DECISION DOCUMENT

Adoption of the Manual for Assessing Safety Hardware

Problem Statement: The American Association of State Highway and Transportation Officials (AASHTO) has published a set of crash testing guidelines for developing and evaluating new roadside safety hardware, titled Manual for Assessing Safety Hardware (MASH). MASH supersedes the National Cooperative Highway Program (NCHRP) Report 350 crash testing guidelines, which the California Department of Transportation (Department) currently follows. The Department plans to adopt MASH instead of continuing to comply with NCHRP Report 350 for developing new roadside safety hardware.

Recommendation: Develop a Traffic Operations Policy Directive (TOPD) that establishes MASH as the Department's crash testing guidelines.

Fiscal Impact: Minimal costs are anticipated for new and/or upgraded equipment for the Department's Division of Research and Innovation, Office of Safety Innovation and Cooperative Research, Roadside Safety Research Group, which is responsible for crash testing.

Organizational Impact:

- If highway safety hardware that has been accepted by Federal Highway Administration (FHWA) using criteria contained in NCHRP Report 350 are found not to be in compliance with MASH criteria, AASHTO and FHWA will jointly review the test results and determine a course of action.
- Manuals and guidelines that reference NCHRP Report 350 must be modified to include references to MASH.
- The Roadside Safety Research Group must update crash test procedures to reflect MASH crash testing guidelines.

Policy Impact: Adoption of MASH supersedes compliance with NCHRP Report 350 by the Department for developing new roadside safety hardware. FHWA does not require replacing or upgrading existing roadside safety hardware installations that comply with NCHRP Report 350.

Risks: Not adopting MASH is in direct conflict with FHWA guidance. Adoption of MASH will lead to fewer inconsistencies regarding application of roadside safety hardware on the National Highway System and ensure federal reimbursement eligibility for state research and field installations of roadside safety hardware.

Proposed Implementation Schedule:
MASH guidelines will be used for any new products developed after January 1, 2011.

APPROVAL RECOMMENDED:

JANICE BENTON,
Chief, Office of Traffic Safety Program

March 8, 2012
Date

JOSEPH W. HORTON,
Chief, Office of Safety Innovation and Cooperative Research

March 8, 2012
Date

SHANNON POST
Chief, Office of Design and Technical Services

March 13, 2012
Date

APPROVED BY:

ROBERT COPP
Chief, Division of Traffic Operations

March 30, 2012
Date

COCO BRISENO
Acting Chief, Division of Research and Innovation

March 22, 2012
Date

Attachment(s)

1. Decision Document Attachment
2. Traffic Operations Policy Directive

DECISION DOCUMENT ATTACHMENT

Adoption of the Manual for Assessing Safety Hardware

1. Background:

The Federal Highway Administration (FHWA) currently requires that roadside safety hardware used on the National Highway System (NHS) meet the crash testing criteria of National Cooperative Highway Research Program (NCHRP) Report 350 (or the latest crash test criteria adopted by FHWA) and accepted by that agency. This acceptance is documented in a letter to the requestor which also states the test level (speed and design vehicle) for the subject roadside safety hardware. The acceptance letter also states any limiting conditions for its use.

Manual for Assessing Safety Hardware (MASH) was published by the American Association of State Highway and Transportation Officials (AASHTO) on November 20, 2009 and supersedes NCHRP Report 350 for roadside safety hardware developed after January 1, 2011. Acceptance letters are issued by FHWA for each product and reference the testing criteria and test level used in MASH. FHWA does not require replacing or upgrading existing roadside safety hardware installations that comply with NCHRP Report 350. However, if highway safety hardware that has been accepted by FHWA using criteria contained in NCHRP Report 350 are found not to be in compliance with MASH criteria, AASHTO and FHWA will jointly review the test results and determine a course of action. This may lead to changes in the Department's Standard Plans.

