S. Department of Transportation
Federal Highway Administration

Turner-Fairbank Highway Research Center

Selection Summary

1. Report Number: 1

2. Mode Basic: Powered Personal Conveyance

3. Mode Detailed: Powered or Power-Assisted Stand-up Scooter

4. Relation to Trafficway: On Trafficway

5. Crash Location Type: Intersection

5a. Leg of Intersection: Entry Leg for Motorist

6. Road or Lane Departure: No

7. Non-Motorist Facility Type at Crash: Intersection - Crosswalk

8. Non-Motorist Facility Type Prior to Crash: Sidewalk

9. Motorist Maneuver: R: Turning Right

10. Non-Motorist Maneuver: CR: Crossing Path from Motorist's Right

11. Basic Crash Type: R-C

12. Detailed Crash Type: R-CR

13. Non-motorist Turning: Straight

13a. Overtaking Indicator: Not Applicable

14. Contraflow Indicator: Opposite direction

15. Dooring Indicator: Not Applicable

Back-Make Changes **Accept and Continue**

Based on your selections, the Detailed Crash Type is:

R-CR

Turning Right - Crossing Path from Motorist's Right
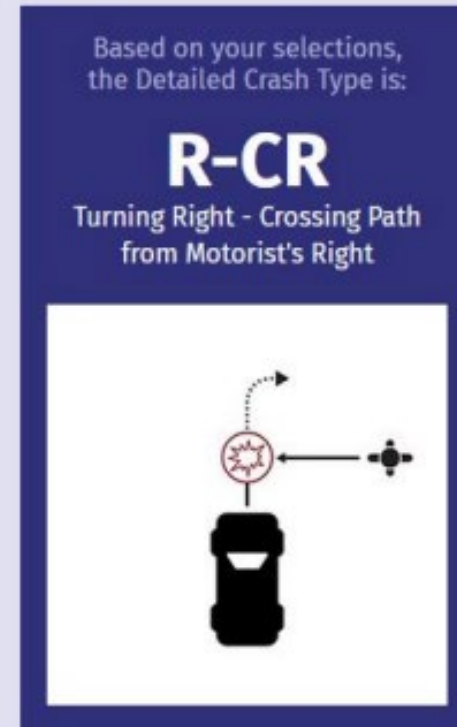
FHWA-HRT-22-038
Source: FHWA

[PBCAT Pedestrian and Bicycle Crash Analysis Tool Version 3.0 User Guide (dot.gov)](#),

