

# DRISI

CALTRANS DIVISION OF RESEARCH,  
INNOVATION AND SYSTEM INFORMATION

TRANSFORMING IDEAS INTO SOLUTIONS

# Research

# Notes

Geotechnical/  
Structures

NOVEMBER 2023

Project Title:  
MASH 2016 Compliance of  
Roadside Safety Features

Task Number: 3169

Start Date: January 1, 2017

Completion Date: Pending

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## Development of a Replacement for Breakaway Supports for Large Roadside Signs and Crash Testing to MASH 2016 Test Level 3

Current federal guidelines require that all roadside hardware be evaluated by the latest crash testing criteria. This project is to identify and test sign support systems that need to meet the current criteria.

### WHAT IS THE NEED?

Per Federal Highway Administration (FHWA) guidelines all roadside hardware including sign supports must be evaluated using the 2016 edition of the American Association of State Highway and Transportation Officials (AASHTO) Manual for Assessing Safety Hardware (MASH) criteria. Many of the California Department of Transportation's (Caltrans) one and two post sign supports have not been tested under the MASH criteria. The purpose of this project is to research what testing has been or will be conducted by other state Departments of Transportation (DOT) or testing agencies. Once completed, sign support systems that require testing will be identified and ranked. Those that are deemed the most critical or represent a large group of sign support systems will be tested under the criteria in MASH.

### WHAT ARE WE DOING?

Specific sign and post combinations for testing are being reviewed to include in the testing plan. Crash testing by others, such as Midwest Roadside Safety Facility (MwRSF) and Texas Transportation Institute (TTI) are being monitored to avoid testing overlap and to better define sign and post combinations that are likely to pass MASH testing. Many combinations are failing due to windshield penetration or excessive deformations of the windshield or roof.



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Sign posts are considered Support Structures in MASH. There are three tests for each sign post configuration. The California Department of Transportation (Caltrans) sign supports are considered MASH Test Level 3 systems and the testing criteria details are as follows, additional tests may be required for impact angles that are determined to be critical:

MASH Test Number	Vehicle	Impact Speed Mph (km/h)
3-60	1100C Passenger Car	19 (30)
3-61	1100C Passenger Car	62 (100)
3-32	2270P Pickup Truck	62 (100)

### WHAT IS OUR GOAL?

The goal is to confirm that one and two post sign support systems on California's highways meet the current safety evaluation criteria. Any systems that do not meet the criteria will be redesigned and tested.

### WHAT IS THE BENEFIT?

This research will insure that the sign support systems on California's highways meet safety standards and federal guidelines. By meeting these standards, Caltrans will improve safety for road users by lowering the potential for injuries and fatalities, reduce tort liability, and will continue to have Federal-aid reimbursement eligibility. Also, other DOTs throughout the country will benefit from this research since many use similar sign support systems.

### WHAT IS THE PROGRESS TO DATE?

The scope of the project was broadened to include Perforated Square Steel Tube (PSST) posts and given testing priority. The new proposed testing plan is to test a two PSST post system, but the size of the sign, tube size, and type of installation are still being decided. Other DOT standard plans that provided PSST details were reviewed to get an understanding of PSST systems. From this research some sign sizes and post details were chosen and are pending approval by our customer.

Plans for excavating the testing location at the test site have been developed. For a signpost test the conditions of the soil at the installation is important and involves special soil placement, compaction and soil related physical testing. Dynamic and static soil testing posts have been fabricated. Post instrumentation have been purchased and received. The test bogie that will be used in the soil testing will have new tires and master brake cylinder installed. We have also been monitoring and communicating with other accredited crash testing labs about other on-going signpost and soil testing nationally.