



U.S. Department
of Transportation
**Federal Highway
Administration**

June 12, 2020

1200 New Jersey Ave., SE
Washington, D.C. 20590

In Reply Refer To:
HSST-1/WZ-394

Mr. Eric Willetts
MDI Worldwide
38271 W. Twelve Mile Road
Farmington Hills, MI 48331

Dear Mr. Willetts:

This letter is in response to your December 2, 2019 request for the Federal Highway Administration (FHWA) to review a roadside safety device, hardware, or system for eligibility for reimbursement under the Federal-aid highway program. This FHWA letter of eligibility is assigned FHWA control number WZ-394 and is valid until a subsequent letter is issued by FHWA that expressly references this device.

Decision

The following device is eligible within the length-of-need, with details provided in the form which is attached as an integral part of this letter:

- MDI Worldwide 4818M Sign Stand TL-3

Scope of this Letter

To be found eligible for Federal-aid funding, new roadside safety devices should meet the crash test and evaluation criteria contained in the American Association of State Highway and Transportation Officials' (AASHTO) Manual for Assessing Safety Hardware (MASH). However, the FHWA, the Department of Transportation, and the United States Government do not regulate the manufacture of roadside safety devices. Eligibility for reimbursement under the Federal-aid highway program does not establish approval, certification or endorsement of the device for any particular purpose or use.

This letter is not a determination by the FHWA, the Department of Transportation, or the United States Government that a vehicle crash involving the device will result in any particular outcome, nor is it a guarantee of the in-service performance of this device. Proper manufacturing, installation, and maintenance are required in order for this device to function as tested.

This finding of eligibility is limited to the crashworthiness of the system and does not cover other structural features, nor conformity with the Manual on Uniform Traffic Control Devices.

Eligibility for Reimbursement

Based solely on a review of crash test results and certifications submitted by the manufacturer, and the crash test laboratory, FHWA agrees that the device described herein meets the crash test and evaluation criteria of the AASHTO's MASH. Therefore, the device is eligible for reimbursement under the Federal-aid highway program if installed under the range of tested conditions.

Name of system: MDI Worldwide 4818M Sign Stand
Type of system: Work Zone
Test Level: MASH Test Level 3 (TL3)
Testing conducted by: Applus IDIADA KARCO Engineering, LLC.
Date of request: December 2, 2019

FHWA concurs with the recommendation of the accredited crash testing laboratory on the attached form.

Full Description of the Eligible Device

The device and supporting documentation, including reports of the crash tests or other testing done, videos of any crash testing, and/or drawings of the device, are described in the attached form.

Notice

This eligibility letter is issued for the subject device as tested. Modifications made to the device are not covered by this letter. Any modifications to this device should be submitted to the user (i.e., state DOT) as per their requirements.

You are expected to supply potential users with sufficient information on design, installation and maintenance requirements to ensure proper performance.

You are expected to certify to potential users that the hardware furnished has the same chemistry, mechanical properties, and geometry as that submitted for review, and that it will meet the test and evaluation criteria of AASHTO's MASH.

Issuance of this letter does not convey property rights of any sort or any exclusive privilege. This letter is based on the premise that information and reports submitted by you are accurate and correct. We reserve the right to modify or revoke this letter if: (1) there are any inaccuracies in the information submitted in support of your request for this letter, (2) the qualification testing was flawed, (3) in-service performance or other information reveals safety problems, (4) the system is significantly different from the version that was crash tested, or (5) any other information indicates that the letter was issued in error or otherwise does not reflect full and complete information about the crashworthiness of the system.