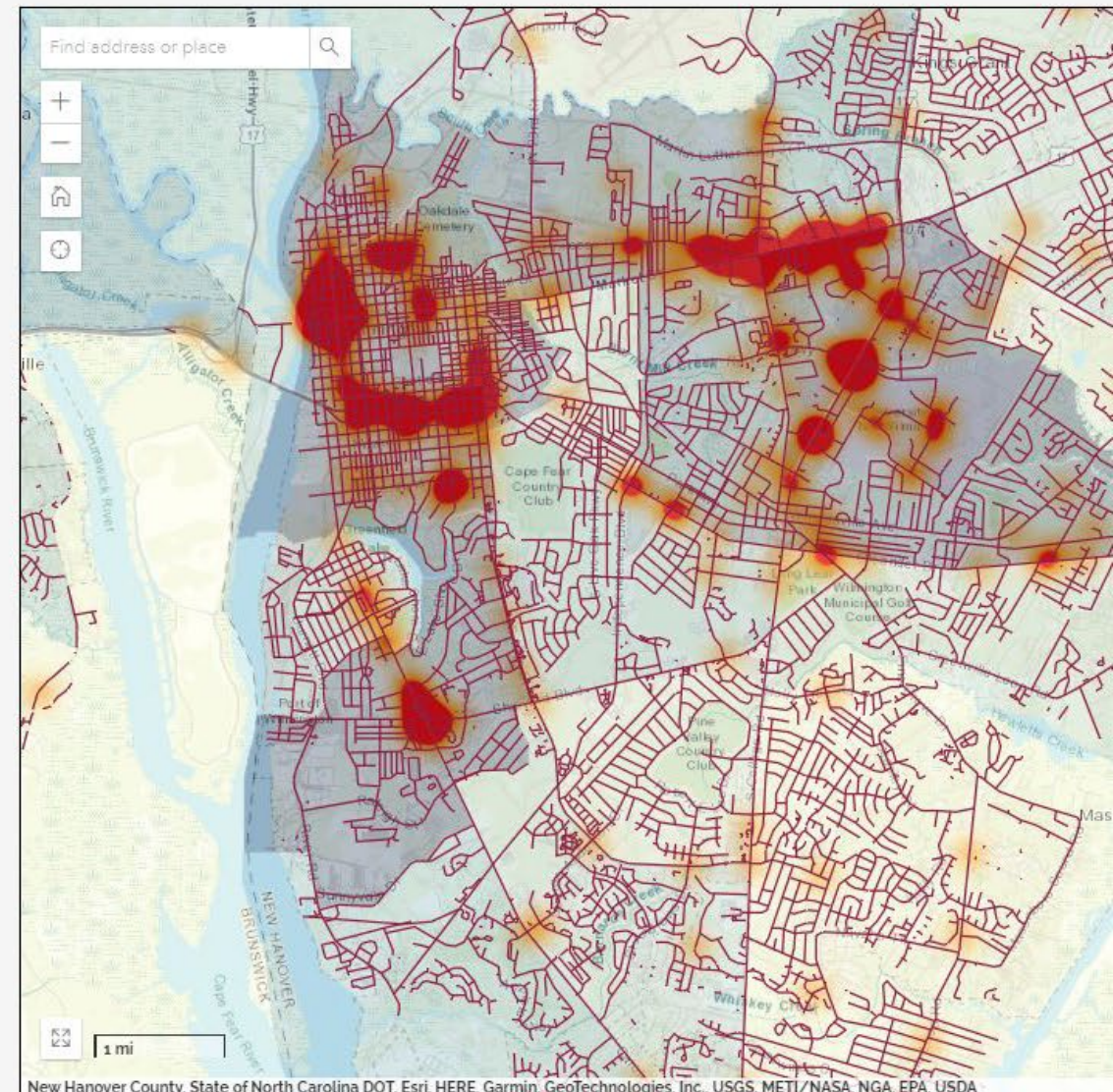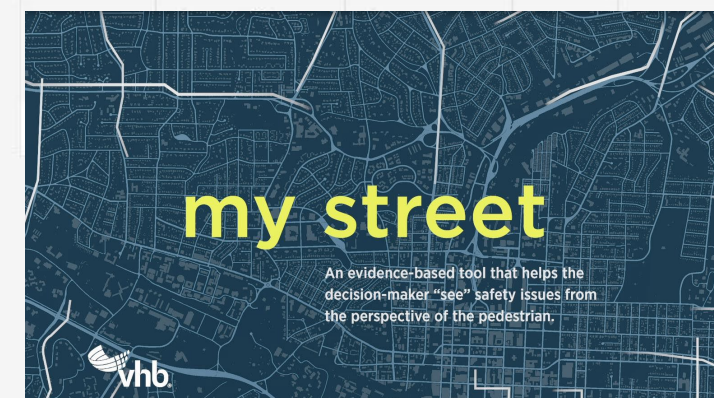https://www.pbcat3.org/

my street

Results

Based on the data you provided. My Street created profiles of the roadway facility types where pedestrian crashes occurred most often. My Street identifies all corridors and segments that matched each of the facility type profiles where crash frequency and crash risk is highest. Explore this map and table to review sites in more detail.