Some roadside safety hardware are proprietary products and it is the responsibility of the manufacturer to develop and test the hardware to ensure crash worthiness. The Department evaluates the manufacturer's crash test results to ensure compliance with crash test criteria prior to approving for use on the state highway system. In some cases the Department develops and crash tests roadside safety hardware. This occurs for certain needs of projects, especially if the needs are regional and there are no suitable alternatives previously accepted by FHWA. Project specific needs may include roadside barriers, bridge rails, sign supports, crash cushions, transitions, (and various modifications/attachments) for which requests might be made.

The Roadside Safety Research Group is the Department's crash test team. Their crash test site, the Caltrans Dynamic Test Facility, has been accredited to conduct all versions of crash testing, which eliminates the need to execute a contract for testing roadside safety hardware developed by the Department. With the adoption of MASH, the crash team will need to make changes to its protocol and equipment to ensure compliance with the new crash test guidelines. The cost and effort to do this is minimal since the team has anticipated and prepared for this change.

The decision to adopt MASH has been discussed with the Division of Engineering Services, Office of Design and Technical Services, which is responsible for standards for bridge barriers and railings. That office has concurred with the recommendation to adopt MASH.

Alternatives:

1.1 Alternative A ("No Action" Alternative): Do not adopt MASH and retain NCHRP Report 350 crash test requirements.

Pros:

1.1.1 Avoid additional costs associated with more stringent testing criteria (vehicle and equipment costs).

Cons:

1.1.2 If new products are tested to NCHRP Report 350 after January 1, 2011, then FHWA will not provide reimbursement for field installations.

1.1.3 Will not receive support from FHWA for non-compliant testing done by the Department.

1.1.4 Opportunities for pooled-fund research will be less likely if other states adopt MASH and the Department does not.

1.2 Alternative B (Recommended): Adopt MASH as the new crash test requirements.

Pros:

1.2.1 There is greater availability of new products.

1.2.2 MASH products are crash tested to more stringent criteria except for the very light-weight sedans. Those vehicles were optional in NCHRP Report 350 test matrices but were not used in MASH due to the increased size of the vehicle fleet. The weight of the standard size sedan used in NCHRP Report 350 was increased approximately 34 percent and used in MASH test matrices.

1.2.3 Conforms to FHWA request for all States to adopt MASH.

1.2.4 The Department will continue to receive FHWA funding for using MASH crash tested products.

1.2.5 Roadside safety hardware developed by the Department will be supported by FHWA on the national level.

1.2.6 The current fleet of vehicles using public roads meets MASH criteria.

1.2.7 All highway safety hardware accepted by FHWA and approved by the Department prior to adoption of MASH, which used criteria contained in NCHRP Report 350 may remain in place and may continue to be manufactured and installed.

1.2.8 Roadside safety hardware installations that are NCHRP Report 350 compliant need not be upgraded or replaced with MASH-compliant safety hardware installations.

Cons:

1.2.9 Crash testing protocol and equipment will need to be updated. This is minimal impact since the crash testing team has anticipated and prepared for this change.

2. **Performance Measures:**

   2.1 Deliverable(s):
   Traffic Operations Policy Directive (TOPD) to adopt MASH

   2.2 Change Measure:
   Consistent with crash test standards across other states and complies with FHWA requirement for development of new products

3. **Contact Person:**

Janice Benton, Chief, Office of Traffic Safety Program, Division of Traffic Operations
E-mail address: janice_benton@dot.ca.gov Phone number: (916) 654-5176

Randy Hiatt
Chief, Traffic Safety Devices Branch, Office of Traffic Safety Program, Division of Traffic Operations
E-mail address: randy_hiatt@dot.ca.gov Phone number: (916) 654-2465

Joseph W. Horton
Chief, Office of Safety Innovation and Cooperative Research, Division of Research and Innovation
E-mail address: joe_horton@dot.ca.gov Phone number: (916) 654-8229

John Jewell
Chief, Crash Testing Operations Branch, Office of Safety Innovation and Cooperative Research, Division of Research and Innovation
E-mail address: john_jewell@dot.ca.gov Phone number: (916) 227-5824