Research Project: ***SHA/MSU/4-6***
Date: ***November 2016***

RESEARCH SUMMARY

THE DEVELOPMENT OF LOCAL CALIBRATION FACTORS PHASE II: MARYLAND FREEWAYS AND RAMPS

PROBLEM & OBJECTIVE

The goal of the study was to develop local calibration factors (LCFs) for Maryland freeways in order to apply the predictive methods of the Highway Safety Manual (HSM) supplement (2014) to the state. LCFs were computed for freeway segments, speed-change lanes, and signalized and stop-controlled ramp terminals (intersections of the entrance/exit ramps and the crossroads). Ramps (facilities connecting local roads to freeway travel lanes) and collector-distributor roads were excluded from the study due to insufficient historical crash data.

METHODOLOGY

An LCF of a facility type is a ratio of the total observed crashes at the selected sites to the total predicted crashes computed by the HSM predictive method. Unlike the facility types presented in the Phase I study, LCFs of the facility types included in the new chapters of the HSM are independent from its default crash distributions or locally derived ones. Selecting a crash distribution is a step after applying LCFs. The study team created crash severity and collision type proportion tables for Maryland. The minimum 200 crashes (collectively during a recent one- to three-year period) are required to replace the HSM default crash distribution, and Maryland's stop-controlled ramp terminals have only 160 crashes during the study period no crash distribution was calculated for the type.

The initial data set of the four facility types in Maryland had approximately 2.569 million data points. After cleaning and customizing them for the study purpose, samples were drawn and additional required/desirable data were gathered for sampled sites. The average predicted crash frequency by facility type was computed using the interactive highway safety design model (IHSDM). The predicted crash frequency was compared to the observed number of crashes to derive LCFs. It should be noted that Baltimore City was not part of this study.

RESEARCH SUMMARY

RESULTS

The results are summarized in the table below. The Maryland LCFs were all smaller than 1.0, implying on average Maryland had fewer crashes than predicted crashes estimated by the HSM predictive method during the study period. LCFs for ramp terminals were extremely low. Due to potential under-reporting of property damage only (PDO) crashes on ramps, it is recommended that applying LCFs developed with PDO crashes should be done with caution. The report concludes with a discussion on the interpretation of LCFs and data limitations.

Facility	Crash Type	# of Segments	Observed Crashes	Predicted Crashes	LCF
Freeways	FI MV	564	1,190	2,617.94	0.4546
	PDO MV	564	1,890	6,610.84	0.2859
	FI SV	564	910	1,451.53	0.6269
	PDO SV	564	1,735	2,705.70	0.6412
Speed-Change Lanes	FI En	264	358	605.63	0.5911
	PDO En	264	600	1,139.64	0.5265
	FI Ex	254	336	438.32	0.7666
	PDO Ex	254	572	649.53	0.8806
Ramp Terminals	ST FI	147	83	122.85	0.6756
	SG FI	172	425	1,213.81	0.3501
	ST PDO	147	77	203.91	0.3776
	SG PDO	172	511	1,690.71	0.3022

Interpretation of LCFs

LCFs do not indicate good or bad about the level of safety. They only indicate whether the number of crashes on a certain facility are lower or higher than the HSM base model. In addition, LCFs are the average value of all sampled sites and they may or may not accurately predict site-specific crashes.

REPORT INFORMATION

Dr. Hyeon-Shic Shin
City & Regional Planning Program
School of Architecture & Planning
Morgan State University
hyeonshic.shin@morgan.edu
(443) 885-3208

LINK TO FINAL REPORTS

Phase I: http://www.roads.maryland.gov/OPR_Research/MD-14-SP209B4J_Local-Calibration-Factors-for-HSM_Report.pdf

Phase II: http://www.roads.maryland.gov/OPR_Research/MD-16-SHA-MSU-4-6_LCF-II_Report.pdf