Standard Provisions

- To prevent misunderstanding by others, this letter of eligibility designated as FHWA control number WZ-394 shall not be reproduced except in full. This letter and the test documentation upon which it is based are public information. All such letters and documentation may be reviewed upon request.
- This letter shall not be construed as authorization or consent by the FHWA to use, manufacture, or sell any patented system for which the applicant is not the patent holder.
- This FHWA eligibility letter is not an expression of any Agency view, position, or determination of validity, scope, or ownership of any intellectual property rights to a specific device or design. Further, this letter does not impute any distribution or licensing rights to the requester. This FHWA eligibility letter determination is made based solely on the crash-testing information submitted by the requester. The FHWA reserves the right to review and revoke an earlier eligibility determination after receipt of subsequent information related to crash testing.

Sincerely,

A handwritten signature in dark ink, appearing to read "Michael S. Griffith". The signature is fluid and cursive, with the first name "Michael" being the most prominent part.

Michael S. Griffith
Director, Office of Safety Technologies
Office of Safety

Enclosures

Request for Federal Aid Reimbursement Eligibility of Highway Safety Hardware

Submitter	Date of Request:	May 20, 2020	☒ New ☐ Resubmission
	Name:	Eric Willetts	
	Company:	MDI Worldwide	
	Address:	38271 W. Twelve Mile Road, Farmington Hills, MI 48331	
	Country:	United States	
	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	☒ Physical Crash Testing ☐ Engineering Analysis	4818M	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:	Eric Willetts	Same as Submitter ☒
Company Name:	MDI Worldwide	Same as Submitter ☒
Address:	38271 W. Twelve Mile Road, Farmington Hills, MI 48331	Same as Submitter ☒
Country:	United States	Same as Submitter ☒
Enter below all disclosures of financial interests as required by the FHWA 'Federal-Aid Reimbursement Eligibility Process for Safety Hardware Devices' document.		
Marketing Displays, Inc., doing business as MDI Worldwide ("MDI"), whose principal place of business is 38271 West Twelve Mile Road, Farmington Hills, Michigan 48331-3041, and Applus IDI ADARCO Engineering, LLC., whose principal place of business is 9270 Holly Road, Adelanto, CA 92301 share no (\$0.00) financial interests between the two organizations. This includes no (\$0.00) financial interest but not limited to: i. Compensation, including wages, salaries, commissions, professional fees, or fees for business referrals (dollar values are not needed); ii. Consulting relationships; iii. Research funding or other forms of research support; iv. Patents, copyrights, and other intellectual property interests; v. Licenses or contractual relationships; or vi. Business ownership and investment interest.		

PRODUCT DESCRIPTION

Help

- ☒ New Hardware or
 Significant Modification
 ☐ Modification to
 Existing Hardware

Product Description of 4818M
(Reference Drawing ZA-07919)

The 4818M temporary sign stand is a work-zone traffic control device used to display traffic control signs.

Further Description:

The 4818M temporary sign support is a portable/fold-up stand manufactured with two vertically mounted wind deflecting steel coil springs. The sign stand consists of a steel base assembly, four aluminum legs and an aluminum telescoping upright. The legs are constructed of 1.25" square tube. The two piece telescoping uprights are constructed of 1.50" SQ and 1.25" SQ tube. A roll-up sign is attached to the telescoping mast with the use of an adjustable roll-up sign bracket. The sign can be raised and lowered to the desired height.

The overall height of the stand is 105". The test was conducted with a 48" x 48" vinyl roll-up sign mounted 63" above grade to the bottom of the sign. The total weight of the stand is approximately 30 lbs.

CRASH TESTING

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.

Engineer Name:	Nick V. Injev	
Engineer Signature:	 email=nick.injev@idiada.com, c=US Digitally signed by Nick Injev DN: cn=Nick Injev, o=Applus IDIADA KARCO, ou, Date: 2020.06.09 16:14:38 -07'00'	
Address:	9270 Holly Road, Adelanto, CA 92301	Same as Submitter ☐
Country:	USA	Same as Submitter ☐

A brief description of each crash test and its result:

Help

Required Test Number	Narrative Description	Evaluation Results
3-70 (1100C)	Designed to evaluate the ability of a small vehicle to activate any breakaway, fracture, or yielding mechanism. Is considered optional for work-zone traffic control devices weighing less than 220 lbs (100 kg).	Non-Relevant Test, not conducted
3-71 (1100C)	An 1100C test vehicle approached the test article at a nominal speed of 62 mph. The first 4818M sign stand impacted was oriented at 0° and the second test article at 90°. The vertical upright of both devices released from the base upon impact making contact with the roof of the vehicle. The second article positioned at 90° also made contact with the windshield, but did not tear the plastic liner or cause excessive deformation. The occupant compartment was not penetrated and the deformation limits were not exceeded. The devices did not induce any vehicle instability. The 4818M met all the requirements for MASH Test 3-71.	PASS

Required Test Number	Narrative Description	Evaluation Results
3-72 (2270P)	A 2270P test vehicle approached the test article at a nominal speed of 62 mph. The first 4818M sign stand impacted was oriented at 0° and the second at 90°. Upon impact the 0° stand's vertical upright released from the base making contact with the hood of the vehicle. There was no penetration into the test vehicles occupant compartment nor were the deformation limits exceeded. The vertical upright of the 90° stand did not fully engage with the front of the truck. A second 3-72 (2270P) was conducted on a stand oriented at 90°. Upon impact the 90° stand's vertical upright released from the base making contact with the hood of the vehicle. There was no penetration into the test vehicles occupant compartment nor were the deformation limits exceeded. The devices did not induce any vehicle instability. The 4818M met all the requirements for MASH Test 3-72.	PASS

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:	Applus IDIADA KARCO Engineering, LLC.	
Laboratory Signature:	 email=nick.injev@idiada.com, o=US Digitally signed by Nick Injev DN: cn=Nick Injev, o=Applus IDIADA KARCO, ou, Date: 2020.06.09 16:14:53 -07'00'	
Address:	9270 Holly Road, Adelanto, CA 92301	Same as Submitter ☐
Country:	USA	Same as Submitter ☐
Accreditation Certificate Number and Dates of current Accreditation period :	TL-371: July 1, 2019 - July 1, 2022	

Submitter Signature*: **Eric Willetts**  Digitally signed by Eric Willetts
Date: 2020.05.20 15:27:55
-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.

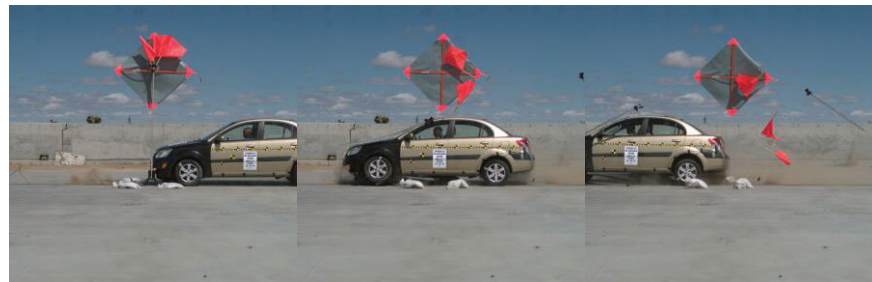
FHWA Official Business Only:

Eligibility Letter		
Number	Date	Key Words

MASH 2016 Test 3-71 Summary

0° CIA

90° CIA



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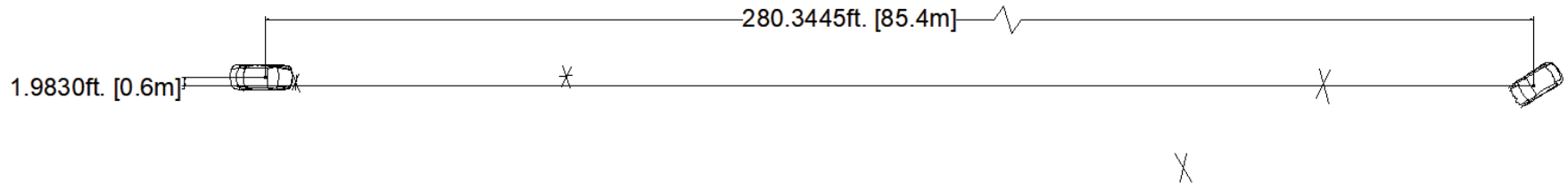
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GENERAL INFORMATION

