



# BRIDGE RAILING MASH UPDATES

---

Taya Retterer, P.E.

# Table of contents

|          |                                     |      |
|----------|-------------------------------------|------|
| <b>1</b> | The Rules                           | 3    |
| <b>2</b> | Status                              | 4    |
| <b>3</b> | Crash Tests                         | 5-8  |
| <b>4</b> | What is Next?                       | 9-10 |
| <b>5</b> | Current Bridge Rails that meet MASH | 11   |
| <b>6</b> | Wrap Up                             | 12   |
| <b>7</b> | On Going Research                   | 13   |

- Manual for Assessing Safety Hardware (MASH)
  - On January 7, 2016, AASTHO and FHWA issued the “AASHTO/FHWA Joint Implementation Agreement for Manual for Assessing Safety Hardware (MASH)” memorandum. The memorandum outlines a staged plan, which requires that permanent installations of safety hardware be evaluated using MASH 2016 criteria by the following dates:
    - December 31, 2019: bridge rails, transitions, all other longitudinal barriers (including portable barriers installed permanently), all other terminals, sign supports, and all other breakaway hardware

- Completed MASH crash testing
  - Tested in the last year
    - T402 and C402 – MASH TL-4 (car, pickup, box)
    - T411 and C411 – MASH TL-2 (car, pickup, low speed)
    - C412 – MASH TL-5 (18 wheeler)
    - T1W – MASH TL-3 (car, pickup)
    - C1W – MASH TL-4 (box truck)
    - T66 and C66 – MASH TL-3 (car and pickup)
    - » Total 11 crash tests

# Crash Testing – C402 – Box Truck



# Crash Testing – Damage



# Crash Testing – C402 – Pickup



# Crash Testing – C402 – Car



# What Is Next?

- Updating the Bridge Railing Standards
  - Change general notes from NCHRP 350 to MASH
    - T402/C402, T411/C411, C412, T1W/C1W and T66/C66
    - Other minor changes to reinforcement, concrete type, sleeve members
  - Retiring the T401

When? – Actively working on, planning no later than October.

# What Is Next?

- Update Bridge Railing Manual
  - To reflect the above
  - To finish conversion to MASH

When? – Actively working on, planning no later than October.

# Bridge Rails that meet MASH

| TL-2    | TL-3        | TL-4        | TL-5    | TL-6    |
|---------|-------------|-------------|---------|---------|
| T631LS  | T1F         | T2P / C2P   | T224    | T80TT*  |
| T411    | T1P*        | T222        | T80HT   |         |
| C411    | T1W         | T402 / C402 | T80SS   |         |
|         | T221 / C221 | SSTR        | C412    |         |
|         | T223 / C223 | C1W         |         |         |
|         | T551 / T552 |             |         |         |
|         | T66 / C66   |             |         |         |
|         | T131RC      |             |         |         |
|         | T221P       |             |         |         |
| 3 total | 13 total    | 7 total     | 4 total | 1 total |

RED indicates standards to be updated.

\* Available as working drawings.

# Wrap Up

- Starting January 2020 lettings – bridge rail must be MASH
- You to need to update to the new standard before letting.
- Do not use the T401 – retiring. Use T402 instead.
- All other rails are MASH compliant.

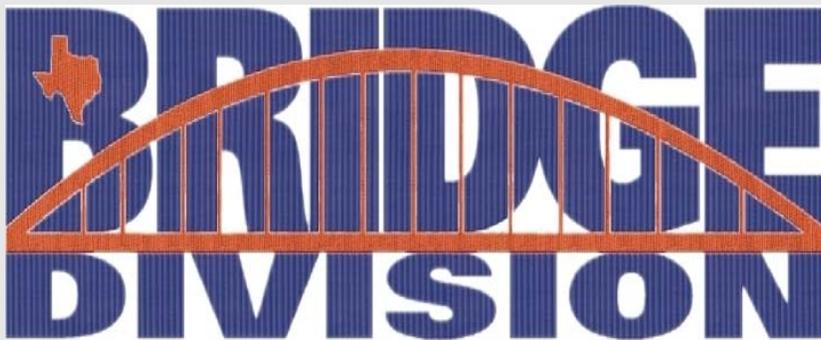
- 54" TL-5 Rail on a Structurally Independent Foundation
  - Computer simulations and design done
  - Crash test in June
  - Project finishes in September
- TL-4 Foundation (TRF)
  - Computer simulations and design done
  - Crash test in June
  - Project finishes in August
- C-RAIL-R – evaluating for TL-4 and adding curb rails (T1F, T2P, T1W, etc.)
- CIP Retaining walls – evaluating load response to rail impact at top

# Questions?

Taya Retterer

TxDOT Standards Engineer

Taya.Retterer@txdot.gov



# Questions?

- Copyright 2019 • Texas Department of Transportation • All Rights Reserved
- Entities or individuals that copy and present state agency information must identify the source of the content, including the date the content was copied. Entities or individuals that copy and present state agency information on their websites must accompany that information with a statement that neither the entity or individual nor the information, as it is presented on its website, is endorsed by the State of Texas or any state agency. To protect the intellectual property of state agencies, copied information must reflect the copyright, trademark, service mark, or other intellectual property rights of the state agency whose protected information is being used by the entity or individual. Entities or individuals may not copy, reproduce, distribute, publish, or transmit, in any way this content for commercial purposes. This presentation is distributed without profit and is being made available solely for educational purposes. The use of any copyrighted material included in this presentation is intended to be a “fair use” of such material as provided for in Title 17 U.S.C. Section 107 of the US Copyright Law.