

**Geotechnical/
Structures****NOVEMBER 2024****Project Title:**MASH 2016 Compliance of
Roadside Safety Features**Task Number:** 3169**Start Date:** January 1, 2017**Completion Date:** January 1, 2035**Task Manager:**Christopher Caldwell
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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.

Signposts are considered Support Structures in MASH. There are three tests for each signpost configuration. Caltrans sign supports are considered MASH Test Level 3 systems. The testing criteria details are as follows. Additional tests may be required



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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 ensure 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 departments of transportation 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 had been given testing priority. After some research, it was decided that most PSST systems were proprietary and should be proposed to the Highway Safety Features New Product Committee

for acceptance. Therefore, the focus went back to wood post systems. The first sign panel chosen for testing is a 60" x 60" diamond warning aluminum sign sheet. This panel is mounted to two 6" x 6" wood posts.

For a signpost test, the conditions of the soil at the installation are important and involves special soil placement, compaction, and specific soil properties related physical testing. Therefore, a 3/4" Virgin Aggregate Base Class 2 soil pit was installed at the test site. Static and dynamic tests were conducted in the soil pit, but the tests failed to meet the MASH requirements. It is believed that the tests failed due to the soil being over compacted. We then conducted a number of static tests with different compaction methods until one was found that seemed to meet the requirements. We are currently preparing to redo the dynamic and static tests in the soil pit. We have also been monitoring and communicating with other accredited crash testing labs about other on-going signpost and soil testing nationally.

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