



Caltrans Division of Research,
Innovation and System Information

Research

Notes

Transportation
Safety and
Mobility

AUGUST 2020

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

Task Number: 3057

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Phase 2: Implementation of Safety Performance Functions for California

Enhance pedestrian safety and refine the capabilities and resources needed to address the imbalance between pedestrians and motorized roadway users in California.

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 (SPFs) (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.

California Department of Transportation (Caltrans) is currently in the process of piloting SPF-based methodologies into the process to identify high collision concentration locations for roadway segments, intersections, and ramps on the entire state highway system. While the existing effort have value, the full benefits cannot be realized until the necessary enhancements are developed, and the process is fully deployed.



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California's transportation system

WHAT ARE WE DOING?

The techniques and tools developed in this study will help Caltrans to target locations more efficiently that will likely benefit from safety improvements and would result in the greatest reduction in fatal and injury collisions. To accomplish this, we will further develop the range and depth of the existing SPF along with enhancements to the Microsoft (MS) Excel tool.

WHAT IS OUR GOAL?

The proposed project has several goals:

- i. Identifying performance measures and threshold values for the potential safety improvements of sites
- ii. Enhancing the capability of the existing MS Excel tool in terms of functionality, users, and interface
- iii. Maintaining forward-compatibility with Transportation System Network Replacement;
- iv. Developing advanced SPFs and evaluation types of SPFs in network screening along with integration from new SPF such as nighttime
- v. Developing MS Excel tool guidelines, along with training materials and user manual.

WHAT IS THE BENEFIT?

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

WHAT IS THE PROGRESS TO DATE?

As of August 2020, the research team has completed the following major tasks:

- Advancing research on identifying the performance criteria for ranking potential locations based on SPF-based network screening for investigation through existing literature and resource allocation.
- Research team deepened their knowledge about the Table B-selective accident rate calculation report and the reasons why the calculation is being used within Caltrans. The review and analysis helped the team to understand the features to be added to the report generation stage of the SPF Tool V1.X in order to provide a Table B compatibility feature within the spreadsheet tool.