

Safety Programs

DECEMBER 2022

Project Title:
Safe System Research and
Implementation Project

Task Number: 4014

Start Date: July 26, 2022

Completion Date: May 31, 2024

Task Manager:
Arvern P. Lofton, P.E.
Transportation Engineer (Electrical)
arvern.lofton@dot.ca.gov

Safe System Research and Implementation

Evaluating and implementing Safe System Approach principles into Caltrans' current safety programs for enhanced safety of all California roadway users.

WHAT IS THE NEED?

While the predominant goal of the global transportation system is the safe and efficient mobility of motorized vehicles, other elements of the transportation system may experience less protection and safety, contributing to additional transportation related fatalities and injuries. Such elements include but not limited to bicyclists and pedestrians.

The California Department of Transportation (Caltrans) has a strong history of providing a safe transportation system for the State of California. In the constant pursuit of improvement, Caltrans has identified the Safe System Approach (SSA) principles for potential incorporation into their transportation practices. While SSA principles have been implemented in other countries, the Caltrans Division of Safety Programs needs research support to tailor the principles for relevancy and usefulness to Caltrans needs. State-level implementation of such principles is not prescriptive and requires a customized interpretation that can emerge from Caltrans' existing policies.

WHAT ARE WE DOING?

The research comprises of defining an SSA, including an equity and SSA relationship, from a Caltrans' perspective. Based on the SSA definition specifically for Caltrans, the research focuses on developing a generic method to evaluate whether Caltrans' existing safety programs align with SSA and proposing an SSA evaluation methodology to a current Caltrans safety monitoring program. Next, the research includes evaluating current Caltrans' countermeasure selection process with a focus on roundabouts and cable-barriers, identifying challenges in implementing these countermeasures, and providing recommendations to encourage wider application of these countermeasures on California's highway system.



DRISI provides solutions and
knowledge that improves
California's transportation system



In addition, the research involves reviewing Caltrans current safety training programs' effectiveness in obtaining SSA outcomes. This effort includes developing a prioritized list of training needs regarding an SSA for Caltrans, recommending a short-term training course, and developing a curriculum for the selected training course. Afterwards, the research involves brainstorming best-practice models to advance the SSA with an emphasis on managing kinetic energy on the state highway network and identifying future research needs towards achieving the Caltrans Vision Zero goal. This effort includes recommending various technical models suitable for specific road environments, and developing a technical model for application on a selected road environment.

The final step of the research is to compile the research findings into a comprehensive final report and present the results to Caltrans stakeholders in a workshop forum.

WHAT IS OUR GOAL?

The goal of the research is to adopt SSA principles and to support SSA usage, transition, and implementation into Caltrans business practices. System implementation of SSA principles can ultimately eliminate fatalities and serious injuries for all road users of California's roadway system.

WHAT IS THE BENEFIT?

Successful adoption and implementation of SSA principles will support Caltrans in applying best safety practices on California roadways. As a result, Caltrans management of enhanced safety practices gained from the research could impact all road users' behavior, thus potentially mitigating fatalities and significant injuries on California's roadway system and yielding substantial cost saving benefits to Caltrans and California taxpayers.

WHAT IS THE PROGRESS TO DATE?

To define a SSA from Caltrans' perspective, the university research team conducted interviews with seven Caltrans Safe System liaisons from headquarters and varying districts and incorporated the interview conclusions into a draft technical memo. Next, to initiate evaluation of roundabout and cable-barrier applications as Caltrans safety countermeasures, the researchers conducted additional interviews with Caltrans engineers.

The next immediate steps for this research are to draft and finalize the SSA technical memo, finalize interview reports regarding Caltrans safety countermeasures, and continue monthly progress meetings with the Caltrans task manager (TM), customer, and the university researchers.

For more information, please contact the TM.

IMAGES

THE SAFE SYSTEM APPROACH VS. TRADITIONAL ROAD SAFETY PRACTICES		
Traditional	Safe System	
Prevent crashes	Prevent deaths and serious injuries	Whereas traditional road safety strives to modify human behavior and prevent all crashes, the Safe System approach also refocuses transportation system design and operation on anticipating human mistakes and lessening impact forces to reduce crash severity and save lives.
Improve human behavior	Design for human mistakes/limitations	
Control speeding	Reduce system kinetic energy	
Individuals are responsible	Share responsibility	
React based on crash history	Proactively identify and address risks	

Image 1: Traditional and Safe System Approach Comparisons of Road Safety Practices



Image 2: Safe System Approach(SSA) Wheel Diagram of the Five SSA Elements and Six SSA Principles

The contents of this document reflect the views of the authors, who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the California Department of Transportation, the State of California, or the Federal Highway Administration. This document does not constitute a standard, specification, or regulation. No part of this publication should be construed as an endorsement for a commercial product, manufacturer, contractor, or consultant. Any trade names or photos of commercial products appearing in this document are for clarity only.