Appendix 3-3

New Hampshire DOT
Department of Transportation

THE STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION

*Victoria F. Sheehan*
*Commissioner*

*William Cass, P.E.*
*Assistant Commissioner*

Tel: 603.271.1484
Fax: 603.271.3914

**Revised - Process for Determination of**
**Roadside Safety Hardware Crashworthiness**

February 27, 2020

Michelle Marshall
Safety and Area Engineer
Federal Highway Administration, NH Division
53 Pleasant St, Suite 2200
Concord, NH 03301

Dear Ms. Marshall,

Please find attached NHDOT's **revised** outlined process for determining crashworthiness of roadside safety hardware on the National Highway System (NHS). The attached revises the original process outline sent to your division office in June 2018.

It remains the goal of NHDOT to utilize roadside safety hardware that meets national crash test criteria. During our search for a new state standard for portable concrete barrier it became evident that there are many MASH compliant barrier options, some of which contractors have already purchased and put into use. We feel that this revised process best addresses future use of temporary work zone devices that are MASH compliant.

In the attached document, we separate the requirements for new hardware into two categories, permanent and temporary. We have identified that the need for detailed review of maintenance, installation, and in most cases regional climate, is not the same for temporary installations as it is for permanent installations of hardware. Proof of MASH testing compliance at an approved laboratory will need to be submitted for approval of temporary hardware. Temporary hardware would not require a federal letter of compliance, or require to be "Department Approved" hardware. Temporary hardware will still be reviewed for approval for use on a project by project basis. Regional climate impact on the hardware can be best assessed by project Construction personnel.

Thank you for the original guidance for determining this process. I trust the attached meets FHWA's expectations of an acceptable process, please let me know if otherwise.

Sincerely,

Peter Stamnas
Director of Project Development

Attachment
KOM

cc: J. Marshall/K. Cota

S:\Highway-Design\Specialty Section\Guardrail\Processes\Crashworthiness\Revision\Revised Crashworthy Process FHWA.doc

# *NHDOT* Process for Determination of Roadside Safety Hardware Crashworthiness

February 27, 2020

## New Permanent Roadside Safety Hardware

To determine crashworthiness of new permanent systems, NHDOT shall:

- Confirm the existence of a federal eligibility letter relative to AASHTO MASH criteria.
- Confirm that the crash testing was conducted by an ISO 17025 accredited laboratory
- Seek out manufacturer's data for installation, maintenance, and crash testing and determine if the system meets the NHDOT's needs, considering, at a minimum :
    - Climate effects on the system performance, longevity, etc.
    - Complication of installation requirements
    - maintenance needs
    - overall crash performance
- Documentation would be required, with signature of chief engineer, similar to controlling criteria design exception process.

## Modifications to existing successfully MASH tested permanent roadside safety hardware

Proprietary Devices –

- Originally having a federal eligibility letter relative to AASHTO MASH criteria
- Confirmation that the crash testing was conducted by an ISO 17025 accredited laboratory
- Engineering analysis conducted by an ISO 17025 accredited laboratory that determines the modification does not affect the crashworthiness of the roadway safety hardware based on previous testing.
- Internal review to determine that the modification will still meet the NHDOT's need for a system using the same criteria as for a new system.
- Documentation would be required, with signature of chief engineer, similar to controlling criteria design exception process.

Generic Devices –

- An engineering analysis shall be conducted by NHDOT, or group approved by NHDOT. The other group could be another state or pooled fund, but NHDOT would need to review their report and videos.
- Crash testing may be warranted based on the results of the analysis.
- Documentation would be required, with signature of chief engineer, similar to controlling criteria design exception process.

Assurance of Proper Installation of Proprietary System, Through Contractor and Maintenance Forces

- Ensure proper installation through:
    - Required training of installer by manufacturer
    - Contractor completion of checklist (sign off), including:
        - Date
        - Location (Coordinates)
        - Type
- Encourage proper maintenance by providing manufacturer installation guides to maintenance forces.

Assessment of In-Service Performance

- NHDOT may perform periodic crash data assessments
    - Priority to examine new products over established products, 3-5 years after first installed
    - Sources that are most likely to contain relevant data for use:
        - Crashes occurring during construction of a project. (Those who understand the hardware are quite often witnesses to the event.)
        - Accident reports that come via re-imbursement sought though Bureau of Finance – where guardrail is impacted during a crash. (These are usually more detailed than typical police reports)
        - Other state's crash data, if available and detailed enough.
    - NHDOT will make determination from this review, whether the system is still meeting our expectations.

