

Design

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Project Title: Highway Safety Manual 2 (HSM2) Part C Calibration for the California Department of Transportation for Caltrans

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Highway Safety Manual 2 (HSM2) Part C Calibration for the California Department of Transportation (Caltrans)

Update the Highway Safety Manual (HSM).

WHAT IS THE NEED?

Caltrans uses the HSM methodologies to conduct proactive safety analyses on numerous State Highway System (SHS) facilities. The HSM is a tool developed by American Association of Highway and Transportation Officials (AASHTO) that uses mathematical models (model) to quantify safety impacts by predicting the safety performance of various roadway and intersection facility types when geometric or operational modifications are proposed. Consistent with Caltrans' goal to prioritize multi-modal facilities, the HSM2 models also include safety performance methodologies for pedestrians and bicycles, which are based on data collected nationwide. Since the models may not represent all contexts nationwide, the HSM recommends calibrating the models to a jurisdiction using localized crash data to obtain a more accurate and representative safety performance. Caltrans currently does not have any calibration factors and uses a default value of 1.0. For Caltrans, the "local jurisdiction" with the representative crash data is the SHS. Generally, calibration is a tedious and time-consuming process. The 2nd edition of the HSM, HSM2, is anticipated to be published by AASHTO in 2024. This research request proposes to calibrate the HSM2 models. Caltrans is proposing to undertake a multi-phase approach to calibrate the HSM by prioritizing development based on facility type, localized area, emerging research, or other methods to be determined.

WHAT ARE WE DOING?

The research will develop calibration factors for the various HSM2 models, including bicycle and pedestrian models, as available data allows. If sufficient data is available, and it's

deemed appropriate, new models derived from only California data may be developed, as an alternative to calibration factor development.

WHAT IS OUR GOAL?

Once the calibrations are obtained, they will be posted on Design's external [HSM website](#), to be made public for all to obtain and use. Project-level implementation of the calibrated models can be quick if the end user inputs the calibration into the HSM analysis tools directly on a per-project basis. For a more holistic approach, the calibration can be applied by modifying the tools, so the calibration is integrated to provide, essentially, customized HSM tools for use in California, by Caltrans engineers, local agencies, and consultants doing work on and off the SHS. Based on feedback from other State Department of Transportations (DOTs) at various TRB HSM-related meetings, these calibrations could also potentially be used by other similar jurisdictions nationwide.

WHAT IS THE BENEFIT?

The benefits of this research will be a more reliable and proactive safety analysis method for projects on and off the SHS. The research also possibly benefits other states and local agencies. If new models derived from California only data is the preferred calibration method option, then another benefit for highly urbanized districts (District 4, District 7, District 11, and District 12) would be potentially overcoming the maximum number of lanes and traffic volume limitations currently experienced with the HSM Part C models.

WHAT IS THE PROGRESS TO DATE?

- Continued establishing data quality parameters and data collection practices.
- Documented internally the variables to be collected for the first Safety Performance Functions.
- Initiated development of tools to support data

collection.

Work Planned for the next quarter:

- Continued establishing data quality parameters and data collection practices.
- Initiated development of tools to support data collection.