



FY 2017 Research Problem Statement

ODOT Research Section
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I. TITLE

17-034 Safety Performance Functions for Freeways

II. PROBLEM

To identify, prioritize and address safety needs requires an understanding of the complex interactions between the elements of roadway design, infrastructure, and traffic. This is particularly true in an environment of limited funding, since large scale improvements will be increasingly difficult to implement and lower cost targeted solutions will be more the norm. Tools available in the recently published AASHTO *Highway Safety Manual* (HSM) are helping ODOT staff complete the analysis needed to identify solutions suitable to address the causes of crashes. A recent amendment of the HSM added Freeways and their associated interchanges to the HSM.

Having a complete suite of tools is important for ODOT and one of the last areas to assess for use of HSM Safety Performance Functions is Freeways and interchanges. Although Freeways do not account for many of the fatal and serious crashes that occur in Oregon, they do account for a substantial investment whenever an interchange or freeway section is modernized. Those costs could be better assessed if ODOT had a calibrated or Safety Performance function specific to Oregon.

The HSM includes Safety Performance Functions (SPFs) to assess options for improving the safety of freeways and interchanges. These are equations that use traffic volumes and other factors to predict crash reductions for various types of improvements. Since the SPFs do not allow for certain features such as weaving sections, Crash Modification Factors (CMFs) can then be used to adjust the results of the equations to allow for these factors.

This research will determine the safety impact of different configurations and section designs specific to freeways in Oregon. Also given that Oregon has most other elements of the transportation system already calibrated or has specific Safety Performance Functions for those facilities, this research will complete most of necessary missing components of the HSM analysis and allow Oregon to have a nearly complete suite of HSM tools for analysis. The research will develop calibration factors or Oregon specific SPFs for a range of interchange and freeway configurations.

III. PROPOSED RESEARCH, DEVELOPMENT, OR TECHNICAL TRANSFER ACTIVITY

The objective of the research is to develop more reliable ways to assess freeway and interchange safety in Oregon. This will be done by developing freeway and interchange safety performance functions or calibration of SPF's that explicitly consider crashes in Oregon for using HSM methods to predict crashes for different designs and configurations. A research TAC team will help the researcher decide between calibration and specific development of Oregon SPF. Also consider developing a simpler SPF with fewer variables for applications with less data available, it might be based on a sensitivity analysis to determine the most applicable variables. Also attention might be given to less than fully-access controlled facilities to determine if there is available data to determine a specific SPF.

IV. POTENTIAL BENEFITS

- Improved decision making about which configurations and interchange types are used in Oregon.
Improved safety and operation of freeways and interchanges.
- Better estimates of true costs of choices on Freeways.
- Freeways may not represent an overarching safety problem, but the cost of freeway facilities is considerably more than other types of roadways, thus the best HSM prediction methods is essential to substantiate the investment decisions between different configurations.

- This will substantially complete the calibration of the SPF's for facilities used by ODOT and enable a complete suite of HSM tools to be employed at ODOT.

V. IMPLEMENTATION

The project would develop SPF's (or calibration) for freeways and interchanges with data collection efforts for SPF's at interchanges and along freeways. The project may also delve into different configurations of interchanges. The advisory committee should also advise the research effort on which other new or different configurations of interchanges might be possible to evaluate.

VI. LIST OF REFERENCES *(optional)*

There is no comparable study done specifically for Oregon, but a few states have performed calibration or developed SPF's for their states, Illinois, Missouri and Virginia completing their SPF's. Safety Performance Function Decision Guide: http://safety.fhwa.dot.gov/rsdp/downloads/spf_decision_guide_final.pdf

VII. CONTACT INFORMATION

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