1. FHWA’s roll in MASH implementation
2. FHWA’s eligibility letters of MASH compliant hardware.
3. FHWA’s web site listing systems that have FHWA eligibility letters.
4. Value of FHWA eligibility letters.
5. Communication protocol between a State DOT and the FHWA Safety Office. (how should a state contact you if they have a question – should they go through the Division Office?)
6. Schedule for MASH implementation on NHS system. If a delay in the schedule needs to occur, how will that happen?
7. MASH tested hardware that does not have a FHWA acceptance letter
MASH Test Hardware

- **Longitudinal Barrier:** 31
  - Permanent: 22
    - 32% (7) Proprietary
    - 68% (15) Generic
  - Temporary: 9
    - 56% (5) Proprietary
    - 44% (4) Generic

- **Transitions** (bridge & guardrail beam element): 3
  - 100% (3) Generic

- **Terminals:** 4 [(3)w-beam energy absorbing; (1) cable non-energy absorbing]
  - 100% (4) Proprietary (2 manufacturers)

- **Small Sign Supports:** 3
  - 67% (2) Proprietary
  - 33% (1) Generic

- **Work Zone Devices:** 12 [various devices]
  - 100% (12) Proprietary

- **Crash Cushions:** 2 [metal]
  - 100% (2) Proprietary
Implementation Agreement

http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road.hardware/

Roadside Hardware Policy and Guidance

Federal-aid Reimbursement Eligibility for Safety Hardware Devices

- Memo on Policy and Process Changes
- Open letter to highway safety hardware and roadside design community
- Federal-aid Reimbursement Eligibility Process
  - Hardware Eligibility Request Form – UPDATED 05/2016
  - Hardware Eligibility Request Form using FEA
- FAQs on Communications concerning Eligibility Requests
- FAQs on Public Comments regarding Roadside Hardware

FHWA Policy Memoranda and Guidance on Roadside Hardware

Here's where to find FHWA policy memoranda on roadside hardware.

Manual for Assessing Safety Hardware (MASH)

- Overview of MASH
- Memorandum outlining the AASHTO/FHWA Joint Implementation Agreement on MASH – NEW 01-07-2016
- Questions and Answers regarding the agreement – NEW 01-07-2016
- FHWA Federal Register Notice on Transition to MASH

FHWA Review of the ET-Plus

Frequently Asked Questions and Answers About Roadside Safety Appurtenances

Questions and comments from State transportation agencies, industry, and the Federal Highway Administration.

- FAQs on Barriers, Terminals, and Bridge railings
- FAQs on Breakaway Sign and Luminaire Supports
http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/

Federal-aid Reimbursement Eligibility for Safety Hardware Devices

- Memo on Policy and Process Changes
- Open letter to highway safety hardware and roadside design community
- Federal-aid Reimbursement Eligibility Process
  - Hardware Eligibility Request Form – UPDATED 05/2016
  - Hardware Eligibility Request Form using FEA
- FAQs on Communications concerning Eligibility Requests
- FAQs on Public Comments regarding Roadside Hardware

FHWA Policy Memoranda and Guidance on Roadside Hardware

Here's where to find FHWA policy memoranda on roadside hardware.

Manual for Assessing Safety Hardware (MASH)

- Overview of MASH
- Memorandum outlining the AASHTO/FHWA Joint Implementation Agreement on MASH – NEW 01-07-2016
- Questions and Answers regarding the agreement – NEW 01-07-2016
- FHWA Federal Register Notice on Transition to MASH

FHWA Review of the ET-Plus

Frequently Asked Questions and Answers About Roadside Safety Appurtenances

Questions and comments from State transportation agencies, industry, and the Federal Highway Administration.

- FAQs on Barriers, Terminals, and Bridge railings
- FAQs on Breakaway Sign and Luminaire Supports
Agencies are urged to establish a process to replace existing highway safety hardware that has not been successfully tested to NCHRP Report 350 or later criteria.

[Active] NCHRP Project will provide guidance: “NCHRP 20-07/Task 395 [Active] ‘MASH Equivalency of NCHRP 350-Approved Bridge Railings’
• Agencies are encouraged to upgrade existing highway safety hardware to comply with the 2016 edition of MASH either when it becomes damaged beyond repair, or when an individual agency's policies require an upgrade to the safety hardware.
Implementation Agreement

- W-beam barrier and cast-in-place concrete barrier: December 31, 2017
- W-beam terminals: June 30, 2018
- Cable barrier, cable barrier terminals, and crash cushions: December 31, 2018
- Bridge rails, transitions, all other longitudinal barriers (including portable barriers installed permanently), all other terminals, sign supports, and all other breakaway hardware: December 31, 2019
• Since the 1980’s
• Review of crash tests and evaluations
• If device meets crash test criteria, FHWA issues letter indicating that it is eligible for FHWA reimbursement
• Effective December 31, 2015 FHWA no longer accepts requests for modifications to NCHRP 350 hardware.
Q1: Does all roadside safety hardware need a FHWA Eligibility Letter in order to be eligible for reimbursement on projects on the NHS?

