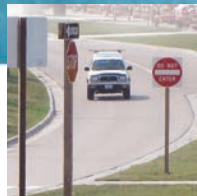
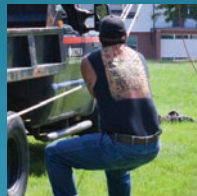


Connecticut Technology Transfer

Summer 2011



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The Science of Highway Safety

Highway Safety Manual is a Valuable Tool for Local Agencies

By John Ryyanen, Editor Center for Technology & Training,
Michigan Tech Transportation Institute

As a civil engineer (or one who works closely with civil engineers) you know that when you're designing an intersection and you have a question about sight distance, you can look in the American Association of State Highway Transportation Officials (AASHTO) A Policy on Geometric Design of Highways and Streets, also known as the AASHTO Green Book, for an answer. Similarly, when you have a question about signs, pavement markings and signals for the same intersection, you know you will find all the answers in your copy of the Manual on Uniform Traffic Control Devices, or MUTCD.

"Nothing about the HSM constitutes a legal standard, nor does it mandate responsibilities. It's simply a great tool for making informed decisions about how to allocate resources to address safety issues most effectively." Priscilla Tobias - Illinois Department of Transportation

But where do you look when you have a question about traffic safety? For example, what is the safest method for handling left turn movements at a four-way signalized intersection? Until recently, you would have had to sift through multiple sources of information (including, probably, the AASHTO Green Book, the MUTCD, and published research reports) to find an answer to such a question. But there was no guarantee that you would find a definitive answer. The question about left turn movements exposes a dilemma that

Highway Safety continued on page 4

2010 Hot Mix Asphalt Paving Awards

At the 53rd Annual Paving Conference hosted on April 25, 2011 by the CAAPA (Connecticut Asphalt & Aggregate Producer's Association), the CCIA (Connecticut Construction Industries Association) and the Connecticut Department of Transportation, the following awards were presented:

To recognize a quality HMA Pavement placed on a municipal roadway, the following team exemplified the highest standards of paving excellence.

Location: Meadow Road and Red Oak Hill Road, Farmington
Prime Contractor: Tilcon Connecticut, Inc.
Paving Contractor: Tilcon Connecticut, Inc.
Milling Contractor: Gorman Brothers
Inspection Agency: Town of Farmington

To recognize a quality HMA Pavement placed on a limited access roadway, the following team exemplified the highest standards of paving excellence.

Location: Interstate 91 Southbound in Rocky Hill and Cromwell
Prime Contractor: American Industries, Inc.
Paving Contractor: American Industries, Inc.
Milling Contractor: Costello Industries, Inc.
Inspection Agency: ConnDOT – District I – Office of Construction

To recognize a quality HMA Pavement placed on an unlimited access roadway, the following team exemplified the highest standards of paving excellence.

Location: Route 165 – Preston/Griswold
Prime Contractor: American Industries, Inc.
Paving Contractor: American Industries, Inc.
Milling Contractor: Black & Boucher
Inspection Agency: ConnDOT – District 2, Office of Maintenance



Town of Farmington

Connecticut Technology Transfer

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Connecticut's First Fully Pre-Cast Concrete Bridge is Constructed

Connecticut's first fully Pre-Cast Concrete Bridge, carrying South Maple Street over the Scantic River, was erected in Enfield in late summer/early fall of 2010. The bridge replaces a structurally deficient 66-foot single span steel through truss bridge. Pre-casting techniques were utilized on the new 82-foot single span bridge to expedite construction duration at this culturally and environmentally sensitive location. Under full road closure, construction was completed in only 4 months, including the demolition of the deficient bridge, and construction of the new bridge and its roadway approaches.

In contrast, the estimated construction duration for a traditional cast-in-place installation at the location exceeded a year.

The Capitol Regional Council of Governments (CRCOG) was responsible

for assisting in programming the federal monies associated with this project. Extensive coordination and timely problem solving was necessary between the Town of Enfield, CRCOG, ConnDOT, Tectonic Engineering and Surveying Consultants, Manufacturers, Contractors and Inspectors to meet the aggressive schedule.



Prefabricated Bridge Elements and Systems



Photos courtesy of FHWA

With Prefabricated Bridge Elements and Systems (PBES), many time-consuming construction tasks no longer need to be done sequentially in work zones. An old bridge can be demolished while the new bridge elements are built at the same time off-site, then brought to the project location ready to erect. Because PBES are usually fabricated under controlled climate conditions, weather has less impact on the quality, safety, and duration of the project. The use of PBES also offers cost savings in both small and large projects. The ability to rapidly install PBES onsite can reduce the environmental impact of bridge construction in environmentally sensitive areas.

