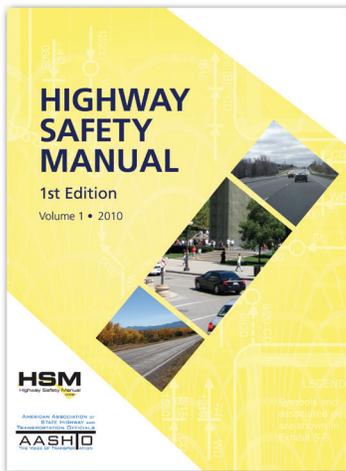


A Revolution in Highway Safety Planning

The first edition of the *Highway Safety Manual* is the product of more than \$3 million of NCHRP research over 10 years. Using quantitative methods, the manual gives practitioners state-of-the-art tools to predict and evaluate the safety-related impacts of transportation decisions throughout the project development process.



The first edition of the *Highway Safety Manual* is a milestone in science-based safety planning.

Making Safety a Science

The safety of the traveling public on the nation's roadways is a top priority among transportation agencies, both at the national and the state levels. Yet even as recently as 1999, planners, designers, and traffic engineers had no consistent and reliable way to predict the safety impacts of decisions made throughout the project development process. Without a standard, data-driven approach available for anticipating potential crashes, safety considerations often took a back seat to other planning and development considerations.

In 1999, a TRB joint task force was established to initiate the development of an authoritative guide for evaluating the safety performance of transportation projects. With strong support from AASHTO and FHWA, TRB spearheaded a 10-year research and development process that led to publication of the nation's first *Highway Safety Manual* (HSM) in 2010.

The HSM fundamentally changes the way transportation professionals develop projects by supporting a quantitative safety evaluation of specific treatments or programs and predictive modeling of the safety impacts from varying geometric or operational decisions. The HSM consists of four parts, all

intended to support front-line decision making in transportation agencies:

- Part 1: Introduction, Human Factors, and Fundamentals of Safety
- Part 2: Roadway Safety Management Process
- Part 3: Predictive Methods
- Part 4: Crash Modification Factors

NCHRP Projects 17-18(4), 17-26, 17-27, 17-29, 17-34, and 17-36 provided the foundational research and production coordination for this edition. Additional studies fed into the ultimate manual and are contributing to ongoing enhancements.

Paths to Practice

Building the foundation

It was clear from the start that developing the new manual would require extensive and sustained coordination among multiple organizations, not only to effectively conduct the research needed to develop the HSM content but also to provide the organizational channels needed to produce, distribute, and promote the results. The new TRB joint task force spearheaded development of the HSM and provided the necessary framework for ongoing collaboration among TRB, AASHTO, and FHWA.

"It was a formal and committed process," says Geni Bahar, the investigator with NAVIGATS Inc. for HSM Parts 1 and 2. "Going from a report to a manual involved many years of work with volunteers from TRB and practitioners around the country." Each step in the development process

"It was a formal and committed process."

required extensive review and approval from the NCHRP project panels guiding the research, the TRB task force coordinating the overall effort, and the AASHTO committee

"We presented the science as it evolved to the TRB committees to make sure they were aware of what we were doing as we were doing it."

that would ultimately publish the manual. "We had to get the trust as well as the confidence of the professionals and researchers together to encourage adoption of the HSM," Bahar says.

Raising awareness, anticipating challenges

Getting support for the HSM at the national level was only the beginning, however. The TRB task force members knew that getting buy-in for the HSM among end users would

(continued)

Implementation Strategies AT A GLANCE

- **Cooperative National Effort:** Developing and implementing the *Highway Safety Manual* required broad and sustained collaboration among TRB, AASHTO, FHWA, and other transportation stakeholders.
- **Engaging End Users:** TRB established a user liaison subcommittee that was dedicated to educating end users about HSM, inviting feedback, and addressing practitioner concerns.
- **Providing Implementation Tools:** TRB, AASHTO, and FHWA worked together to support practitioner implementation by producing companion tools and resources and funding pilot implementations.

NCHRP—Transportation research that works

Objective national highway research since 1962 • Focused on practical problems of state DOTs • Contract researchers competitively selected • Overseen by balanced panels of technical experts • Reviewed by TRB highway specialists

be critical for widespread implementation. The task force established a user liaison subcommittee to identify potential HSM users and effective approaches to promoting the new concepts in the manual.

Chaired by Bahar, the subcommittee began simply by spreading the word about HSM at TRB conferences and inviting technical feedback from TRB committees. The group's work quickly became more formal, with systematic outreach efforts planned during frequent meetings and teleconferences. "We presented the science as it evolved to the TRB committees to make sure they were aware of what we were doing as we were

"We needed to create enough know-how to overcome the fears of change."

doing it," Bahar says. "We also invited state DOT engineering practitioners, through AASHTO, into the process throughout the HSM development. We worked with both sides—the TRB researchers as well as the practitioners who would be adopting and using the manual—so that when the manual was ready, there would be confidence and understanding."

