

## Request for Federal Aid Reimbursement Eligibility of Highway Safety Hardware

<b>Submitter</b>	Date of Request:	April 02, 2021	<input checked="" type="radio"/> New <input type="radio"/> Resubmission
	Name:	Ben Cohen	
	Company:	Bone Safety	
	Address:	6450 Industrial Way, Alpharetta, GA 30004	
	Country:	USA	
	To:	Michael S. Griffith, Director FHWA, Office of Safety Technologies	

I request the following devices be considered eligible for reimbursement under the Federal-aid highway program.

**Device & Testing Criterion** - Enter from right to left starting with Test Level

!-!-!

System Type	Submission Type	Device Name / Variant	Testing Criterion	Test Level
'WZ': Crash Worthy Work Zone Traffic Control Devices	<input checked="" type="radio"/> Physical Crash Testing <input type="radio"/> Engineering Analysis	SZ-412-S	AASHTO MASH	TL3

By submitting this request for review and evaluation by the Federal Highway Administration, I certify that the product(s) was (were) tested in conformity with the AASHTO Manual for Assessing Safety Hardware and that the evaluation results meet the appropriate evaluation criteria in the MASH.

**Individual or Organization responsible for the product:**

Contact Name:	Ben Cohen	Same as Submitter <input checked="" type="checkbox"/>
Company Name:	Bone Safety	Same as Submitter <input checked="" type="checkbox"/>
Address:	6450 Industrial Way, Alpharetta, GA 30004	Same as Submitter <input checked="" type="checkbox"/>
Country:	USA	Same as Submitter <input checked="" type="checkbox"/>
<p>Enter below all disclosures of financial interests as required by the FHWA 'Federal-Aid Reimbursement Eligibility Process for Safety Hardware Devices' document.</p> <p>Bone Safety of Alpharetta, GA and Calspan Corporation share no financial interests between the two organizations. This includes no shared financial interest but not limited to:</p> <p>i. Compensation including wages, salaries, commissions, professional fees, or fees for business referrals</p> <p>iii. Research funding or other forms of research support;</p> <p>iv. Patents, copyrights, licenses, and other intellectual property interests;</p> <p>vi. Business ownership and investment interests;</p>		

## PRODUCT DESCRIPTION

<input checked="" type="radio"/> New Hardware or Significant Modification	<input type="radio"/> Modification to Existing Hardware
<p>The SZ-412-S work zone safety sign stand attached a roll-up sign at 48" by 48" in size and a bottom height of 18". It is manufactured from steel component parts which have been powder-coated and clear zinc-plated to minimize corrosion. The sign stand is designed using basic nut &amp; bolt construction, so that all component parts may be readily replaced if worn or damaged.</p> <p>Legs have both a pull-pin and kick release mechanism for releasing legs. The sign stand measures 6.50" x 6.50" x 24" when folded for storage and have a total weight of 23 lbs. Two sand bags can be placed on the sign stand legs if wind conditions require. This occurred only during the 0 degree impact for the 3-71 test.</p>	
<h3>CRASH TESTING</h3>	
<p>By signature below, the Engineer affiliated with the testing laboratory, agrees in support of this submission that all of the critical and relevant crash tests for this device listed above were conducted to meet the MASH test criteria. The Engineer has determined that no other crash tests are necessary to determine the device meets the MASH criteria.</p>	
Engineer Name:	Mark Parisi
Engineer Signature:	<div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> <h2 style="margin: 0;">Mark J. Parisi</h2> </div> <div> <p style="font-size: small; margin: 0;">Digitally signed by Mark J. Parisi Date: 2021.04.02 13:10:12 -04'00'</p> </div> </div>
Address:	4455 Genesee Street, Cheektowaga, NY 14225
Country:	USA
	Same as Submitter <input type="checkbox"/>
	Same as Submitter <input type="checkbox"/>

A brief description of each crash test and its result:

Required Test Number	Narrative Description	Evaluation Results
3-70 (1100C)	Designated to evaluate the ability of a small vehicle to activate any breakaway, fracture, or yielding mechanism. Is considered optional for work zone traffic control weighting less than 220 lb (100 kg)	Non-Relevant Test, not conducted