Systemic Analysis Results: Facility Types

Help

	Speed Limit	AADT	Lanes	Fatal	Serious Injuries	Other	Crash Count	Weighted Score
+	Over 40 mph	Over 15000	4+	16	0	95	111	15282.04
+	Under 40 mph	Under 9000	2	5	0	100	105	4845.95
+	Under 40 mph	Over 15000	4+	3	0	42	45	2889.57
+	Under 40 mph	9000-15000	2	2	0	12	14	1910.38
+	Over 40 mph	9000-15000	2	2	0	12	14	1910.38

my street

vhb

New Hanover County, State of North Carolina DOT, Esri, HERE, Garmin, GeoTechnologies, Inc., USGS, METI/NASA, NGA, EPA, USDA

1 mi

Understand Unique Needs of Vulnerable Pedestrians

https://mystreetpedsafety.org

Local Road Safety Plan DIY Site

Updated:
- More videos
- LRSP Template with added SS4A components
- Example Plan list (now table)

More updates in future!

https://highways.dot.gov/safety/local-rural/local-road-safety-plans

Expanding safety data – Yusuf Mohamedshah

Transportation Research Informatics Platform (TRIP) Maturity and Use Cases:

1) Measuring and Monitoring Operational Performance of TSMO Strategies

2) Identifying Secondary Crash Occurrence and Contributing Factors.

3) Non-Recurring Congestion Monitoring and Analysis.

4) Pedestrian Activity and Safety

Development of two Realistic Artificial Datasets (RAD)

1. Multidisciplinary Initiative on Methods to Integrate and Create realistic artificial dataset (MIMIC)

   - MIMIC—Multidisciplinary Initiative on Methods to Integrate and Create Realistic Artificial Data

2. Development and Application of a Disaggregate Realistic Artificial Data Generator for Computationally Testing Safety Analysis Methods (DREDGE)

HSM Implementation PF (22 States) – Derek Troyer/Matt Hinshaw

1. To advance ongoing efforts by lead States to implement the HSM
2. To expand implementation to all states

- Funded over 10 products, including:
    - SPF Decision Guide: Calibration vs. Development
    - SPF Development Guide: Developing Jurisdiction-Specific SPFs
    - Scale and Scope of Safety Assessment Methods in the Project Development Process
    - State Policies and Procedures on Use of the HSM
    - Highway Safety Benefit-Cost Analysis Guide and Tool
    - Crash Costs for Highway Safety Analysis
    - Safety Performance for Intersection Control Evaluation (SPICE) Screening Tool and Guide
    - Safety Analysis Needs Assessment for TSMO Applications
    - Countermeasure Service Life Guide
    - Safety Data and Analysis Case Studies (ongoing)
    - Advancing Application of DDSA (ongoing)
        - Explore the validity of combining predictive methods
        - Develop an implementation approach for NCHRP 17-62
        - Develop a Communications Guide for explaining safety analysis to non-safety professionals

https://www.pooledfund.org/Details/Study/484

HSM2 Implementation PF – Derek Troyer/ Matt Hinshaw

- Accelerate implementation of HSM2 and related analytical tools to assess current and future safety performance of existing roadways and alternative designs, and help practitioners make more informed decisions, better target investments, and reduce fatalities and serious injuries on the nation's roadways.
- Includes activities before and after publication of HSM2
- This study will conduct research and develop products to enable States to accelerate their implementation of HSM2.
- A Technical Working Group consisting of one representative from each participating agency will help identify and prioritize the specific tasks and products.
- Requested commitment is $80,000 over five years ($16,000 per year)
- 100% SP&R waiver obtained
- FL, ID, IA, KS, KY, MO, MS, OH, PA, TX, WA have all made commitments

https://www.pooledfund.org/Details/Solicitation/1577

SHRP2 Naturalistic Driving Study PF (7 States) – Charles Fay

- Verification and Calibration of Microscopic Traffic Simulation Using Driver Behavior and Car-Following Metrics for Freeway Segments
- Incorporating the Impacts of Driver Distraction into Highway Design and Traffic Engineering
- Freeway Guide Sign Performance at Complex Interchanges: Reducing Information Overload
- Investigating How Multimodal Environments Affect Multitasking Driving Behaviors
- Validation of Performance-Based Design
- Developing Speed Crash Modification Factors (CMF) Using SHRP 2 RID Data

https://www.pooledfund.org/Details/Study/613

Human Factors Research Related to Vehicle Automation Safety – Brian Phillips

- **Transportation Systems Management and Operations (TSMO).**

- **Adaptation to automation.**

- **Infrastructure.**

- **Truck platooning.**

- **Vulnerable road users.**

All photos source: FHWA.