Exceptions to MASH Approved Hardware Requirement

There may be circumstances where requiring hardware that meets AASHTO MASH test criteria is very difficult. Approval for exceptions would be required, with signature of chief engineer.

## Temporary Use Safety Hardware

To determine crashworthiness of temporary (construction workzone) systems, contractors shall:

Either,

- Use a pre-approved permanent hardware system being utilized for temporary use, that NHDOT approved via the system above (New Roadside Permanent Safety Hardware),

Or,

- Use a pre-approved system that NHDOT approved by:
    - Confirmation that the system has passed MASH testing
    - Confirmation that the tests took place at an ISO 17025 accredited laboratory
    - Determining from manufacturer's data for crash testing, that the system meets the NHDOT's needs for overall crash performance.

Or,

- Supply proof of successful MASH testing of a product for approval by the engineer. This method shall be outlined for contractors in item specifications and elsewhere within the Proposal.
    - For example: NHDOT will have a preferred and approved standard portable concrete barrier, but will allow use of other MASH systems, with approval, on a project by project basis.
    - Engineer will determine if the system meets the project's needs, considering:
        - Climate effects on the system performance, longevity, etc.
        - Overall crash performance

Drafted By: K. Mudgett
Noted By: J. Marshall, K. Cota, C. Spetelunas
Attachments: Cover Letter

# STATE OF NEW HAMPSHIRE
## INTRA-DEPARTMENT COMMUNICATION

**DATE:** March 8, 2023

**FROM:** [Name]
[Position Title]

**AT (OFFICE):** Department of Transportation
Bureau of Highway Design

**THRU:** [Project Manager's Name]
Project Manager

**THRU:** Kirk Mudgett, P.E.
Chief of Specialty Section

**SUBJECT:** Design Exception for Non-MASH Hardware on the NHS –
[Project Name & Number] – [Project Description]

**TO:** William J. Cass, P.E.
Assistant Commissioner

**THRU:**

| | | |
|---|---|---|
| James A. Marshall, P.E.<br>Administrator<br>Highway Design | William J. Oldenburg, P.E.<br>Assistant Director of<br>Project Development | Peter Stamnas, P.E.<br>Director of<br>Project Development |

**MEMORANDUM**

In cooperation with the *NHDOT Process for Determination of Roadside Safety Hardware Crashworthiness* (with FHWA), and AASHTO, MASH compliance shall be met on NHS roadways. When compliance cannot be met due to unavailable resources, or other reasons, a design exception shall be obtained, through use of this memo.

Example Wording:

I hereby request that a design exception be approved to allow the use of a Controlled Release Terminal (CRT) on [Roadways, # of locations, Towns where units are proposed].

The CRT is a terminal, or treatment, of which we do not have a cost effective MASH approved option or design. The CRT is most often used when the hazard is interrupted abruptly by a driveway or side road, leaving no room for the length of need required for an energy absorbing guardrail terminal (EAGRT). The intention of the terminal is to close off the access to the hazard. It is comprised of breakaway posts which require a clear area behind the rail to retain the vehicle and a special anchor in many situations. It is limited to NHCRP 230 testing, low speed (40 mph and below), and low volume roadways. However, in some circumstances, it may be used at higher speeds (up to 55 mph).

Each of the [Number of Locations] locations have plans attached with the field observed hazard location sketched to indicate the inability of meeting length of need by extension of guardrail.

Elimination of the hazard is not considered feasible at each of these locations due to [Reason. ie: scope, filling in of wetlands, cost, other]. In addition, eliminating the break in the rail by moving the driveway is not considered feasible due to (right-of-way impacts beyond the scope of this project, cost, property frontage limitations, other)

DESIGN APPROVED: ☐
NOT APPROVED: ☐

William J. Cass, P.E.
Assistant Commissioner

[INITIALS of author/initials of checker]
Attachments - General Plans of Locations, CRT Detail, CRT Specification, photo of each location

S:\Highway-Design\Specialty Section\Guardrail\Design Exceptions\CRT Design Exception.docx