



Florida Department of Transportation Research Improved Processes for Meeting the Data Requirements for Implementing the Highway Safety Manual (HSM) and SafetyAnalyst in Florida – BDK80-977-37

Similar to an ill patient, road safety issues can also be diagnosed, if the right tools are available. Statistics on roadway incidents can locate areas that have a high rate of incidents and require a solution, such as better signage, lighting, better road design, or others. Recent highway safety research has focused on more advanced, statistically proven techniques of highway safety analysis. Two very recent safety analysis tools that incorporate this research are the Highway Safety Manual (HSM) and SafetyAnalyst, a software suite. Both tools aim to help planners reduce crashes.

HSM and SafetyAnalyst are similar in using location-specific data about roadway and intersection characteristics and safety performance with advanced statistical methods to develop predictive equations. Planners can use these equations to examine how changes to characteristics might improve safety performance. Where HSM and SafetyAnalyst differ is in scale of focus and data requirements. The HSM helps designers examine in detail the impacts of safety interventions at individual sites on rural two-lane roads, rural multilane highways, and urban and suburban arterials. “Detail” is key here, meaning that HSM requires very detailed roadway characteristics and crash information. By contrast, SafetyAnalyst takes a broader view, in the words of its publisher, “to identify safety improvement needs and develop a system-wide program of site-specific improvement projects.” SafetyAnalyst has lesser and different data requirements than HSM.

In this project, Florida International University researchers investigated developing data to support use of HSM and SafetyAnalyst in Florida.

The researchers examined Florida’s most comprehensive roadway database, the Roadway Characteristics Inventory (RCI). They found that the RCI did not cover all variables needed for HSM. To determine what additional variables must be included, the researchers identified and prioritized variables, examining their impact



Two-lane rural roads seem very peaceful, but they can have a high incident rate. Safety analysis can pinpoint reasons for this and guide solutions.

on HSM calculations. They further determined minimum sample sizes needed to estimate reliable HSM calibration factors. For each facility type included in the HSM, they then applied the random forest technique to rank the importance of variables in three groups based on their influence on crash predictions. Work on minimum sample sizes showed that minimums recommended by HSM were insufficient to achieve desired accuracy for nearly all facility types.

For SafetyAnalyst, the researchers undertook two major efforts. They developed software to convert the crash and roadway data for Florida’s state roads into strict format required for import files used by SafetyAnalyst. The researchers then developed safety performance functions (SPFs) for unsignalized intersections to supplement those for other facilities, developed under a separate project. They demonstrated use of SafetyAnalyst by using Florida’s data to identify high crash locations.

As safety analysis advances, planners are provided with more powerful tools that make Florida’s roads safer for all users, with a direct impact reducing loss of life, injury, and property damage.

Project Manager: Joe Santos, FDOT Safety Office
Principal Investigator: Priyanka Alluri, Florida International University
For more information, visit <http://www.dot.state.fl.us/research-center>