Vulnerable Road User Research Studies - — Brian Phillips

Separated Bike Lane (SBL)

© 2020 Texas A&M Transportation Institute (TTI).

Right Turn Radius

Original Photo: © 2019 Google. Modifications: FHWA.

Warning Sign with LED

Source: Modifications by FHWA.[1]

[1]FHWA. 2009. *Embedded LEDs in Signs.* Report No. FHWA-SA-09-006. Washington, DC: FHWA.

Evaluation of Low-Cost Safety Improvements PFS (41 states) – Carol Tan

Coming Soon!

- HRT-22-115: **Development of Crash Modification Factors for Wrong-Way-Driving Countermeasures**
- HRT-22-112: **Techbrief: Development of Crash Modification Factors for Wrong-Way-Driving Treatments**
- HRT-22-XXX: **Compendium of Wrong-Way-Driving Treatments**
- HRT-23-020: **Development of Crash Modification Factors for Bicycle Treatments at Intersections**
- HRT-23-031: **Techbrief: Development of Crash Modification Factors for Bicycle Treatments at Intersections**

https://highways.dot.gov/research/safety/evaluations-low-cost-safety-improvements-pooled-fund-study/evaluations-low-cost-safety-improvements-pooled-fund-study-elcsi%E2%80%93pfs

Intersections – Wei Zhang

Coming Soon!

- HRT-22-XXX: *Development of Crash Modification Factors for Mini Roundabouts*

- HRT-22-109: *Techbrief: Development of Crash Modification Factors for Mini Roundabouts*

HSIS – Carol Tan

2023 Excellence in Highway Safety Data Award

.....encourages students to prepare for a career in highway safety by using high-quality data and prioritizing safety in research

— Papers due: March 1, 2023, 11:59 p.m. Eastern Standard Time —

https://www.hsisinfo.org/award.cfm

https://www.hsisinfo.org/pdf/2023_HSIS_DataContestFlier.pdf

HRSO Vacancy

Open Now!

- Office of Safety and Traffic Operations Research and Development, Safety Data & Analysis Team is seeking a Research Engineer

- Responsible for Development of Crash a Modification Factors Program and managing the Evaluation of Low-Cost Evaluation Pooled Fund Study.

- Position located at FHWA Turner-Fairbank Research Center, McLean, VA (GS-13/14).

- Open to internal and external candidates

- Please reach out to Carol Tan (Carol.Tan@dot.gov) with any questions!

- **Applications due February 2, 2023**

- **https://www.usajobs.gov/job/698625900**

AASHTO Update

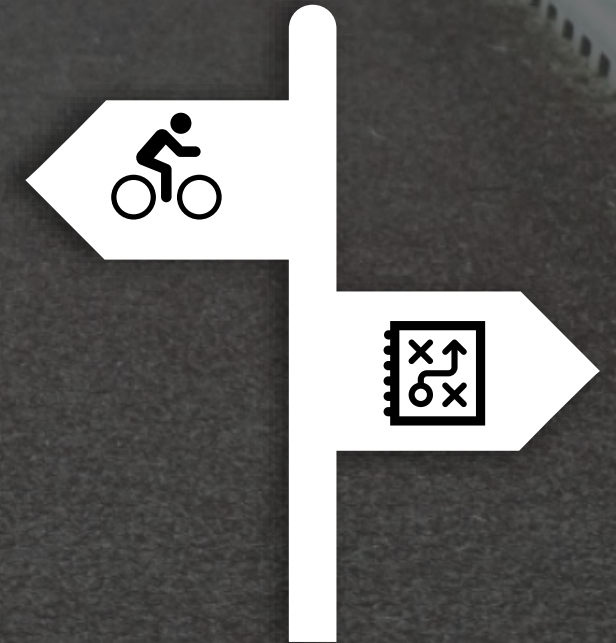Stephen W. Read, P.E. Virginia DOT

ACS 20 Annual Meeting January 12, 2023

Agenda

- HSM Support
  - NCHRP 17-71A
  - Practical Applications
  - User Forum
  - Part C Tools
- Ongoing AASHTO Outreach Activities
  - COS Subcommittees
  - COS Workgroup on Safety Data
  - COS