Required Test Number	Narrative Description	Evaluation Results
3-71 (1100C)	<p>For this test, two Bone Safety road signs were impacted. Two different 1100C vehicles were used in this testing. Only during the 0° test were two sand bags used (due to wind condition).</p> <p>Lightweight devices such as the Bone Safety sign cannot cause sufficient velocity change that would result in exceeding occupant risk criteria limits. Therefore Test 71 was conducted without instrumentation for evaluating occupant risk values OIV and RA per MASH test description.</p> <p>The 0° test was conducted using a commercially available 2014 Kia Rio 4 door sedan with a test inertia mass of 2,445 lbs (1,109 kg). The sign stand had two sand bags near the end of legs. The test vehicle impacted the first sign stand (orientated at 0°) at a velocity of 63.8 mph (102.9 km/hr). Upon impact the roll up sign released the sign stand and folded over the front end of the vehicle. No identifiable damage to the vehicle occurred beyond the front clip.</p> <p>The 90° test was conducted using a commercially available 2014 Kia Rio 4 door sedan with a test inertia mass of 2,458 lbs (1,115 kg). The test vehicle impacted the second sign stand (oriented at 90°) at a velocity of 62 mph (99.8 km/hr). Upon impact the roll up sign released from the sign stand and folded over the front end of the vehicle. No identifiable damage to the vehicle occurred beyond the front clip.</p> <p>In both tests, the vehicle's occupant compartment was not penetrated by the test articles and there was NO cab/passenger compartment deformation.</p> <p>Debris from the test articles did not block the driver's vision after initial impact. The vehicle remained upright and did not have any roll and pitch throughout the test. The vehicle did not leave its lane and its trajectory was stable after both sign stands were impacted.</p> <p>TEST RESULT = PASS</p>	

3-72 (2270P)	<p>For this test, two Bone Safety Signs Stands were impacted. The first test article was aligned at 0° and the second test article was aligned at 90° to the test vehicle's direction of travel. No Sand bags were required.</p> <p>Lightweight devices such as the Bone Safety Sign cannot cause sufficient velocity change that would result in exceeding occupant risk criteria limits. Therefore, Test 72 was conducted without instrumentation for evaluating occupant risk values OIV and RA per MASH test description.</p> <p>The test was conducted using a commercially available 2009 Ram 1500 Pickup Truck with a test inertia mass of 5022 lbs (2,278 kg).</p> <p>The test vehicle impacted the first sign stand (oriented at 0°) at a velocity of 61.6 mph (99.1 km/hr). Upon impact, the roll up sign released from the sign stand and folded over the front end of the vehicle. The top of the vertical cross frame impacted the lower portion of the windshield, but did not damage the glass. The test vehicle continued along its path and impacted the second sign stand (oriented at 90°) at a velocity of 60.7 mph (97.7 km/hr). Upon impact, the roll up sign released from the sign stand and folded over the front end of the vehicle. The top of the vertical cross frame impacted the middle of the hood. The test vehicle's occupant compartment was not penetrated by the test articles and there was NO inner cab/passenger compartment deformation.</p> <p>Debris from the test article did not cause a hazard to the driver's vision. The vehicle remained upright and did not have any roll and pitch throughout the test. The vehicle did not leave its lane and its trajectory was stable after both sign stands were impacted</p> <p>TEST RESULT = PASS</p>	
--------------	--	--

Full Scale Crash Testing was done in compliance with MASH by the following accredited crash test laboratory (cite the laboratory's accreditation status as noted in the crash test reports.):

Laboratory Name:	Calspan Corporation	
Laboratory Signature:	<b>Mark J. Parisi</b>	Digitally signed by Mark J. Parisi Date: 2021.04.02 13:14:25 -04'00'
Address:	4455 Genesee Street, Cheektowaga, NY 14225	Same as Submitter <input type="checkbox"/>
Country:	USA	Same as Submitter <input type="checkbox"/>
Accreditation Certificate Number and Dates of current Accreditation period :	L20-602 December 31, 2022	

Submitter Signature\*: **Ben F. Cohen** Digitally signed by Ben F. Cohen  
Date: 2021.04.19 16:55:55 -04'00'

**Submit Form**

## ATTACHMENTS

Attach to this form:

- 1) Additional disclosures of related financial interest as indicated above.
- 2) A copy of the full test report, video, and a Test Data Summary Sheet for each test conducted in support of this request.
- 3) A drawing or drawings of the device(s) that conform to the Task Force-13 Drawing Specifications [[Hardware Guide Drawing Standards](#)]. For proprietary products, a single isometric line drawing is usually acceptable to illustrate the product, with detailed specifications, intended use, and contact information provided on the reverse. Additional drawings (not in TF-13 format) showing details that are relevant to understanding the dimensions and performance of the device should also be submitted to facilitate our review.

**FHWA Official Business Only:**

Eligibility Letter		
Number	Date	Key Words