Potential New Methods for Review of Crash Test Results for the Determination of Crashworthiness of Roadside Safety Hardware

This document presents several potential options for reviewing, evaluating, and accepting the results of crash testing of roadside safety hardware (RSH) that is intended to be used on the National Highway System (NHS). These options are intended for discussion purposes only, and do not necessarily represent the full spectrum of possibilities. Additional thoughts and ideas are welcome.

Introduction: Roadside Safety Hardware Acceptance and Use on the NHS

For RSH to be eligible for Federal-Aid reimbursement when used on the National Highway System, it must be determined to be crashworthy by a State department of transportation (DOT) or other transportation agency. FHWA considers RSH to be crashworthy once it has been successfully crash tested and/or evaluated in accordance with the AASHTO *Manual for Assessing Safety Hardware* (MASH). A careful review of the results of crash testing will determine the crashworthiness and suitability of RSH for use on user agency roads. State DOTs and other transportation agencies should have in place a process to determine crashworthiness through the review and assessment of AASHTO MASH crash test results/evaluations. FHWA Division Offices will work with their respective State DOTs to ensure the State DOTs have a process for determining the crashworthiness of RHS. See FHWA April 9 memo to Division Offices.

Currently, FHWA reviews certified test results for roadside safety hardware products as conducted by accredited labs and submitted by manufacturers or State DOTs. Upon review by FHWA that the product has been successfully tested in accordance with AASHTO's MASH, FHWA issues a letter of eligibility for Federal-aid reimbursement for the product. As mentioned in the FHWA Eligibility Letter, "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. The 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 a device. Proper manufacturing, installation, and maintenance are required in order for a device to function as tested. The FHWA 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."

After roadside safety hardware has been determined to be crashworthy and eligible for use on the NHS, an understanding of how the device will operate in real-world conditions can be obtained through a post-acceptance program of observation and assessment. To operate as designed, hardware must be properly assembled and installed and must be maintained after installation. If damaged, the RSH should be repaired or replaced and, where appropriate, damage and circumstances leading to the damage be documented. This documentation will

form the basis of an in-service performance evaluation (ISPE) that will enhance a user agency's knowledge of device performance. Additionally, information and data contained within an ISPE is valuable in informing future improved device design and testing, and enable improvements to installation, maintenance, and repair procedures.

Recognizing that not all highway agencies have the in-house capabilities to fully assess all of the roadside safety hardware that may be incorporated into their highway systems, the following is a list of potential methods for State DOTs to consider to ensure that the devices used on their highways have been tested, evaluated, and deemed crashworthy.

Potential New Methods for Review and Assessment

1. **State Agency review and assessment:** Individual State DOTs may implement their own procedures for reviewing and accepting roadside safety hardware through agency quality assurance procedures. Such procedures would be similar to how they accept other manufactured materials for use on projects. State DOTs may assess and determine the initial acceptability of RSH by:
   - Direct Agency Testing: Subjecting RSH products to direct crash testing (in accordance with State standards) through an accredited lab.
   - Independent Lab Certification: Reviewing certified results of crash testing in accordance with State standards submitted to the State by a lab or manufacturer.
   - Manufacturer Certification: Reviewing and accepting manufacturers' certifications that their RSH product meets the requirements for crashworthiness in accordance with State standards.
   - State Self-determination/Certification: Determining the most appropriate types of RSH products that are suitable for needs on state highways and specifying those products for use on NHS projects.

Accepted RSH can then be listed on a State DOT's approved/qualified product lists (A/QPL) or included in agency standard plans and specifications for use on the NHS. AASHTO's *Standard Practice for Quality Assurance of Standard Manufactured Materials (Designation: R 38-10)* provides a framework for implementing quality assurance procedures for manufactured products, including RSH, and includes guidelines for acceptance. With some modification, the R-38 framework could potentially be adjusted to include procedures for testing and determining crashworthiness of RSH.

2. **Multi-Agency Review and Assessment:** While it is each State DOT's ultimate responsibility to accept and utilize RSH on its own projects, there are opportunities for groups of states to combine resources in the review and determination of RSH crashworthiness, such as pooled-fund projects and regional coordination.

   - **Pooled-fund projects:** Multiple States combine funding to conduct research on transportation issues that may include laboratory crash testing and review and assessment of crash testing reports. Currently, there are two established transportation pooled fund programs that are devoted to roadside safety research:

- Midwest States Pooled Fund Program (http://mwrsf.unl.edu/about.php) located at the University of Nebraska has 19 State DOT members
- Texas A&M Transportation Institute Roadside Safety Pooled Fund (https://www.roadsidepooledfund.org/) located at Texas A&M University has 7 State DOT members

- **Regional Coordination:** States, other transportation agencies, and academic institutions in a region could join formally or informally to share information and resources on reviewing, assessing and accepting RSH. Although each State is ultimately responsible for approving RSH to be used on its own roadways, such regional cooperation would benefit all members by allowing states with differing levels of RSH expertise to share information, test results, and field experience on in-service performance of RSH.

3. **AASHTO's National Transportation Product Evaluation Program (NTPEP):** NTPEP is a national partnership program between State DOTs and manufacturers that tests manufactured transportation products to nationally accepted materials specifications that are of common interest to all member State DOTs and shares the results from these laboratory and field tests. The products may be listed on AASHTO's Product Evaluation List (APEL) website (reinforcing steel is an example of a material that was evaluated under NTPEP and is now listed in the APEL). Under this scenario, manufacturers who participate pay for having their products tested.

4. **U.S. Consumer Product Safety Commission (CPSC) Model**: The CPSC is a Federal agency that is charged with protecting the public from unreasonable risks of injury or death associated with the use of the thousands of types of consumer products under the agency's jurisdiction, such as toys, cribs, power tools, cigarette lighters, and household chemicals. Federal law requires that a manufacturer or importer certify in writing that their product complies with all consumer product safety rules, standards, regulations, and laws as enforced by CPSC. The certification, also known as a General Certificate of Conformity (GCC), must be issued by the manufacturer or importer, and must be based upon the results of testing for each product. Testing for general use (non-children's) products may be conducted in-house by the manufacturer, importer, or at any testing laboratory. However, for children's products, Federal law requires that testing be conducted by a third-party CPSC-accepted laboratory. Once a GCC has been issued, the manufacturer or importer of the product must furnish the GCC to distributers and retailers and must retain records in case of audit by CPSC. It should be noted that for the case of RSH, CPSC would not administer the program, however the inclusion of the CPSC framework in this document provides a model for how a similar program for certifying RSH with threat of audit could be established at a State or national level.

5. **National Highway Traffic Safety Administration (NHTSA) Review:** NHTSA (or another Federal agency) would conduct testing or review of certified test results for roadside safety hardware products and verify that the RSH product is crashworthy in accordance with AASHTO MASH criteria. Upon verification of crashworthiness, NHTSA would notify State

DOTs, who would then be able to demonstrate to FHWA that the product is crashworthy. It should be noted that NHTSA does not have current authority to do this.

6. **Manufacturer-based Certification, Installation, and Maintenance:** This process would include not only manufacturer certification that the device has been crash tested, but would also include manufacturer assembly on site, construction installation, maintenance, and repair of the device throughout its service life (the manufacturer would be the quasi-owner of the devices it manufactures and installs – could also be run similar to an extended warranty contract for household appliances). Once damaged beyond repair, the manufacturer of the old device would no longer be responsible and a new device would be installed and maintained as above.