September 6, 2018

Mr. Charles Mettler
Plastic Safety Systems, Inc.
2444 Baldwin Road
Cleveland, Ohio 44104

Dear Mr. Mettler:

This letter is in response to your June 26, 2018 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-359 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:

- SafetyRail

**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: SafetyRail  
  Type of system: Channelizer  
  Test Level: MASH Test Level 3 (TL3)  
  Testing conducted by: Texas A&M Transportation Institute  
  Date of request: June 26, 2018  
  Date initially acknowledged: June 29, 2018

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-359 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.

- If the subject device is a patented product it may be considered to be proprietary. If proprietary systems are specified by a highway agency for use on Federal-aid projects: (a) they must be supplied through competitive bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for synchronization with the existing highway facilities or that no equally suitable alternative exists; or (c) they must be used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes. Our regulations concerning proprietary products are contained in Title 23, Code of Federal Regulations, Section 635.411.

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 Traffic Control Devices</td>
<td>Physical Crash Testing</td>
<td>SafetyRail</td>
<td>AASHTO MASH</td>
<td>TL3</td>
</tr>
<tr>
<td></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:** Chuck Mettler  
  - Same as Submitter √
- **Company Name:** PSS (Plastic Safety Systems) Inc.  
  - Same as Submitter √
- **Address:** 2444 Baldwin Road, Cleveland, Ohio 44104  
  - Same as Submitter √
- **Country:** USA  
  - 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.

None
PRODUCT DESCRIPTION

The SafetyRail channelizer was comprised of upper and lower notched wave boards, each measuring 48 inches long × 8 1/4 inches wide × 13/16 inches thick, supported by right-triangle shaped, hollow up-rights, each 38 inches tall × 24 inches wide at the base × 3 3/4 inches thick. Each up-right was weighted to the apron with one 45-to-50 lb sandbag. There were no bolts, pins, or adhesives that secured the up-rights to the concrete apron. The notched wave boards were attached to the up-rights with proprietary break-away bushings. The up-rights and wave boards were constructed of high density polyethylene (HDPE) material.

Up-rights No. 6 through 25 (see attached report) were fitted with Type A-C beacon lights (Dicke Safety Products TrafiLITE, with batteries). The upper wave boards between up-rights No. 10 and 11, and 11 and 12 (see attached report) were fitted with aluminum "SIDEWALK CLOSED" signs that measured 24 inches long × 18 inches tall × 0.100 inch thick.

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.
Engineer Signature: D. Lance Bullard, Jr. Digitally signed by D. Lance Bullard, Jr. Date: 2018.06.04 08:20:48 -05'00'
Address: TTI, TAMU 3135, College Station, TX 77843-3135 Same as Submitter
Country: USA Same as Submitter

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>3-90(1100C)</td>
<td>Test 3-90 involves an 1100C vehicle impacting the test article at a target speed of 62 mph and at a target angle of 0-to-25 degrees. The results of the test conducted on October 16, 2017 are found in TTI Test Report number 690900-PSS9&amp;10. The test vehicle contacted the channelizer at a barricade support at the joint between barricade 9 and 10 at an impact angle of 9.7° while traveling at an impact speed of 61.7 mi/h. The vehicle penetrated through the channelizer and the brakes on the vehicle were applied 1.7 s after impact. The vehicle subsequently came to rest 223 ft downstream of impact and 16 ft behind the installation. The wave boards and sand/sand bags were strewn over an area 250 ft long, 53 ft behind the field side, and 35 ft forward of the traffic side. The channelizer opening created from the impact extended from supports 10 through 21. One of the wave boards lodged under the vehicle, but did not penetrate or show potential to penetrate the occupant compartment. The front bumper, hood, right front fender, and front part of the roof received slight denting and scuffing, and the headlight was dislodged. There was slight denting, but no measurable deformation of the exterior of the vehicle. No occupant compartment deformation or intrusion occurred. Occupant risk factors were all within the preferred MASH limits. The device performed acceptably for MASH test 3-90.</td>
<td>PASS</td>
</tr>
<tr>
<td>Required Test Number</td>
<td>Narrative Description</td>
<td>Evaluation Results</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>3-91(2270P)</td>
<td>Test 3-91 involves a 2270P vehicle impacting the test article at a target speed of 62 mph and at a target angle of 0 to 25 degrees. The test vehicle contacted the channelizer at barricade support 10 at an impact angle of 9.9° while traveling at an impact speed of 64.0 mi/h. The vehicle penetrated the channelizer and the brakes on the vehicle were applied at 1.7 s. The vehicle subsequently came to rest 307 ft downstream of the impact and 15 ft toward the field side. The wave boards and sand/sand bags were strewn over an area 327 ft long, 45 ft behind the field side, and 48 ft forward of the traffic side. The channelizer opening created by the impact extended from supports 10 through 22. The front bumper, grill, hood, and right front fender were slightly deformed. No occupant compartment deformation or intrusion occurred. Occupant risk factors were all within the preferred MASH limits. The device performed acceptably for MASH test 3-91.</td>
<td>PASS</td>
</tr>
</tbody>
</table>

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:** Texas A&M Transportation Institute