For more information on this and other technologies highlighted in the Every Day Counts initiative, visit: www.fhwa.dot.gov/everydaycounts

Save the Dates! Upcoming Technology Transfer Center Trainings

Construction Math & Plan Reading
July 21

Principles of Drainage
August 9, 10 or 11

Road Safety 365 for Local Governments
August 18

Public Works Construction Projects
August 24

Supervisory Skills
August 30 or 31

Chainsaw Safety and Operations
September 7 or 8

Effective Communication Skills
September 13, 14 or 15

Technology Transfer Expo
September 21 (call for your free tickets)

**Competent Person for
Trenching & Shoring**
October 12 or 13

For more information and to register, visit us at:

www.t2center.uconn.edu



Highway Safety continued

safety professionals have grappled with for years: What constitutes safety on a road? Must a road simply adhere to established design standards to be considered safe, or does it require something more?

Standards Not Enough

Dr. Ezra Hauer, Professor Emeritus in the Department of Civil Engineering at the University of Toronto and internationally-recognized highway safety expert, introduced the adjectives “nominal” and “substantive” to help shed more light on the topic of roadway safety. In a 1999 paper titled *Safety in Geometric Design Standards*, Hauer wrote, “Nominal safety is judged by compliance with standards, warrants, policies and sanctioned procedures ... substantive safety is measured by expected crash frequency and severity.” (Hauer 1999a) The problem with defining safety as a function of compliance with standards, Hauer asserted, is that “Limit standards do not tell the designer what the safest design is. Rather, they specify the limit of what is permissible.” (Hauer 1999b).

Today the Highway Safety Manual (HSM), which is available through AASHTO, is the definitive source of substantive answers to roadway safety questions. The manual was developed and refined by a

diverse team of roadway safety stakeholders over the past ten years to provide a single source for safety information and tools in a form that facilitates data-based decision-making.

Major Effort

Creation of the HSM began in May 2000 under the direction of a group of volunteers from eight different subcommittees of the Transportation Research Board (TRB) in Washington DC. Research and development for the effort was funded in large part by the National Cooperative Highway Research Program (NCHRP). The Federal Highway Administration (FHWA) provided supplementary funding and research support.

In 2006, a decision was made to publish the HSM as an AASHTO document, at which point a Joint Task Force was formed with representatives from the AASHTO subcommittees on Design, Traffic Engineering and Safety Management. Over the next three years, the task force examined the HSM to ensure that it would meet the needs of State Departments of Transportation and local agencies. During that time, members of the task force also worked to promote the HSM

within their respective subcommittees.

In 2009, after nine years of intensive development and careful refinement, the AASHTO board of directors approved the HSM for distribution.

Valuable Resource, But Not a Standard

Priscilla Tobias, Bureau Chief of Safety Engineering for the Illinois Department of Transportation (IDOT) serves as Chair of the task force that oversees the maintenance and on-going development of the HSM. She is extremely pleased that such a powerful tool is available for road owning agencies. “This manual represents the best safety-related science of our day,” she said. “And it has been thoroughly vetted by safety experts and representatives from all groups involved with roadway safety to make sure it’s accurate and relevant for all stakeholders. This is the first time we have had such a resource.”

Tobias is careful to stress that the HSM is not a standard, like the MUTCD. “The manual is intended as a guide; nothing about it constitutes a legal standard, nor does it mandate responsibilities,” she said. “It’s simply a great tool for making informed decisions about how to allocate resources to address safety issues most effectively.”

New Direction in Highway Safety

The key to the manual’s usefulness lies in its thorough, scientific approach to identifying, analyzing and solving safety problems. First, by accounting for the statistical phenomenon of regression to the mean, many methods of site selection in the HSM help road agencies zero in on the most relevant sites by eliminating from consideration sites that are at a randomly high or low fluctuation in crashes. After a site is identified, the HSM provides a means for analyzing the safety impact of decisions at all stages of the project development process, which enables practitioners to quantify the effectiveness of safety improvements along with other transportation performance measures. Finally,



Dedicated turn lanes, pedestrian refuge areas, adequate signage, and wide separation between traffic lanes all contribute to the safety of a road. The new Highway Safety Manual provides guidance for determining the best treatments to address safety concerns.

Highway Safety continued on page 5

the HSM includes an extensive catalog of proven crash modification factors (CMFs) for a variety of geometric and operational treatment types. Using CMFs, practitioners can predict the safety impact that a potential treatment or design may have on their road system.

Highway safety expert Dr. Hauer is pleased that the manual is available. "Publication of the Highway Safety Manual indicates wide recognition of the need for approaching safety in some evidence-based manner. With procedures that examine safety quantitatively rather than subjectively, the document is an important first step in the right direction."

Early Adopters Lead the Way

At three volumes and nearly one thousand pages, the HSM contains a formidable amount of information, especially for those who are not experienced in the practice of analyzing and improving roadway safety. To help disseminate new information in the manual and to encourage road-owning agencies to use it, the NCHRP is

"The problem with defining safety as a function of compliance with standards is that limit standards do not tell the designer what the safest design is. Rather, they specify the limit of what is permissible."