A1. No.

Eligibility Letters are provided as a service to the States and are not a requirement for roadside safety hardware to be eligible for reimbursement.
Q2: If a State does not request an FHWA Eligibility Letter for a safety hardware device, what documentation can a Division Office rely on that the device is eligible for Federal-aid reimbursement?

A2: When approving the State's standard plans or qualified products lists (QPLs), the Division Office may rely on a certification from the State DOT indicating that the hardware satisfies MASH or NCHRP 350 criteria. The State DOT should keep on file documentation supporting this certification.
Q5:

... All modifications to an NCHRP 350-tested device will require testing under MASH in order to receive a Federal-aid reimbursement eligibility letter from FHWA." Does this mean that any modification to a previously eligible NCHRP 350 device will now require MASH testing for crashworthiness?.....
A5.

No, the memo only serves as notice that the FHWA Office of Safety will no longer provide the service of issuing eligibility letters for modified NCHRP 350 devices.

If a State DOT chooses to make or accept a non-significant modification to a previously eligible NCHRP 350 device (generic or proprietary), the State DOT should keep on file adequate documentation indicating the modified hardware satisfies NCHRP 350 criteria.
New Hardware:
- Crash test report from ISO 17025 Accredited Laboratory
- Crash tested article details in DOT Standard
- Crash test video(s)

Modifications to MASH-Tested Hardware:
- Existing Crash test report and/or eligibility letter
- Crash tested article modification details in DOT Standard
- Static testing and/or engineering analysis of modification
- An accredited laboratory correspondence stating the modification to existing successfully crash tested barrier is non-significant.
A5: (con’t.)
If the State DOT or manufacturer deems the modification as a significant modification, a modification that has the potential to affect the device's ability to meet crash test criteria, then the device should be crash tested per MASH testing criteria.
Form V10 posted in May 2016

- New form requires engineer signature affiliated with the crash test laboratory.
- Engineer affiliated with the Test lab agreeing that the critical and relevant tests were conducted.

Request for Federal Aid Reimbursement Eligibility of Highway Safety Hardware

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:

<table>
<thead>
<tr>
<th>Device &amp; Testing Criteria</th>
<th>Enter from right to left starting with Test Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>600: Crash Worthy Work</td>
<td>Physical Crash Testing Engineering Analysis</td>
</tr>
<tr>
<td>Test Level</td>
<td>AASHTO MASH</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:

<table>
<thead>
<tr>
<th>Contact Name</th>
<th>Same as Submitter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company Name</td>
<td>Same as Submitter</td>
</tr>
<tr>
<td>Address</td>
<td>Same as Submitter</td>
</tr>
<tr>
<td>Country</td>
<td>Same as Submitter</td>
</tr>
</tbody>
</table>

Enter below all disclosures of financial interests as required by the FHWA Federal Aid Reimbursement Eligibility Process for Safety Hardware Devices' document.
• The submitter certifies that the product was tested in conformance with MASH and discloses any financial interests of the test lab.

• Completed Form required w/signatures before eligibility letter issued.
Testing Video
Failing Ugly
Testing Video
TL4 MASH Testing

Texas A&M Transportation Institute
Test Report No. 9-1002-5
Single Slope Concrete Barrier

Recommended Design Load = 80kip
Safety shape profiles (e.g., F-shape and NJ profile) are known to instigate significant climb and instability in passenger vehicles due to tire interaction with the toe of these barriers. However, due to a significantly greater mass and wheel radius, the effect of the toe on the stability and climb of the 22,050-lb SUT vehicle is insignificant. Previous testing with the 32-inch NJ barrier under MASH TL-4 conditions did not reveal any significant climb attributable to the safety profile of the barrier (4). Therefore, although the simulation analyses and crash test performed in this research used the single slope barrier profile, the minimum rail height and design impact load recommendations are considered applicable to all other barrier profiles.
Testing Video
TL2 MASH Testing
Testing Video
TL2 MASH Testing
Testing Video
TL2 MASH Testing
Thank You.

Will Longstreet
FHWA Office of Safety
Washington, D.C.
will.longstreet@dot.gov
202-366-0087