

FACT SHEET

Regionalized Urban/Suburban Collector Road Safety Performance Functions (SPFs)

Study Timeline:

June 2018-March 2019

Project Manager:

Heather Sorce,
PennDOT Bureau of
Planning & Research

Technical Advisor:

Jason Hershock,
PennDOT Bureau of
Maintenance &
Operations

Principal

Investigators:

Eric T. Donnell, Vikash
Gayah, Lingyu Li and
Houjun Tang,
The Pennsylvania State
University
Larson Transportation
Institute

Report Link:

https://gis.penndot.gov/BPR_PDF_FILES/Documents/Research/Complete%20Projects/Operations/Regionalized_Urban_Suburban_Collector_Road_Safety_Performance_Functions.pdf

Introduction

The AASHTO Highway Safety Manual (HSM) provides transportation professionals with quantitative tools that can be used to assess the safety performance of planned or existing highways. One set of tools currently available in the HSM are safety performance functions (SPFs), which relate the expected crash frequency of a roadway segment or intersection to anticipated traffic volumes, geometric characteristics, and other roadway and roadside features. This study focused on the development of SPFs for urban-suburban collector roadway segments.

Methodology

Negative binomial regression was used to develop the roadway segment and intersection SPFs in this study to be consistent with the models developed in the first edition of the HSM. The negative binomial model estimates relationships between the expected number of crashes per year as a function of one or more explanatory variables. This is a very common approach to model roadway segment and intersection crash frequencies because it accounts for the overdispersion that is often observed in crash data. Overdispersion results from the variance exceeding the mean in the crash frequency distribution.

Recommendations

SPFs were developed for urban and suburban collector highway intersections and segments. Based on the regionalization process, engineering district-level SPFs with county-level adjustments were recommended for two-lane undivided roadway segments. Statewide SPFs were recommended for three-leg all-way stop controlled, four-leg minor-street stop-controlled, four-leg all-way stop-controlled and four-leg signalized intersections. Statewide SPFs with district-level adjustments were recommended for three-leg minor-street stop-controlled intersections.

Implementation

The new SPFs for collector roads and intersections were added to PennDOT's network screening and will be utilized with the 2019 crash data. PennDOT is also updating our Publication 638A, PA Safety Predictive Analysis Methods Manual and the HSM analysis tools; so everyone can easily access and use the new SPFs.



pennsylvania

DEPARTMENT OF TRANSPORTATION

PennDOT Bureau of Planning and Research

400 North Street, 6th Floor, Harrisburg, PA 17120

For More Information Contact Heather Sorce (E: hsorce@pa.gov, P: 717.214.9508).