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.
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?
The following tasks have been accomplished:

Task 3:
- The research team updated the SPF tool to version 1.6.6, (i) addressed the query from Caltrans’ issue of error while processing the tool with the most recent data, (ii) ability to review the data imported for analysis was incorporated in the Stage A, (iii) added District-level network screening and reporting ability within the tool, (iv) all the sheets that contain SPF parameters are password protected, and finally (v) provided with basic user manual and testing checklist.
- Based on the revised the draft Table B reporting format – summary report and detailed report, research team developed an updated mock-up of Table B feature to be included in the tool based on Table B handbook and shared with Caltrans’ for feedback.
- Based on the insights from the Caltrans’ experts on the significance of Table B, the research team is exploring how to develop a separate Table B business requirement for safety analysis within the SPF Tool.

Task 4:
- The research team closely monitors the development in the TSNR – the data availability within TSN after the completion of the project and its potential impact on the SPF tool development which helps in network screening leading to the resource allocation.

Task 5:
- The research team is advancing research in identifying data needs for developing California specific bi-directional SPFs based on the data available within TASAS-TSN.
- Developing advanced ramp SPFs which includes ramp metering data to identify HCCLs along ramp facility through SPF-based network screening approach.