

Geotechnical/  
Structures

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Project Title:  
MASH 2016 Compliance of  
Roadside Safety Features

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Task Manager:  
Vue Her  
Senior Transportation Engineer  
vue.her@dot.ca.gov

## Type 15-FBS Breakaway Pole Replacement Development and Testing

A modified version of the Type 15-FBS is being developed and will be crash tested to the current crash test guidelines

### WHAT IS THE NEED?

The Type 15-Flashing Beacon System (FBS) is a slip-base pole in the California Department of Transportation's (Caltrans) Standard Plan but has not been tested to the current crash test guidelines, the American Association of State Highway and Transportation Officials' (AASHTO) Manual for Assessing Safety Hardware (MASH) 2016. The Type 15-FBS is one of many roadside safety hardware and appurtenances that will need to meet the Federal Aid Eligibility requirements for new installations per the implementation agreement for MASH 2016.

This will require research, review, design, crash testing, test report, and publication of revised standards. The design will also have to meet Caltrans design standards and stakeholder priorities.

### WHAT ARE WE DOING?

The objective of this project is to test and evaluate the crash performance of the Type 15-FBS slip base pole system under the MASH 2016 Test Level 3 criteria. This work includes a redesign of the existing Type 15-FBS system. MASH 2016 Test Level 3 criteria for "Support Structures" comprise of the following tests:

1. 3-60, 1100C (small car), 19 mph, right or left quarter point of impacting vehicle, 30 degree angle impact
2. 3-61, 1100C (small car), 62 mph, right or left quarter point of impacting vehicle, 30 degree angle impact
3. 3-62, 2270P (pickup), 62 mph, right or left quarter point of impacting vehicle, 30 degree angle impact

Redesign and retesting of the Type 15-FBS may be necessary if any of the test are not successful. When testing is completed, the research team will prepare a final report. If the testing shows that the product meets the MASH 2016 evaluation criteria, the slip base pole system will be adopted into Caltrans standards for use.



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## WHAT IS OUR GOAL?

Our goal is to produce a replacement for the Type 15-FBS that is compliant with Caltrans design standards and meet the Federal Aid Eligibility requirements for new installations per the implementation agreement for MASH 2016.

## WHAT IS THE BENEFIT?

The Type 15-FBS has been a Caltrans standard plan for many years and has not been tested to current federal crash test guidelines. The benefit of this research is a MASH-compliant version of the Type 15-FBS that will meet federal safety guidelines and remain eligible for federal fund reimbursement.

## WHAT IS THE PROGRESS TO DATE?

Eight Type 15-FBS light standards were ordered for this project. The installation of two modified Type 15-FBS light standards was completed at the Caltrans Dynamic Testing Facility in West Sacramento, CA. One MASH 2016 test was conducted on March 7, 2018. The second test, MASH 2019 Test 3-60 (TEST 410MASH3C20-01) was conducted on February 26, 2020. Test data results indicate that this test failed the MASH 2019 Test 3-60 evaluation criteria due to the breakaway feature of the test article not activating and the occupant impact velocity exceeding the maximum recommended value. A draft evaluation summary of the results was sent to the customer (Structures) on March 25, 2020. The status of this task is not complete and is still in the testing phase. Four additional Type 15-FBS light standards have been acquired for additional testing (total of 8 Type 15-FBS light standards for the project).

The research team met with Structures to determine the direction of this project. The decision is to modify the Type 15-FBS by widening the slip base notch angles from 60° to 90°. The clamping hardware will also be updated to accommodate the larger slip angles. The modifications will be done in-house in addition to ordering hardware from suppliers.

The research team looking at previous testing on a similar slip base design from Oregon DOT (ODOT) where the slip base notch angles were increased from 60° to 90°. Any useful information will be helpful in the modification and testing of the Type 15-FBS.

The research team is testing different modification methods for on the Type 15-FBS slip base. The research team is also inquiring suppliers for new hardware as the modifications of the slip base will require custom hardware.

## IMAGES



Image 1: Modified Type 15-FBS at the Caltrans Dynamic Test Facility



Image 2: Type 15-FBS Slip Base



Image 3: Test 430MASH3C17-01 Small Car 31 MPH Impact



Image 4: TEST 410MASH3C20-01 Small Car 19 MPH Impact

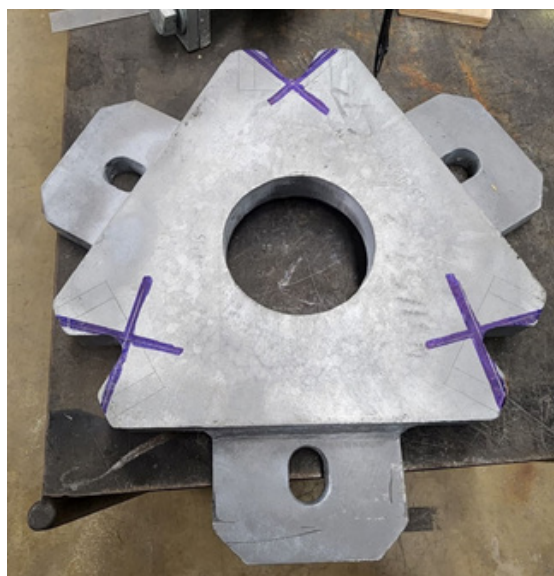


Image 5: TYPE 15-FBS SLIPBASE MODIFICATIONS – INCREASE NOTCH ANGLE FROM 60° TO 90°

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