Test Agency.....Applus IDIADA KARCO
Test No.....P39090-01
Test Designation.....3-71
Test Date.....3/28/19

TEST ARTICLE

Name / Model.....4818M
Type.....Work-Zone Device
Device Height10.7 ft. (3.3 m)
Key Elements.....Plastic and Metal
Road Surface.....Concrete

TEST VEHICLE

Type / Designation.....1100C
Year, Make, and Model.....2009, KIA, Rio
Curb Mass.....2,339.1 lbs (1,061.0 kg)
Test Inertial Mass.....2,390.9 lbs (1,084.5 kg)
Gross Static Mass.....2,559.5 lbs (1,161.0 kg)

Impact Conditions

Impact Velocity Device 1..... 61.84 mph (99.52 km/h)
Impact Velocity Device 2..... 59.73 mph (96.13 km/h)
Device 1 Angle..... 0.0°
Device 2 Angle..... 90.0°
Device 1 Kinetic Energy.....305.6 kip-ft (414.4 kJ)
Device 2 Kinetic Energy.....285.2 kip-ft (386.6 kJ)

Exit Conditions

Device 1 Exit Velocity.....61.4 mph (98.8 km/h)
Device 2 Exit Velocity.....57.9 mph (93.2 km/h)
Vehicle Resting Position..... 280.3 ft. (85.4 m) Downstream
1.9 ft. (0.6 m) Left

Vehicle StabilitySatisfactory
Maximum Roll Angle.....N/A*
Maximum Pitch Angle.....N/A*
Maximum Yaw Angle.....N/A*

* Not Applicable, device weighs less than 220 lbs (100 kg)

Occupant Risk

Longitudinal OIV.....N/A*
Lateral OIV.....N/A*
Longitudinal RA.....N/A*
Lateral RA.....N/A*
THIV.....N/A*
PHD.....N/A*
ASI.....N/A*

Test Article Deflections

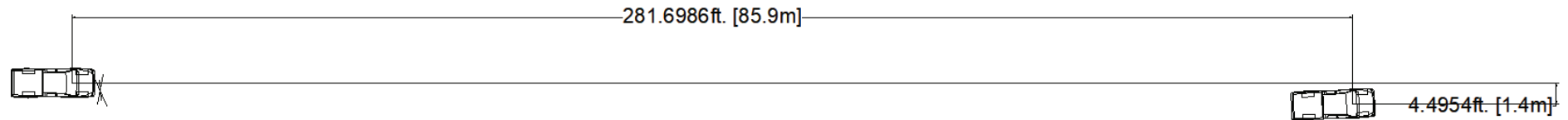
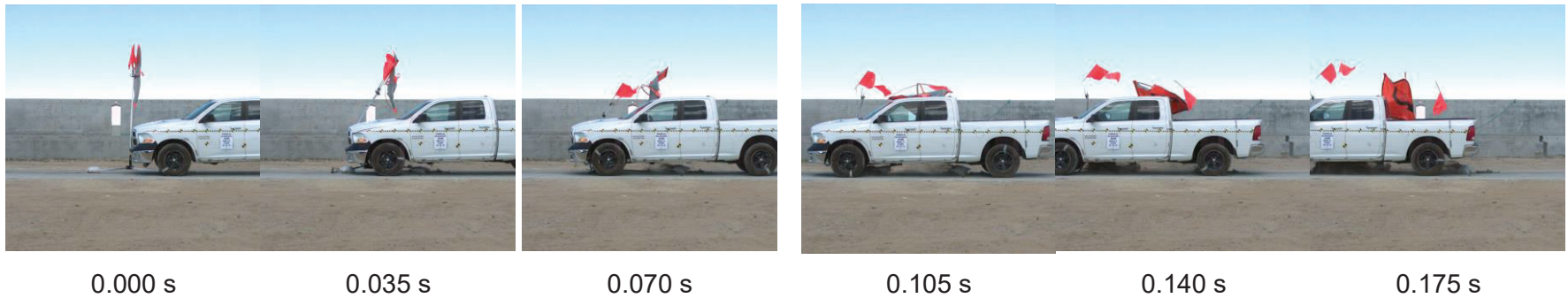
Debris Field (longitudinal) 196.3 ft. (59.8 m)
Debris Field (lateral)..... 18.8 ft. (5.7 m)