Dr. Ezra Hauer – Professor Emeritus, University of Toronto

sponsoring an effort that involves showcasing different states' experiences with the HSM. The effort, officially titled the Lead States Initiative for Implementing the Highway Safety Manual, involves state and local transportation officials in thirteen states.

The project manager for the Lead States Initiative is Charles Niessner, senior program officer at NCHRP. To kick the project off, Niessner worked with Tobias' AASHTO task force on the HSM to solicit participants from among State Departments of Transportation (DOTs). He was encouraged by the response. "Thirty DOTs initially

expressed interest," Niessner said. "That was encouraging. We didn't expect that kind of response from the states because launching something like this is not a simple thing—it's a major effort." Niessner thinks the willingness to get involved is thanks to the requirement in the transportation bill of 2005 (Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users, or SAFETEA-LU), that required each state DOT to establish a strategic highway safety plan by October 1, 2007. "Requiring strategic highway safety plans really elevated the importance of roadway safety and helped everyone move more purposefully in that direction. I think the response to our invitation shows that our State DOTs see the HSM as another great tool to help refine our collective approach to improving the safety of our roads."

Not Just for State DOTs

Tony Giancola, Executive Director of the National Association of County Engineers (NACE) is also excited about the availability and relevance of the HSM for road-owning

agencies across the country. "This is a very useful tool," he said. "It will be a big help for road agencies at state and local levels as they evaluate, design, plan for and implement safety improvements in their respective communities."

Everyone familiar with the HSM agrees that it will be a great tool for improving roadway safety, but some are expecting more—especially those who have experience with implementing safety improvements at the local level. Wayne Schoonover, P.E.,

County Highway Engineer for Ionia County Road Commission in Michigan, says the HSM could help local road agencies pay for road projects. He has been



DR. JOHN IVAN, Professor and Associate Head of the Department of Civil & Environmental Engineering at the University of Connecticut was a member of the Task Force for the Creation of a Highway Safety Manual (now the Committee on Highway Safety Performance) and was the Chair of the task group for Chapter 14 "Crash Modification Factors for Intersections". Dr. Ivan is now the Chair of the Subcommittee on Predictive Methods.

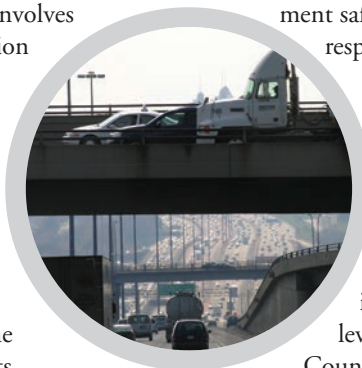
an enthusiastic participant in the Michigan Department of Transportation's (MDOT) Local Safety Initiative program since it was created in 2004. "The success we've had in securing federal safety funding for Ionia County road improvements is a great example of the value of a data-driven approach to safety," Schoonover said. "If not for the quantifiable solutions that MDOT's Local Safety Initiative group helped us define, we would not have qualified. The Highway Safety Manual can help any agency define quantifiable solutions to their safety problems, which could help them secure similar funding."

For more information about the Highway Safety Manual, including how to order it, please visit www.highwaysafetymanual.org.

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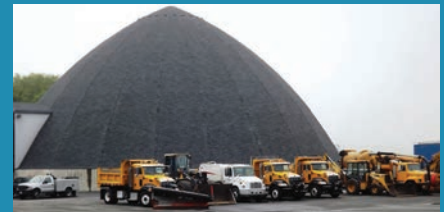
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City of Danbury Commemorates 2011 National Public Works Week with a Public Works Education Day

Each year, the City of Danbury hosts a Public Works Day to increase awareness of the important role of public works in the quality of life of Danbury citizens. This year the event was held on May 23, 2011 and the entire second grade of Ellsworth Elementary School (90 children) was in attendance. Each year the Department invites a different elementary school to participate. Every Public Works Division has an exhibit and the employees try to have an interactive activity for the children. A tour of the public works facility is given which includes a hay ride, something the children thoroughly enjoyed. The complex is also open to the public. Lunch was served to all the visitors and the entire event is funded through sponsorship. The sponsors have always supported the event willingly. After the children leave, the City has an employee recognition ceremony and each division of the Public Works Department awards an employee for their service. It is a great day and a nice team building event for our entire Public Works Department. *Great Job City of Danbury!*



The City of Danbury Public Works Divisions that participate in the educational event:

- **Public Utilities (Sewer & Water)**
- **Public Buildings**
- **Construction Services**
- **Engineering**
- **Public Services (Park Maintenance, Equipment Maintenance, Highway & Forestry)**



Technology Transfer Center Request Form

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Please add this person to the mailing list. Please remove this person

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Title: _____

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I would like to see a future newsletter article on the topic of: _____

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I would like to request the following informational resource materials:

Please fax a copy of this form to (860) 486-5718 or mail to:

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