HSM Implementation Tools and Support

- HSM web portal: www.highwaysafetymanual.org
- *HSM Implementation Guide for Managers* (including who to involve, how to address questions, what additional data may be needed, how to develop an implementation plan, and lessons from lead states)
- *Integrating the HSM into the Highway Project Development Process* (including planning, design, operations, and maintenance)
- Protocols and guidance documents for using crash modification factors and other resources with the HSM
- Lead state pilot implementation projects funded through NCHRP
- Companion tools and AASHTOWare, such as FHWA's Safety Analyst, Crash Modification Factors Clearinghouse, and Interactive Highway Safety Design Model
- Brochures, training materials, and technical support
- Workshops and webinars
- HSM User Discussion Forum

The subcommittee members also worked hard to acknowledge and address the concerns and challenges standing in the way of implementation in the states. For example, the data-driven approaches to safety quantification in the HSM represented a huge shift in practice for most transportation agencies. "The practice was far away from what we were trying to bring forward," Bahar says. "We needed to create enough know-how to overcome the fears of change."

Some states also expressed concerns about potential liability in relying on the manual to estimate safety impacts. The task force involved planners and legal experts to address potential issues throughout the development process.

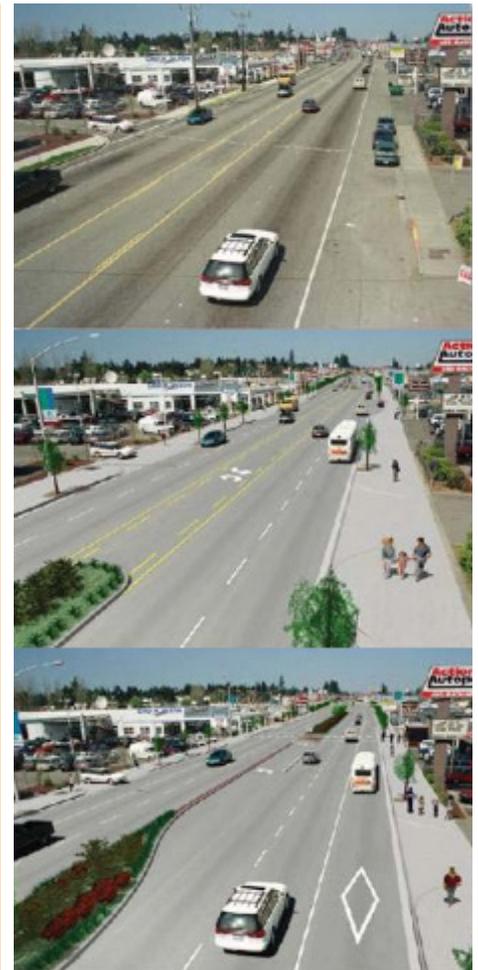
Providing tools and technical support

Since the *Highway Safety Manual* became ready for purchase and use by practitioners in 2010, TRB, AASHTO, and FHWA have made every effort to provide support and guidance for putting the HSM into practice. A comprehensive HSM online portal (www.highwaysafetymanual.org) developed by AASHTO provides a single place to access numerous HSM guidance and reference documents, case studies, protocols, brochures, and training materials. An HSM User Discussion Forum also promotes information sharing and problem-solving among practitioners.

Leanna Depue, highway safety director at the Missouri DOT, says that implementation on this scale is always a work in progress. "You can't just produce a manual," she says. "You have to develop implementation strategies and nurture implementation. It's going to require updating for many years to come."

Implementation Success

The HSM has already been implemented in some form by more than half of the states, expedited through the participation of 21 DOTs as lead states or support states in the Lead States Initiative for Implementing the *Highway Safety Manual* (NCHRP 17-50). FHWA has also published case studies on HSM implementation in five states (Florida, Illinois, Idaho, New Hampshire, and Ohio), highlighting how transportation agencies are moving forward with enhancing their data collection efforts, developing new policies, assessing their skill gaps, and developing implementation plans to support HSM use.



The HSM methodology allows for the systematic comparison of design alternatives and their anticipated impacts on safety.

The TRB Highway Safety Performance Committee (ANB25) has taken the place of the joint task force to continue implementation coordination of the HSM with AASHTO and FHWA. These efforts include new research projects that will help enhance and expand agency capabilities when using the manual. Even as the methodology advances and evolves, the first edition of the HSM will remain a true milestone in science-based safety planning—the core of a fundamental shift in how transportation agencies plan for safety throughout the project development process.

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