Collaborative Approaches to Using and Implementing FHWA’s Interactive Highway Safety Design Model (IHSDM) by Michael Dimaiuta, Genex Systems

University – Agency Collaboration on IHSDM-Related Initiatives

Abstract

FHWA’s Interactive Highway Safety Design Model (IHSDM) is a suite of software analysis tools for evaluating safety and operational effects of highway geometric design decisions. IHSDM includes six evaluation modules (Crash Prediction, Design Consistency, Intersection Review, Policy Review, Traffic Analysis, and Driver/Vehicle) that support decision making in the highway design process. This presentation highlights university-agency collaboration on IHSDM-related initiatives.

Implementation Plan for Agency Use of IHSDM

Case Study: “Scoping Study for Implementation of the Highway Safety Manual in Alabama” - Performed by University Transportation Center for Alabama (Univ. of Alabama) for the Alabama DOT (2011)

The objective is to develop a plan to optimize the implementation of the AASHTO HSM methodologies and FHWA’s supporting software, including... IHSDM.” Project Tasks include: “perform an...analysis of developing IHSDM in Alabama, including general data availability, training needs and associated costs for incorporating IHSDM into Alabama’s traffic safety analysis, an assessment of the advantages and disadvantages of its use, and an evaluation of how the...Critical Analysis Reporting Environment (CARE) software can work with IHSDM”

Case Study: “Indian Reservation Roads (IRR) and Local Roads Modeling and Management Databases” – by North Dakota State University for Tribal/Local Planners (Mountain-Plains Consortium, Project MPC-294, 2007-08)

Tribal and local planners cannot use many of the software management and analysis tools available to state transportation agencies due to data and resource limitations. Project objectives include “...develop a deployment strategy for implementing the IHSDM on IRR segments. The implementation of safety analysis tools such as IHSDM will be tested and evaluated. If data permit, several IRR and local roadway sections will be selected and analyzed with IHSDM; Evaluate the implementation of IHSDM for IRR and local transportation systems.”

Model Development, Calibration and Validation

Case Study: Calibration of IHSDM/HSM Crash Prediction Models – University of Kansas for the Kansas DOT (2010)

Kansas DOT provided data to the University of Kansas (KU) for calibrating the rural two-lane highway segment prediction model. KU used the IHSDM CPM to develop calibration factors, and provided recommendations on the most appropriate level of calibration for Kansas (e.g., one State-wide factor vs. regional or county-level factors).


The state-specific SPF’s can be entered into IHSDM and used in the Crash Prediction Module.

Technology Facilitation

Develop IHSDM Training for Universities (by Agencies and/or Universities)

Develop IHSDM Training for Agencies (by Universities)

Host IHSDM Training Sessions and/or Workshops

Case Studies:
• Kansas University Transportation Center / Kansas LTAP hosted NHI’s IHSDM training course in 2009
• Montana State University hosted IHSDM Workshop in 2006

Evaluation / Adaptation of IHSDM for Agency Use

Case Study: Evaluation of the applicability of the Interactive Highway Safety Design Model to safety audits of two-lane rural highways – BYU for Utah DOT (2011)

To determine if IHSDM can be adopted into the engineering decision making process in Utah, BYU conducted a study under the supervision of the Utah Department of Transportation (UDOT) to evaluate its applicability to audit safety of two-lane rural highways in Utah.


The Policy Review Module and the Crash Prediction Module (CPM) were adapted to Spanish conditions. The CPM basic algorithm was calibrated using Spanish highway and crash data. IHSDM was then experimentally applied in the safety review of 3 highway sections located in Biscay and Madrid. The results indicate that the application of IHSDM could be useful in the verification of the geometric design of existing highways as well as in highway rehabilitation projects. The analysis was completed with the application of the Design Consistency Module.

Case Study: “Adaptation of IHSDM to New Zealand Conditions – University of Canterbury” (2009–10)

“Adjustments included the calibration of the Crash Prediction Module and the addition of local design guidelines to the Policy Review Module. A road project was evaluated... The preliminary results showed that the IHSDM software is a valid tool to evaluate safety and operational conditions in the design of roads in New Zealand.”

References

1. Suits, M. and K. Chen, Evaluation of the Applicability of the IHSDM to Safety Audits of Two Lane Rural Highways, Utah DOT Report No. UT-08-02, prepared by Brigham Young University, March 2008