

ABSTRACT

Brown, Jennifer M. M.S.C.E., Purdue University, December 2011. Developing Components of the Indiana Safety Management System. Major Professor: Andrew Tarko.

The Highway Safety Improvement Program (HSIP) was developed by the Federal Highway Administration (FHWA) to reduce the frequency and severity of crashes. Indiana uses the Road Hazard Analysis Tool (RoadHAT) to support all steps in the HSIP process. To identify hazardous locations, RoadHAT uses safety performance functions developed for state roads from an extensive road database. Safety projects are identified based on site investigation and then prioritized with an economical benefit-cost analysis.

As part of the HSIP, the FHWA has also established a High Risk Rural Roads Program (HRRRP). This program focuses on improvements to hazardous roads or features, whether state or locally owned, that are identified as a rural major or minor collectors or rural local roads. The HRRRP has specific funds set aside to contribute to the improvement of these facilities.

Many components of the current practices adopted by the Indiana Safety Management System were developed nearly ten years ago and require updating. In addition, Indiana has yet to implement these practices for local roads to follow the HRRRP recommendations.

This research study is conducted for two purposes: (1) updating the HSIP process currently used for state roads, and (2) helping implement this process for local roads. These objectives are accomplished through several steps: a thorough literature review of benefit-cost analysis components, data collection and processing, as well as modeling and producing new safety performance functions for three crash severities (as in current

safety analysis practice). The safety performance functions are developed in SAS 9.2 with a negative binomial regression for twenty-four types of road facilities, including road segments, intersections, interchanges, bridges, and ramps. Crashes that occurred in Indiana from 2008 to 2010 are used for this analysis.

RoadHAT has undergone revisions to utilize the updated HSIP processes for state and local road facilities. This research strengthens the Indiana Safety Management System and assists the state and local agencies in receiving funds for needed safety improvements.