Mr. Henry A. Ross  
Plasticade  
100 Howard Avenue  
Des Plaines, IL 60018  
USA  

Dear Mr. Ross:

This letter is in response to your February 24, 2020 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-410 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:

- Plasticade® Safetycade® Type I and Type II Barricade

**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:** Plasticade® Safetycade® Type I and Type II Barricade
- **Type of system:** Work Zone
- **Test Level:** MASH Test Level 3 (TL3)
- **Testing conducted by:** Texas A&M Transportation Institute (TTI).
- **Date of request:** February 24, 2020

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-410 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,

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

Enclosures
Request for Federal Aid Reimbursement Eligibility of Highway Safety Hardware

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

<table>
<thead>
<tr>
<th>System Type</th>
<th>Submission Type</th>
<th>Device Name / Variant</th>
<th>Testing Criterion</th>
<th>Test Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>WZ: Crash Worthy Work Zone</td>
<td>Physical Crash Testing</td>
<td>Plasticade® Safetycade® Type I and II Barricade</td>
<td>AASHTO MASH</td>
<td>TL3</td>
</tr>
<tr>
<td>Zone Traffic Control Devices</td>
<td>Engineering Analysis</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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: Henry A. Ross
- Company Name: Plasticade
- Address: 100 Howard Avenue, Des Plaines, IL 60018
- Country: U.S.A.

Enter below all disclosures of financial interests as required by the FHWA `Federal-Aid Reimbursement Eligibility Process for Safety Hardware Devices` document.

Texas A&M Transportation Institute (TTI) was contracted by Plasticade® to perform full-scale crash testing of the Plasticade® Safetycade® Type I and Type II Barricade. There are no shared financial interests in the Plasticade® Safetycade® Type I and Type II Barricade by TTI, or between Plasticade® and TTI, other than costs involved in the actual crash tests and reports for this submission to FHWA.

690900-PLP9&10
PRODUCT DESCRIPTION

TheSafetycade®Type I and Type II Barricade is 42.5 inches tall, 33 inches wide, and 36 inches long (base/feet). The test article consisted of three main components made from High Density Polyethylene (HDPE) plastic connected at the bottom with hinges, steel hardware, and aspring in each foot to keep the sign portion upright and allow for rotation. A safety light (Empco-Lite Model 2006 with four D-cell batteries) was attached to the top of the test article, bringing the total height of the barricade to 49 inches to the top of the safety light. Each barricade weighed a total of 35 lb (including 14 lb of internal ballast sand in the feet (7 lb each foot) and the 3 lb safety light).

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: D. Lance Bullard, Jr., P.E.
Engineer Signature: D. Lance Bullard, Jr.  Digitally signed by D. Lance Bullard, Jr.  Date: 2020.03.02 08:41:30-06'00'
Address: 3100 SH47, Bldg 7091, Bryan, TX, 77807
Country: U.S.A.

A brief description of each crash test and its result:

<table>
<thead>
<tr>
<th>Required Test Number</th>
<th>Narrative Description</th>
<th>Evaluation Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-70 (1100C)</td>
<td>MASH states that Test 3-70 for small vehicles is considered optional for work-zone traffic control devices weighing less than 220 lb, because velocity changes during low-speed impacts with free-standing, lightweight features will be within acceptable limits. The Plasticade® Safetycade® Type I and Type II Barricade traffic control device weighed 35 lb (including 14 lb of internal ballast sand in the feet (7 lb each foot) and the 3 lb safety light). Therefore, MASH Test 3-70 was not performed on this traffic control device.</td>
<td>Non-Critical, not conducted</td>
</tr>
</tbody>
</table>
MASH Test 3-71 involved an 1100C vehicle weighing 2420 lb ±55 lb impacting the traffic control device at an impact speed of 62 mi/h ±2.5 mi/h. Per MASH recommendations, the device was tested at critical impact angles (CIAs) of 90° ± 1.5° and 0° ± 1.5°.

The results of test 690900-PLP9 conducted on October 23, 2019 are found in TTI Test Report number 690900-PLP9&10. The test vehicle was traveling at an impact speed of 63.7 mi/h when it contacted the first barricade at an impact angle of 0°. The vehicle was traveling at an impact speed of 62.4 mi/h and impact angle of 90° when it contacted the second barrier. Brakes on the vehicle were applied after loss of contact with the second barricade, and the vehicle came to rest 442 ft downstream of the impact. The barricades fractured into several pieces. For the first barricade, one foot came to rest 30 ft downstream of impact and 27 ft to the left of the vehicle path, and the second foot came to rest 84 ft downstream of impact and 9 ft to the right of the vehicle path. The panel of the first barricade rode along on the front of the vehicle and then slid forward an additional 120 ft and came to rest 562 ft downstream of impact. For the second barricade, one foot came to rest 100 ft downstream of impact and 13 ft to the left of the vehicle path. The safety light came to rest 195 ft downstream of impact and 13 ft to the right of the vehicle path. The panel and the remaining foot came to rest 312 ft downstream of impact and 15 ft to the left of the vehicle path. The front bumper, air dam, and hood were damaged. The hood sustained an indentation measuring 24 inches × 32 inches × 2.0 inches deep on the driver's side. There was no damage to the windshield. No occupant compartment deformation or intrusion was observed.