Vehicle Damage

Vehicle Damage Scale..... 12-FD-0
CDC.....12FDAW1
Maximum Intrusion.....0.3 in. (9 mm)

Figure 2 Summary of Test 3-71

MASH 2016 Test 3-72 0° CIA Summary



GENERAL INFORMATION

Test Agency.....Applus IDIADA KARCO
 Test No.....P39090-02
 Test Designation.....3-72
 Test Date.....3/28/19

TEST ARTICLE

Name / Model.....4818M
 Type.....Work-Zone Device
 Device Height10.7 ft. (3.3 m)
 Key Elements.....Plastic and Metal
 Road Surface.....Concrete

TEST VEHICLE

Type / Designation.....2270P
 Year, Make, and Model.....2013 RAM 1500
 Curb Mass.....4,994.5 lbs (2,265.5 kg)
 Test Inertial Mass.....5,012.1 lbs (2,273.5 kg)
 Gross Static Mass.....5,012.1 lbs (2,273.5 kg)

Impact Conditions

Impact Velocity62.08 mph (99.91 km/h)
 Impact Angle.....0.0°
 Device 1 Kinetic Energy.....645.8 kip-ft (875.5 kJ)

Exit Conditions

Exit Velocity.....61.2 mph (98.5 km/h)
 Vehicle Resting Position.....281.7 ft. (85.9 m) Downstream
 4.5 ft. (1.4 m) Right
 Vehicle StabilitySatisfactory
 Maximum Roll Angle.....N/A*
 Maximum Pitch Angle.....N/A*
 Maximum Yaw Angle.....N/A*

* Not Applicable, device weighs less than 220 lbs (100 kg)

Occupant Risk

Longitudinal OIV.....N/A*
 Lateral OIV.....N/A*
 Longitudinal RA.....N/A*
 Lateral RA.....N/A*
 THIV.....N/A*
 PHD.....N/A*
 ASI.....N/A*

