MASH Implementation
2016 Traffic Safety Conference
June 7, 2016
College Station, TX

Dick Albin
FHWA Resource Center
• Crash Testing Background
• Implementation Agreement
• Eligibility Letters
  – What are they?
  – FAQ’s
  – Status
  – Submittal Form
Crash Testing has been used as a tool for evaluating roadside hardware since the 1930’s
Evolution of Crash Test Procedures


1962
1974
1980
1993
2009
2016 MASH
• Update of the evaluation procedures
• Published as AASHTO document in October, 2009
• MASH is NOT an FHWA document
• FHWA forwards questions on interpretation to AASHTO
• 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.

• 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.
For contracts on the National Highway System with a letting date after the dates below, only safety hardware evaluated using the 2016 edition of MASH criteria will be allowed for new permanent installations and full replacements:

- 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**
FHWA Hardware Eligibility Letters

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 Luminance Supports

http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_harderware/
FHWA Role – What is an Eligibility Letter?

• Service to the FHWA Division Offices and States 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.
• 2 reviews are ongoing by the GAO and Volpe that may recommend changes to this process (due in summer of 2016).
• 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.

http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/faq_eligibility_letters.cfm
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.

http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/faq_eligibility_letters.cfm
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? If the answer is no, if a state or manufacturer wants to make a modification to a device, what documentation should be maintained by the State DOT as evidence that the device is eligible for Federal-aid reimbursement?

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 that the modified hardware satisfies NCHRP 350 criteria. 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.

http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/faq_eligibility_letters.cfm
Eligibility Letter Status - Barriers

Letters Issued as of 5/25/16

- W-beam Guardrail – 13 Devices
- Guardrail Transitions – 3 Devices
- Cable Barrier – 3 Devices
- Concrete Barrier – 3 Devices
- Bridge Rail – 3 Devices
- Portable Barriers – 9 Devices
- Other – 3 devices

Note- There has been additional testing conducted (NCHRP projects) but Eligibility letters have not been requested
Eligibility Letter Status – Terminals and Crash Cushions

Letters Issued as of 5/25/16

• W-Beam terminals – 2 devices
  • 1 additional under review
• Crash Cushions – 1 device
Eligibility Letter status – Breakaway Supports

Letters Issued as of 5/25/16

• Dual post support – 2 devices
• Luminaire Supports - 0

Note:

• MASH now requires testing with the PU truck that was not required under NCHRP 350
• There has been additional testing conducted (NCHRP projects) but Eligibility letters have not been requested
Eligibility Letter status – Work Zone Devices

Letters Issued as of 5/25/16

• Portable Sign Stands – 2 devices
• Barricades – 5 devices
• Longitudinal Channelizers – 6 devices
• Other – 2 devices

Note – MASH now requires testing with the PU truck that was not required under NCHRP 350
Eligibility Letter Submission

• New form (version 10.0) posted in May, 2016
• New form has a place for an engineer affiliated with the lab to sign.
• Form needs to be complete with all required signature before a letter is issued
Eligibility Letter Submission

- Fill out this portion from right to left so that the form will generate the appropriate boxes for the device

**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></td>
<td>AASHTO MASH</td>
<td>TL3</td>
</tr>
<tr>
<td>'B': Rigid/Semi-Rigid Barriers</td>
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<td></td>
<td></td>
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<tr>
<td>'CC': Crash Cushions, Attenu</td>
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<td>'CC': Truck-Mounted Attenu</td>
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<tr>
<td>'SS': Breakaway Sign Support</td>
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<td>'LS': Breakaway Luminaire Sup</td>
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<tr>
<td>WZ': Crash Worthy Work Zone</td>
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</table>
Eligibility Letter Submission

The submitter certifies that the product was tested in conformance with MASH and discloses any financial interests of the test lab.

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 asSubmitter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company Name:</td>
<td>Same asSubmitter</td>
</tr>
<tr>
<td>Address:</td>
<td>Same asSubmitter</td>
</tr>
<tr>
<td>Country:</td>
<td>Same asSubmitter</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.
Eligibility Letter Submission

This box is used to describe the product in detail. If a modification, the changes should be identified here. Note – the box expands as text is added.

PRODUCT DESCRIPTION
This box is signed by an engineer affiliated with the Test lab agreeing that the critical and relevant tests were conducted.

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.

<table>
<thead>
<tr>
<th>Engineer Name:</th>
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<table>
<thead>
<tr>
<th>Engineer Signature:</th>
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<table>
<thead>
<tr>
<th>Address:</th>
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<th>Same asSubmitter</th>
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</table>
These boxes appear after the test info is filled in above (system type, test level, etc.).

- Narrative should include a summary of test conditions and results.
- If a test is determined to be non-critical, the basis of this determination should be included here.

Note – FHWA does not “waive” tests. The submitter and test lab determine the critical and relevant tests and provide an engineering basis is a test is determined to be non-critical.

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>
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<tbody>
<tr>
<td>3-70 (1100C)</td>
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<td></td>
</tr>
<tr>
<td>3-71 (1100C)</td>
<td></td>
<td>FAIL</td>
</tr>
<tr>
<td>3-72 (2270P)</td>
<td></td>
<td>PASS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-Critical, not conducted</td>
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<tr>
<td></td>
<td></td>
<td>Non-Relevant Test, not conducted</td>
</tr>
</tbody>
</table>
The test Lab certifies that the tests were conducted in accordance with MASH and provides Accreditation Certificate number and period. Note the Lab needs to be accredited at time of the test.

Submitter signs and submits form.

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></th>
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<tbody>
<tr>
<td>Laboratory Signature:</td>
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<tr>
<td>Address:</td>
<td>Same as Submitter</td>
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<tr>
<td>Country:</td>
<td>Same as Submitter</td>
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<tr>
<td>Accreditation Certificate</td>
<td></td>
</tr>
<tr>
<td>Number and Dates of current</td>
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<tr>
<td>Accreditation period :</td>
<td></td>
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</tbody>
</table>

Submitter Signature*:
• Questions?