HSM2 17-71A On-going Support

- Coordinated and participated in reviews
- Identified areas to support HSM user needs
- Working on timing and scope of final AASHTO review
- Final coordination though AASHTO balloting and publication

HSM Practical Applications

- Identified 11 recommendations

- Developing draft RFP language

- Coordinating with FHWA, NCHRP to determine opportunities

HSM User Forum

- Determining AASHTO system compatibility
- Considering liability and policy
- Coordination with the HSM Pooled Fund Study
- While under development
  - ✓ Continue to keep FAQs current
  - ✓ FHWA case studies are effective in demonstrating HSM applications
  - ✓ Consider HSM email to ask for or share input

HSM Part C Tools

- Coordination with Software Developers
  - ➢AASHTOware meeting

- AASHTO / TRB Joint Webinar on the Evolution of HSM Tools for Part C Calculations, Anticipated Spring 2023

- ULSC Discussion
  - ➢Management of Current HSM Tools
  - ➢Future Needs

- Developing draft guidance on characteristics of the tools to address HSM user needs

AASHTO Committee on Safety Subcommittees

- Towards Zero Deaths

- Safety Data and Performance Management

- Safety Analysis and Evaluation

AASHTO / TRB Webinars

- *Implementing the Safe System Approach*
  - Led by the AASHTO TZD Subcommittee
  - Held on December 7, 2022
  - Featured case studies of SSA in planning and design
    - https://safety.transportation.org/subcommittees/toward-zero-deaths-tzd/

AASHTO Committee on Safety Workgroup

- Safety Data Workgroup:
  - Committees on Safety and Data Management and Analytics and Analytics joint workgroup to discuss safety data issues
  - Webinars Planned
    - Collection and use of vulnerable road user data, for Vulnerable Road User Assessments
    - Collection and Use of Near-Miss Data
    - Lidar for Safety Applications

AASHTO Committee on Safety

- Next Meeting:
  - After June 2023
  - In conjunction with the AASHTO Council on Active Transportation and Committee on Planning
  - Topics may include:
    - Tools for considering safety in planning
    - NCHRP 17-81 planning level models
    - Vulnerable Users methods

AASHTO Committee on Safety

- AASHTO President is Roger Millar, Washington State DOT

- Focus area is a resilient transportation system, which is safe, smart, and sound.

- Discussions about holding a Safety Summit

    - In conjunction with committees (Safety, Active, and Planning)

HSM2 Steering Committee and Tech Safety Publications Sub-Committee

Thank you to our dedicated Steering Group members!

Working to clarify longer term role and scope of committees

- Stephen Read, Chair (Virginia DOT)*
- Bonnie Polin, Co-Chair (Massachusetts DOT)*
- Dennis Emidy (Maine DOT)
- Jason Hershock (Pennsylvania DOT)*
- Christina McDaniel-Wilson (Oregon DOT)
- Jianming Ma (Texas DOT)

- Jason Siwula (Kentucky TC)
- Dibakar Saha (Florida DOT)
- Trey Tillander (Florida DOT)
- Trey Jesclard (Louisiana DOT)
- John Milton (Washington DOT)*
- Kelly Hardy (AASHTO)*

* 17-71A Panel Members

Thank you.

Questions?

Stephen Read – Virginia DOT   stephen.read@vdot.virginia.gov

Bonnie Polin – Massachusetts DOT   bonnie.polin@state.ma.us

Kelly Hardy – AASHTO   khardy@aashto.org

Business Meeting Agenda (2)

11:50 am   Other News

- Related PIARC Activities, John Milton
- Upcoming Events
- Reports from other Committees/Organizations
- Open Floor

12:00 pm   Adjourn

Thank you and safe travels!