Test Article Deflections

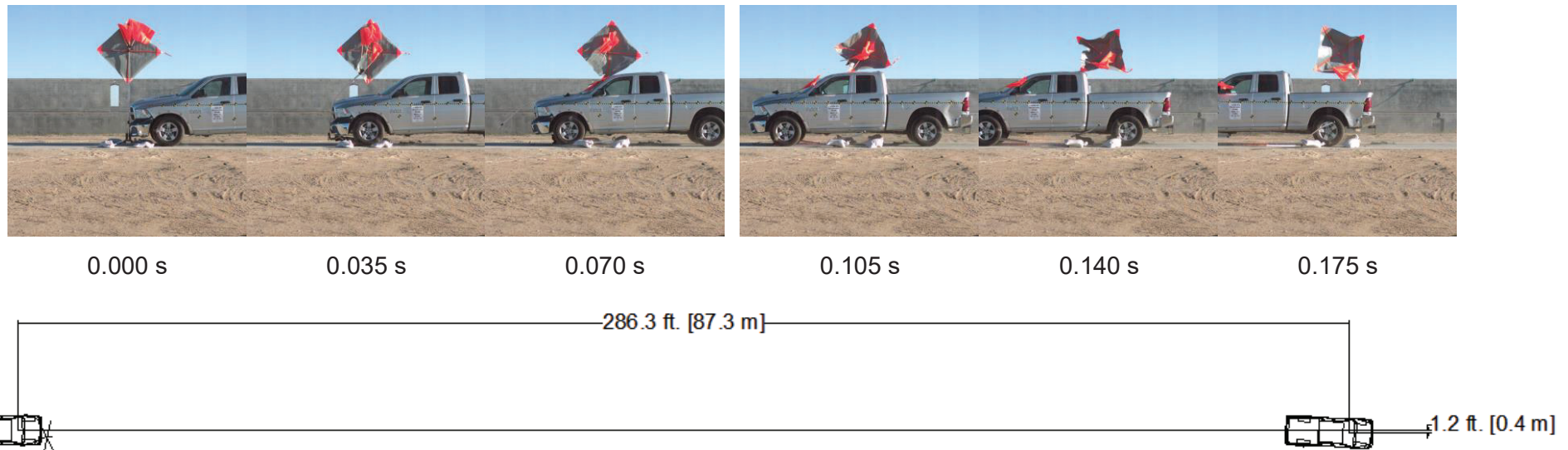
Debris Field (longitudinal)166.5 ft. (50.7 m)
 Debris Field (lateral).....21.4 ft. (6.5 m)

Vehicle Damage

Vehicle Damage Scale.....12-FD-1
 CDC.....12FDAW1
 Maximum Intrusion.....2.1 in. (53 mm)

Figure 3 Test 3-72 0° CIA Summary

MASH 2016 Test 3-72 90° CIA Summary



GENERAL INFORMATION

Test Agency.....Applus IDIADA KARCO
 Test No.....P39090-02A
 Test Designation.....3-72
 Test Date.....3/29/19

TEST ARTICLE

Name / Model.....4818M
 Type.....Work-Zone Device
 Device Height10.7 ft. (3.3 m)
 Key Elements.....Plastic and Metal
 Road Surface.....Concrete

TEST VEHICLE

Type / Designation.....2270P
 Year, Make, and Model.....2013 RAM 1500
 Curb Mass.....4,881.0 lbs (2,214.0 kg)
 Test Inertial Mass.....5,002.2 lbs (2,269.0 kg)
 Gross Static Mass.....5,002.2 lbs (2,269.0 kg)

Impact Conditions

Impact Velocity.....63.16 mph (101.65 km/h)
 Impact Angle.....90.0°
 Kinetic Energy.....667.1 kip-ft (904.5 kJ)

Exit Conditions

Exit Velocity.....63.1 mph (101.5 km/h)
 Vehicle Resting Position.....286.3 ft. (87.3 m) Downstream
 1.2 ft. (0.4 m) Left
 Vehicle StabilitySatisfactory
 Maximum Roll Angle.....N/A*
 Maximum Pitch Angle.....N/A*
 Maximum Yaw Angle.....N/A*

* Not Applicable, device weighs less than 220 lbs (100 kg)

Occupant Risk

Longitudinal OIV.....N/A*
 Lateral OIV.....N/A*
 Longitudinal RA.....N/A*
 Lateral RA.....N/A*
 THIV.....N/A*
 PHD.....N/A*
 ASI.....N/A*

