Wet and Nighttime SPFs Development

Support California Department of Transportation (Caltrans) in implementing an SPF-based network screen methodology with the goal of substantially reducing fatalities and injuries.

WHAT IS THE NEED?

Identifying high collision concentration locations is a major objective of many state and local transportation agencies. In parallel to efforts that are establishing the necessary methodological and functional capability to conduct network screening at high levels of efficiency, it is also necessary to consider a subset of unique circumstances that may be sensitive to a different set of safety concerns. These circumstances can include wet conditions, night time, and congestions.

To better account for safety during these situations, it is necessary to develop Safety Performance Functions (SPFs) for such conditions, and to develop considerations for congestion-related crashes. Moreover, it is necessary to modify and update existing traffic safety tools so that they are aligned with the newly developed tools, to provide comprehensive operational support.

WHAT ARE WE DOING?

The techniques and SPFs developed in this study will help Caltrans to target locations under specific circumstances more efficiently, that will likely benefit from safety improvements and would result in the greatest reduction in fatal and injury collisions.
WHAT IS OUR GOAL?

The proposed project has several goals:

i. Supporting economic evaluation (Safety Index) for safety performance
ii. Developing an inventory of all data elements for wet, nighttime, congestion, and run-off-road based safety evaluation
iii. Updating existing rate group estimates in Traffic Accident Surveillance and Analysis System
iv. Analyzing crashes under congested traffic conditions.

WHAT IS THE BENEFIT?

This project represents an effort to enhance the network screening capability under certain circumstances. These refinements can provide a more concerted effort to identify high collision concentration locations across the state highway system. For example, identifying locations that demonstrate a higher than expected wet crashes will help identify locations requiring a traffic safety investigation and might benefit from implementing countermeasures to reduce wet crashes.

Similarly, evaluating the effect of congestion-related collisions on network screening will provide an opportunity to flag congestion-related property damaged only collisions which are less likely to result in a safety recommendation, and are commonly labeled as false-positives. Developing a package of capabilities and tools to account for such circumstances and provides a better overall networks screening program.

WHAT IS THE PROGRESS TO DATE?

The following tasks have been accomplished:

Task 3:
- The research team developed the data structure for wet SPF, nighttime SPF, and congestion related crash analysis.

Task 4:
- Preliminary Wet SPFs' were developed based on the data structure and existing criteria to identify wet crash, i.e., if road surface condition is wet. Further exploration for redefining wet crash for safety analysis is in progress.

Task 6:
- Advancing research on congestion-related crash analysis based on preliminary findings related to kinematic waves using cumulative occupancy curves and spatiotemporal proximities methodologies.
- Exploring automation process to evaluate congestion related freeway crashes in addition to piecewise linear fit (piecewise regression).