DRISI

CALTRANS DIVISION OF RESEARCH, INNOVATION AND SYSTEM INFORMATION

TRANSFORMING IDEAS INTO SOLUTIONS

Research Notes

Design / Construction

MAY 2025

Project Title:

Development of a Worker Safety Performance Estimation Tool to identify the most effective countermeasures to eliminate roadside worker fatalities and serious injury accidents while in the line of duty

Task Number: 4322

Start Date: June 1, 2024

Completion Date: May 31, 2026

Task Manager:

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Development of a Worker Safety Performance Estimation Tool to identify the most effective countermeasures to eliminate roadside worker fatalities and serious injury accidents while in the line of duty

This project will develop a worker safety performance estimation tool for evaluation of worker safety measures in work zones.

WHAT IS THE NEED?

The California Department of Transportation (Caltrans) is adopting a proactive approach to enhance worker safety in its work zones. To achieve the goal outlined in its 2020-2024 Strategic Management Plan of eliminating employee fatalities and serious injuries, Caltrans aims to develop an accurate worker safety performance tool. This tool will assess the effectiveness of safety measures implemented in highway work zones, helping to ensure the highest level of protection for employees on duty.

WHAT ARE WE DOING?

In this research, the Advanced Highway Maintenance and Construction Technology (AHMCT) Research Center at the University of California (UC) Davis will conduct a literature review of existing practices to determine the most accurate crash reduction factor (CRF) that will help determine the effectiveness of safety countermeasures. AHMCT will propose methods on how to enhance the Safety Performance Estimation Tool. This will be accomplished by partnering with Division of Safety Programs' Office of Safe System Approach Integration and Division of Design's Landscape Architecture Program to understand their needs. The results will be compiled in a final report, along with training materials for Caltrans to distribute to end users.

Caltrans

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WHAT IS OUR GOAL?

The goal of this research project is to improve the accuracy of the Safety Performance Estimation Tool which will help Caltrans personnel determine the effectiveness of safety countermeasures in eliminating worker fatalities and serious injuries.

WHAT IS THE BENEFIT?

The results of this project will help improve the safety for roadside workers by identifying the appropriate countermeasures needed for planned work activities based on reduced and eliminated worker fatalities and serious injuries.

WHAT IS THE PROGRESS TO DATE?

Kick-off meeting was held on July 1, 2024. Project panel meetings were held on July 18, 2024, August 29, 2024, and September 26, 2024. Contractor continuing literature review and exploring past worker-safety projects conducted by AHMCT. Contractor documented methods to develop and optimize CRF based on initial literature review. Contractor obtained access to AHMCT and Caltrans Integrated Maintenance Management System (IMMS) data. A meeting to discuss datasets was held on October 31, 2024. Contractor continues to explore and analyze data.

Project panel meetings were held on December 11, 2024, and March 4, 2025. Contractor started documenting existing methods in literature for developing crash modification factors. Contractor processed data and extracted relevant information. Initial results were generated with analyzed data to guide the project's decision-making process. Needs and constraints of existing dataset were communicated to Caltrans project panel. Contractor continues to work with panel to include relevant data to the project.

Project panel meeting was held April 9, 2025. Contractor developed a data mining machine learning model to extract relevant information from Caltrans construction project documents.

Due to data constraints, the Caltrans project panel informed contractor to shift the project's focus from injury and fatality reduction to worker exposure and risk reduction.