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Caltrans Division of Research, Innovation and System Information

Research Notes

Identify Data Requirements for Safety Screening to Identify High Collision Concentration Locations

Identify the requisite data sources and data collection methodologies both within and outside of Caltrans to meet the data needs for safety performance function (SPF) development.

Transportation Safety and Mobility

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

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WHAT IS THE NEED?

The current method of identifying high collision concentration locations (HCCL) in Caltrans uses data from the Traffic Accident Surveillance and Analysis System (TASAS). In the near future, Caltrans intends to implement newer methods that follow the methodology described in the Highway Safety Manual through software implementations such as Safety Analyst, and/or spreadsheet implementations. An integral component of network screening tools are safety performance functions (SPFs), which are mathematical equations that relate collision frequencies to traffic volumes at a given location and may include other site characteristics such as, road geometry, intersection design, etc. However, the data currently available in Caltrans for developing SPFs suffers from several limitations.

WHAT ARE WE DOING?

This project will identify the requisite data sources and data collection methodologies both within and outside of Caltrans to meet the data needs for SPF development. The primary outcomes of the project include:

(i) Developing an inventory of all the necessary data elements for SPF development

(ii) Appraisal of the suitability of data currently available within Caltrans databases for SPF development

(iii) Identification of data sources outside of Caltrans that can meet the additional data needs or SPF development

(iv) Estimating the costs and data quality associated with the various data collection methodologies

(v) Assessing the robustness of the different data elements when included as explanatory variables in SPF

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The project will focus on both Type I and Type II SPFs. Type I SPFs only use traffic volumes to predict the expected number of collisions at a given location, while type II SPFs use additional site information such as road geometry and intersection design elements as explanatory variables.

Finally, based on the data sources and methods identified, a pilot data collection effort shall be undertaken as part of the project in which a sample of highway locations shall be selected which shall seek to adequately represent all three roadway components: roadway segments, intersections and ramp locations.

WHAT IS OUR GOAL?

The goal of the project is to develop 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 which can be used for the development of safety performance functions for the state highway system. These activities include:

- Identify the anticipated challenges and costs of using the various data collection methodologies for a statewide implementation of the data collection effort.
- Highlight the impact of the data collected on the development of the safety performance functions.
- Develop a prioritization list for the data collection effort to maximize the efficacy of the SPF development.

WHAT IS THE BENEFIT?

As a result of implementing these activities, Caltrans shall be able to better assess the effort and the costs associated with developing safety performance functions for the entire state highway systems. Subsequently, the ongoing SPF development in Caltrans can also be suitably revised given the insights gained about the feasibility of collecting the various data elements. Ultimately, in the long run, these changes will lead to the implementation of better 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 a preliminary list of data elements that can be useful as explanatory variables for SPF development (as presented in the proposal).