

Research Support

May 2026

Project Title: Designing Roadside Safety Hardware for Emerging Vehicle Types, TPF-5(553)

Task Number: 4527

Start Date: July 8, 2025

Completion Date: May 31, 2028

Task Manager:

Thomas Mar
Chief, Roadside Safety Research Branch
thomas.mar@dot.ca.gov

DRISI Division Chief:

Prakash Sah, PE
Prakash.Sah@dot.ca.gov

Designing Roadside Safety Hardware for Emerging Vehicle Types, TPF-5(553)

Designing safe, reliable, and efficient transportation infrastructure for the ever-growing Emerging Vehicle fleet.

WHAT IS THE NEED?

Emerging vehicle (EV) types, including hybrid and battery electric, are rising in sales and comprise a larger share of the total vehicle fleet each year. The characteristics of these emerging vehicle types pose many challenges to our transportation system moving forward. For example, their effect on roadside safety hardware has the potential to be significant based on their increased weight, lower center of gravity, and different crush stiffness. The objective of this Pooled Fund is to assist transportation agencies in designing a safe, reliable, and cost-efficient transportation network for the ever-growing emerging and heavy vehicle fleet.

One primary focus of this research program will be to improve roadside safety hardware to address identified performance limitations. This program will support the next important research step of improving the design of hardware found to be noncompliant with the Manual for Assessing Safety Hardware (MASH) criteria when tested with emerging vehicles.

WHAT ARE WE DOING?

The California Department of Transportation (Caltrans) is one of 10 state departments of transportation (DOTs) participating in this pooled fund project to improve the safety of the national transportation network. For the duration of the pooled fund, Caltrans contributes funding to the lead organization, Texas DOT. At annual meetings, Caltrans presents research needs, prioritizes research tasks and provides oversight of the research conducted by Texas A&M Transportation Institute (TTI).

Caltrans' Roadside Safety Research Group will facilitate communication between its internal customers and the



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

pooled fund to ensure that the needs of California are recognized.

WHAT IS OUR GOAL?

Caltrans' goal for participating in this pooled fund is to stay up to date with the latest research efforts involving the impacts of EVs on roadside safety hardware. Through mutual sharing of expertise, Caltrans can be influential in the development of guidance for EV crash testing and research. Successful outcomes can produce cost saving solutions in the form of new nonproprietary roadside safety hardware that will improve safety for the increased loading of EVs.

WHAT IS THE BENEFIT?

Participation in this pooled fund will allow Caltrans to engage at the national level with a focus on Safety First, one of our Strategic Plan Goals, and ultimately assist with developing a roadmap for testing facilities, DOTs, and other transportation agencies to implement solutions to the increased loading of emerging vehicles. Direct involvement from Caltrans can produce cost saving solutions by improving safety, reducing injuries and deaths. These safety improvements will also reduce Caltrans' tort exposure related to accidents involving EVs.

WHAT IS THE PROGRESS TO DATE?

TTI researchers finalized the research plans for the three prioritized research efforts from the Fall 2025 Annual Meeting. The research plans for the Midwest Guardrail System (MGS) Retrofit Project, Battery Electric Vehicle (BEV) Small Car Finite Element Analysis (FEA) Model Development, and BEV Design Impact Loads were submitted to the technical representatives for review and approval.

The research team will revise the research plans based on feedback from the technical representatives and will start the research efforts once approval is received. The Fall 2026 Annual Meeting is tentatively scheduled to be held in

September.

IMAGES

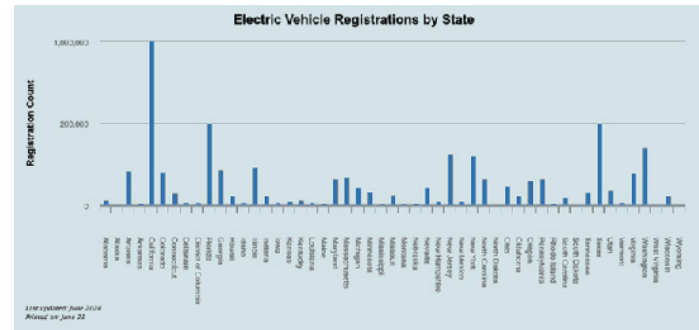


Image 1: Electric Vehicle Registrations by State