



Caltrans Division of Research,
Innovation and System Information

Research

Notes

Transportation,
Safety and
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Project Title:
Methods for Identifying High Collision
Concentration Locations for Potential
Safety Improvements

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Implementation of SPF Methods to Identify High Collision Concentration Locations

Developing a roadmap for a data collection plan that includes an assessment of the cost and the efficiency of combining existing data with new data sources for the development of safety performance functions for the state highway system.

WHAT IS THE NEED?

Identifying high collision concentration locations is a major objective of many state and local transportation agencies. In recent years, significant progress has been made with respect to crash prediction models for identifying such locations. In addition to providing valuable information related to factors that can potentially contribute to increase in the likelihood of traffic collisions, the Highway Safety Manual explains how Safety Performance Functions (SPF's) (i.e., a mathematical relationship describing the collision frequency and explanatory variables) are used to estimate the expected number of collisions per year for a given location, which serve as a baseline for network screening techniques which play a major role in the transportation safety management process.

The California Department of Transportation (Caltrans) is currently in the process of developing type 1 and type 2 SPFs for roadway segments, intersections and ramps on the entire state highway system. The added value of the current Caltrans efforts cannot be realized until the outcomes are deployed as part of a transportation safety management tool. In light of this, the need of this project is to incorporate recently developed SPF's into Caltrans' road safety management procedures.



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WHAT ARE WE DOING?

The proposed project has three overarching activities:

- (i) design and develop an MS Excel transportation safety management tool for conducting SPF-based analyses and for calibrating existing SPF's
- (ii) incorporate all of the Caltrans-approved SPF's into the tool so it can be used by select Caltrans expert users
- (iii) provide guidelines for developing additional SPF's, re-calibrating existing SPF's, and a road-map for incorporating such SPF's into the tool

The other feature of the proposed SPF tool is to include the capability to conduct network screening to identify high collision concentration locations. The development of the network screening framework will consider the inclusion of network screening methods, such as sliding window method, continuous risk profile, etc. The implemented network screening approaches would allow Caltrans to input the parameters which would define the high collision concentration locations, and the output of the network screening would result in a list of locations which meet the selection criteria. In addition, the tool would allow the network screening to be queried using different crash and location characteristics, such as districts, years, party type, etc.

WHAT IS OUR GOAL?

The goal of the transportation safety management tool is to assist Caltrans in gradually deploying newly developed SPF's into the network screening processes. The idea behind this is to develop a tool that would be flexible enough to make use of any intermediate progress related to network screening capabilities.

WHAT IS THE BENEFIT?

As a result of implementing these activities, Caltrans shall be able to use the recently SPF's for identifying high collision concentration locations. Using the most recent SPF's will allow Caltrans to use state-of-the-art models to conduct the most efficient and more accurate network screening techniques for the California state highway system.

WHAT IS THE PROGRESS TO DATE?

Some background literature review and discussions within the project team have led to the required list of tasks that need to be executed for SPF implementation (as presented in the proposal).