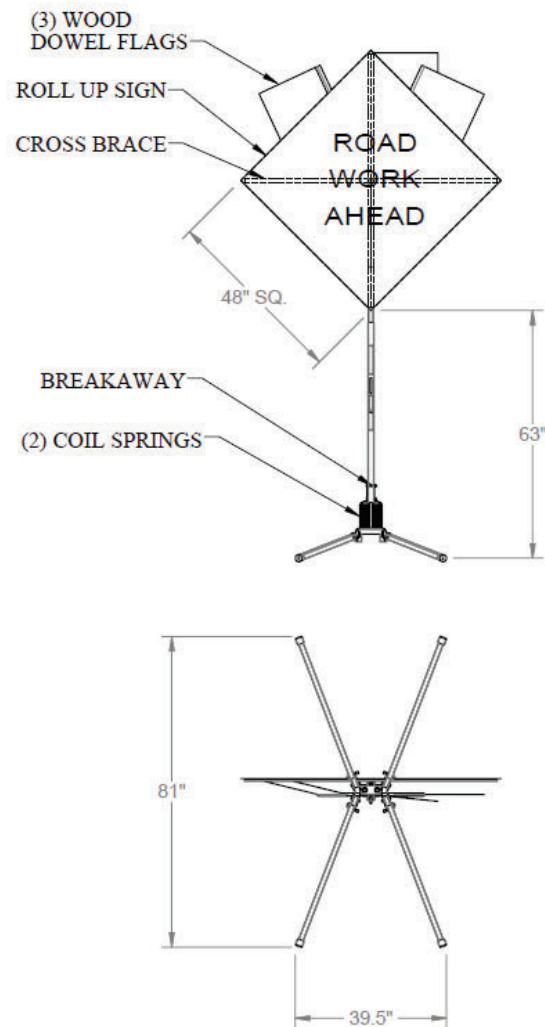
Test Article Deflections

Debris Field (longitudinal)202.4 ft. (61.7 m)
 Debris Field (lateral).....12.7 ft. (3.9 m)

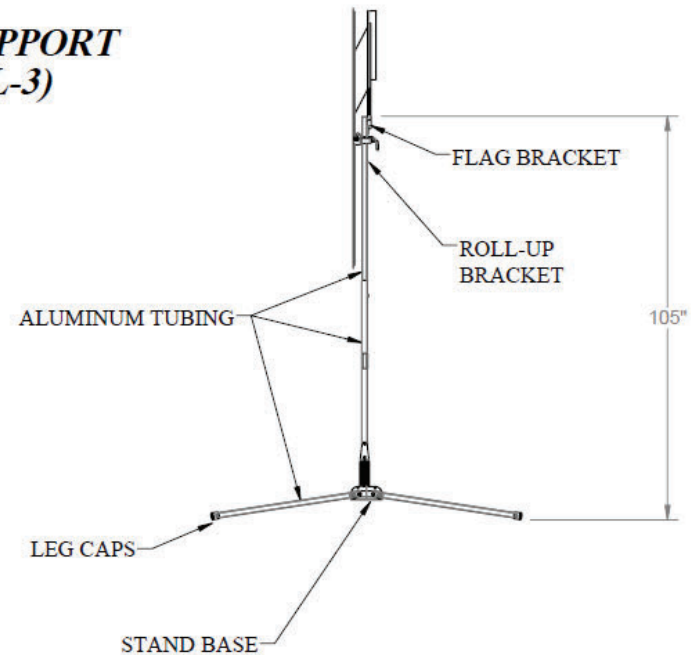
Vehicle Damage

Vehicle Damage Scale.....12-FD-1
 CDC.....12FDAW1
 Maximum Intrusion.....N/A

Figure 4 Test 3-72 90° CIA Summary



MODEL: 4818M
TEMPORARY SIGN SUPPORT
AASHTO MASH (TL-3)



NOTES:

-DIMENSIONS SHOWN ARE PER THE DESIGN INTENT AND ARE SHOWN FOR REFERENCE ONLY.

4818M SIGN STAND

OVERALL WEIGHT: APPROX. 30.0 lbs. (NO SIGN)
 OVERALL DIMENSIONS: APPROX. 39.5" X 81" X 105"
 FRAME MATERIAL: ALUMINUM



MDI Traffic Control Products, 38271 West 12 Mile Road, Farmington Hills, MI 48331-3041 800-521-6776

ZA-07919

Figure 1: 4818M Sign Stand