MASH does not require instrumentation of the vehicle when impacting lightweight, freestanding work zone traffic control devices weighing less than 220 lb, therefore the occupant risk factors were not calculated for this test. The Plasticade® Safetycade® Type I and Type II Barricade weighed 35 lb (including 14 lb of internal ballast sand in the feet (7 lb each foot) and the 3 lb safety light). The Safetycade® Type I and Type II Barricade performed acceptably for MASH test 3-71 with impact angles of 0° and 90°.
MASH Test 3-72 involves a 2270P vehicle weighing 5000 lb ± 110 lb impacting the traffic control device at an impact speed of 62 mi/h ± 2.5 mi/h. Per MASH recommendations, the device was tested at critical impact angles (CIAs) of 90° ± 1.5° and 0° ± 1.5°.

The results of test 690900-PLP10 conducted on October 23, 2019 are found in TTI Test Report number 690900-PLP9&10. The test vehicle was traveling at an impact speed of 63.1 mi/h when it contacted the first barricade at an impact angle of 0°. The vehicle was traveling at an impact speed of 62.5 mi/h and impact angle of 90° when it contacted the second barrier. Brakes on the vehicle were applied after loss of contact with the second barricade, and the vehicle came to rest 420 ft downstream of the impact and 13 ft to the left of the vehicle path. One foot of the first barricade came to rest 2 ft downstream of impact and 5 ft to the right of the vehicle path, and the remainder of the barricade came to rest 60 ft downstream of impact and 12 ft to the left of the vehicle path. One foot from the second barricade came to rest 208 ft downstream of impact, and the remainder came to rest 345 ft downstream of impact and 24 ft to the left of the vehicle path. The front bumper, grill, and hood were damaged. The hood sustained two small areas of deformation. There was no damage to the windshield. No occupant compartment deformation or intrusion was observed.

MASH does not require instrumentation of the vehicle when impacting lightweight, freestanding work zone traffic control devices weighing less than 220 lb, therefore the occupant risk factors were not calculated for this test. The Plasticade® Safetycade® Type I and Type II Barricade weighed 35 lb (including 14 lb of internal ballast sand in the feet (7 lb each foot) and the 3 lb safety light).

The Safetycade® Type I and Type II Barricade performed acceptably for MASH test 3-72 with impact angles of 0° and 90°.
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.):

<table>
<thead>
<tr>
<th>Laboratory Name:</th>
<th>Texas A&amp;M Transportation Institute</th>
</tr>
</thead>
</table>
| Laboratory Signature: | Digitally signed by Darrell L. Kuhn  
'Date: 2020.02.28 16:45:20 -06'00 |
| Address: | 3100 SH47, Bldg 7091, Bryan, TX, 77807  
Same as Submitter |  |  |
| Country: | U.S.A  
Same as Submitter |  |  |
| Accreditation Certificate Number and Dates of current Accreditation period: | ISO 17025-2017 Laboratory A2LA Certificate Number: 2821.01  
Valid To: April 30, 2021 |
| Submitter Signature: | Henry Ross  
Digitally signed by Henry Ross  
'Date: 2020.03.03 16:25:30 -06'00' |

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:

<table>
<thead>
<tr>
<th>Eligibility Letter</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Date</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
General Information
- Test Agency: Texas A&M Transportation Institute (TTI)
- Test Standard: MASH Test 3-71 at 0° and 90°
- TTI Test No.: 690900-PLP9
- Test Date: 2019-10-23

Test Vehicle Post-Impact Trajectory
- Type/Designation: 1100C
- Make and Model: 2008 Kia Rio
- Curb: 2465 lb
- Dummy: 165 lb
- Gross Static: 2589 lb

Maximum Test Debris Scatter
- Barricade #1: 562 ft downstream
- Barricade #2: 30 ft-54 ft downstream

Vehicle Damage
- VOS: 12FD1
- CDC: 12FDEN1
- Max. Exterior Deformation: 2.0 inch
- Max. Occlusion: FS000000
- Windshield Damage: None

Figure 5.7. Summary of Results for MASH Test 3-71 at 0° and 90° on Safetycade® Type I and Type II Barricades
Figure 6.7. Summary of Results for MASH Test 3-72 at 0° and 90° on Safetycade® Type I and Type II Barricades.
SAFETYCADE®

Specs

<table>
<thead>
<tr>
<th>Composition</th>
<th>High Density Polyethylene</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>42.5&quot;H x 33&quot;W x 3&quot;D</td>
</tr>
<tr>
<td>Colors</td>
<td>White</td>
</tr>
<tr>
<td>Weight</td>
<td>29 lbs.</td>
</tr>
<tr>
<td>Retroreflective Sheeting</td>
<td>Available in all grades in white and orange</td>
</tr>
</tbody>
</table>

Ballast Boot

Ballast Boots weigh 20 lbs. each when filled with sand.

Barricade with two boots - 69 lbs.

Ballast Boot

7700 N. Austin Avenue
Skokie, IL  60077
phone (800) 772-0355
fax (847) 966-8074
www.plasticade.com

MADE IN THE USA