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 (HCCL) 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 the increase in the likelihood of traffic collisions, the Highway Safety Manual explains how Safety Performance Functions (SPF), 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. It serves 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.

WHAT ARE WE DOING?

The techniques and tools developed in this study will help Caltrans to more efficiently target locations that will likely benefit from safety improvements and would result in the greatest reduction in fatal and injury collisions. To accomplish this, Caltrans 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 project is the second phase of the Safety Performance Functions Implementation Project. The goal is to develop and support Caltrans in the implementation of an SPF-based network screen methodology with the long-term goal of substantially reducing fatalities and injuries in California. This phase will support the deployment of an MS Excel tool along with methodological refinements and enhancements.

The proposed research has several goals:

1. Identifying performance measures and threshold values for the potential safety improvements of sites;
2. Enhancing the capability of the existing MS Excel tool including in terms of functionality, users, and interface;
3. Maintaining forward-compatibility with Transportation System Network Replacement;
4. Developing advanced SPFs and evaluation types of SPFs in network screening along with integration from new SPF such as night time;
5. Developing MS Excel tool guidelines, along with training materials and user manual.

WHAT IS THE BENEFIT?

This project represents an effort to enhance pedestrian safety and refine the capabilities and resources needed to address the imbalance between pedestrians and motorized roadway users in California. The improvements to the pedestrian exposure modeling will allow Caltrans to perform more advanced safety analyses, involving risk.

Pedestrian-specific SPFs will allow Caltrans to incorporate Empirical Bayes methods in their evaluation of pedestrian countermeasure effectiveness. The crash typology and risk-based HCCL identification and prioritization techniques are intended to more efficiently identify HCCLs with the greatest potential of safety improvements and reduce the number of false positives. Pedestrian corridor identification is meant to identify groups of contiguous segments or intersections with similar features and safety problems that can be addressed systematically.

WHAT IS THE PROGRESS TO DATE?

This research is expected to begin in early 2020.