**Laboratory Signature:** Digitally signed by Darrell L. Kuhn

**Date:** 2018.06.01 17:08:30 -05'00'

**Address:** TTI, TAMU 3135, College Station, TX 77843-3135

**Country:** USA

**Accreditation Certificate Number and Dates of current Accreditation period :** ISO 17025 Laboratory Certificate Number: 2821.01 Valid To: April 30, 2019

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:

<table>
<thead>
<tr>
<th>Eligibility Letter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>General Information</td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td>Test Agency</td>
</tr>
<tr>
<td>TTI</td>
</tr>
<tr>
<td>Test Standard Test No</td>
</tr>
<tr>
<td>TTI Test No</td>
</tr>
<tr>
<td>Test Date</td>
</tr>
<tr>
<td>Test Article</td>
</tr>
<tr>
<td>Type</td>
</tr>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Installation Length</td>
</tr>
<tr>
<td>Material or Key Elements</td>
</tr>
<tr>
<td>So &amp; Condition</td>
</tr>
<tr>
<td>Test Vehicle</td>
</tr>
<tr>
<td>Type/Designation</td>
</tr>
<tr>
<td>Make and Model</td>
</tr>
<tr>
<td>Curb</td>
</tr>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Installation Length</td>
</tr>
<tr>
<td>Material or Key Elements</td>
</tr>
<tr>
<td>Test Article</td>
</tr>
<tr>
<td>Type</td>
</tr>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Installation Length</td>
</tr>
<tr>
<td>Material or Key Elements</td>
</tr>
<tr>
<td>Test Article Debris Field</td>
</tr>
<tr>
<td>Type</td>
</tr>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Installation Length</td>
</tr>
<tr>
<td>Material or Key Elements</td>
</tr>
<tr>
<td>Test Vehicle</td>
</tr>
<tr>
<td>Type/Designation</td>
</tr>
<tr>
<td>Make and Model</td>
</tr>
<tr>
<td>Dummy</td>
</tr>
<tr>
<td>Gross Static</td>
</tr>
<tr>
<td>Dummy</td>
</tr>
<tr>
<td>Gross Static</td>
</tr>
<tr>
<td>Vehicle Damage</td>
</tr>
<tr>
<td>CDC</td>
</tr>
<tr>
<td>Max. Exterior Deformation</td>
</tr>
<tr>
<td>OCDI</td>
</tr>
<tr>
<td>Max. Occupant Compartment</td>
</tr>
</tbody>
</table>

Figure 5.8. Summary of Results for MASH Test 3-90 on PSS SafetyRail™ Channelizer.
Figure 6.8. Summary of Results for MASH Test 3-91 on PSS SafetyRail™ Channelizer.

General Information
- Test Agency: Texas A&M Transportation Institute (TTI)
- Test Standard Test No.: MASH Test 3-91
- TTI Test No.: 690900-PSS10
- Test Date: 2017-10-17

Test Article
- Type: Longitudinal Channelizer
- Name: PSS SafetyRail™
- Installation Length: 201 ft
- Material or Key Elements: 50 4-ft long proprietary, repositionable, high density polyethylene (HDPE) pedestrian barrier segments

Soil Type and Condition

Test Vehicle
- Type/Designation: 2270P
- Make and Model: 2012 Dodge RAM 1500 Pickup
- Curb: 5005 lb
- Test Inertial: 5054 lb
- Dummy: No dummy
- Gross Static: 5054 lb

Impact Conditions
- Speed: 64.0 mi/h
- Angle: 9.9°
- Location/Orientation: Support 10

Kinetic Energy
- Exit Conditions
  - Speed: 59.4 mi/h
  - Angle: 11.1°

Occupant Risk Values
- Longitudinal OIV: 7.2 ft/s
- Lateral OIV: 1.6 ft/s
- Longitudinal Ridedown: 0.8 g
- Lateral Ridedown: 0.6 g
- THIV: 8.5 km/h
- PHD: 0.8 g
- ASI: 0.11
- Max. 0.050-s Average
  - Longitudinal: -0.7 g
  - Lateral: 0.6 g
  - Vertical: 1.0 g

Post-Impact Trajectory
- Stopping Distance: 307 ft downstream
- 15 ft twd field side

Vehicle Stability
- Maximum Yaw Angle: 3°
- Maximum Pitch Angle: 3°
- Maximum Roll Angle: 10°

Test Article Debris Field
- Longitudinal: 327 ft
- Toward Traffic Side: 48 ft
- Toward Field Side: 45 ft

Vehicle Damage
- VDS: 01RFQ1
- CDC: 01FREW1
- Max. Exterior Deformation: Negligible
- OCDI: FS0000000
- Max. Occupant Compartment Deformation: None
P/N BP-04M-N (4)
Retroreflective sheeting as required

P/N SR-38B4

Replaceable break-away bushing

Ballast with sandbags (45 lbs. Max)

Notes: Previous Acceptance WZ-278
Tested to NCHRP-350 TL-3
Type A-C lights as required

Units connected with 4' boards Wave Boards

Safety Rail

PSS

XXX

Sheet No. | Date
---|---
2 of 4 | 5/30/17

TR No. 690900-PSS9&10 | 36 | 2018-04-10