



## **TASK FORCE 13**

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**Thursday and Friday ○ October 19<sup>th</sup> & 20<sup>th</sup>, 2023 ○ College Station, TX**

**Task Force 13 and Roadside Safety Pooled Fund Program - Joint Meeting & Discussion  
THURSDAY October 19th, 2023 – 8:00 am to 10:00 am  
Moderator – John Durkos**

John Durkos – Offered a warm welcome to the group assembled in the well-appointed meeting room at the Embassy Hotel. Special thanks were offered to Todd Tekulve of Brifen for all his assistance with the web / virtual meeting. Additional thanks went out to Tim Moeckel WA State DOT – for inviting their Pooled Fund to our meeting.

John gave a synopsis of TF13 as [organization](#) and [officers](#) and our mission statement. He also gave a briefing on [TF13's guides](#). He also went over the TF13 Memo of Understanding ([MOU](#)) with AASHTO.

### **Joint Meeting Agenda**

#### **New - [NHI Course on MASH Evaluation Training](#) - Presenter John Durkos**

National Highway Institute – is offering a course on: Mash Evaluation Training Development. The courses origin gained legs as a result of the [Jan 7 2016 AASHTO/FHWA Memo](#). John gave a detailed history of how the need for the course spawned from the 1/7/16 memo through where it has progressed to present. He went over the relevant sections of the [IJA Law](#) noting where and likely why the course had been developed. The course is designed to give non-experts the tools to do their own evaluation of MASH crash tested products through reviewing the testing reports “should” (more likely when) FHWA gets out of the business of writing letters. He gave a brief description of each module within the course. The course is in the final development with pilot going out in November 2023 and open to the “public” in early 2024. Question was asked to the State attendees if they are interested in using this course

- Carl From LA DOT – Was concerned about doing this with the staffing issues that they are currently experiencing. Was also concerned about the legal position it could put them in should they independently waive any tests prescribed in the MASH matrix.
- Dave Kilpatrick – CTDOT – said that the training will help the DOT personnel understand more about the tests and criteria ... sees current level of training that many DOT folks have would make it difficult to work through the gray zones of MASH without taking a course of this nature.
- Chris Lindsay TXDOT – Was thankful for the training and that it will help his team. He's currently evaluating products and welcomes any help he can get to better what he's doing.
- Patrick Oniel – WADOT – Training would be useful. Not necessarily useful for the whole DOT . Sees a big gap between what AASHTO requires and what the individual State requires. Doesn't think that the work of interpreting MASH test reports is intuitive... This training will be helpful for the subject matter experts to get a better handle on their specific subject matter. He doesn't want to do any interpretation, would prefer a specification – sees any interpretation that an engineer would do after taking this course as opening them up to legal issues.
- Henry Ross – with change of ownership to the States – he has question about the ultimate control... what's going to happen when the States take control as it relates to the Federal Highway System... if a State deems something crash worthy...where it's not been deemed that way by the FHWA. How will the FHWA local division level handle this?

**Evolving MASH Vehicle Fleet With Respect to Electrification Presenter Stolle Recorded**



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### ***Presentation.***

Changes in the US vehicle Fleet discussed “Practical worst-case scenario”, 95<sup>th</sup> percentile, and overriding philosophy. Went over the Evolution of Passenger Vehicles 1980 to 2020. Noted that MASH requires that the vehicles are updated every 5-years. Discussed vehicle classes, changes to vehicle; increase in weight and CG. Gave details of the changes in recommended test vehicle per class. Gave background on EV (Ford is targeting 50% of their fleet being EV by 2030 and 100% of their production in 2035) EV masses are higher than their counterparts by 20-50%. Increase in Mass will likely fail currently designed rail and rail anchors. Though the risk of fire when EVs interact with highway hardware is predicted to be the same as their internal combustion engine counter parts at .03 of impact events, the difference in how those fires can be extinguished is significant. EVs require 8-10x the water and run off is hazardous. The batteries can energize vehicle and surrounding making challenges for first responders.

Was noted that Midwest has received some information from an EV company on their design that they will be able to use in MwRSF simulations. (Roger noted that the test in the presentation was a MASH test with a 5000 vehicle that impacted the rail with greater impact angle and used an example of what would be expected to happen should the kinetic energies be increased)

### **Remaining/Ongoing MASH Implementation Needs/Efforts Presenter Roger Bligh**

- Remaining MASH needs – provided updates on a number of generic products as they relate to current MASH testing and review.
- [NCHRP 03-119](#) Application of MASH Test Criteria to Breakaway Sign and Luminaire Supports and Crashworthy Work-Zone Traffic Control Devices  
Summarized the report – gave some highlights of testing to date.
- Breakaway Supports Structures  
Project T4541-EC Development and evaluation of a non-Proprietary Sign support – 3# channel with 3ft alum sign panel was tested @ 90 and 0 deg. The 90-degree test passed @TL3. 0 degree test failed TL3 (The test also failed when they subsequently stiffened the post) The project additionally looked at testing MASH TL2 - both those tests also failed when mounting height was 7ft. They changed the mounting height – from 7ft to 8ft and that modification enabled the system to pass MASH TL3 tests.
- Multi Directional Base Design for Steel Beam Non-Proprietary Large Sign Support – Slip base retro fit. They developed a new design of an Omni directional slip base plate. For testing they used a route marker sign – two legged. They conducted the slow speed test with a small car at 0 degree – similarly they tested it at 90 and both passed. They also tested a 15ft wide guide sign. Pickup truck at 90 degree failed. A redesign of the fuse plate helped the outcome but still failed. (They tested at an 8ft mounting height as that is the current state standard) Thinking is that they will increase the mounting height next and believe it has a good chance of passing.
- Luminaire Poles – the stringent roof crush (4”) maximum deformation criteria have been the difficulty for these devices.  
Test 3-60 the slow speed small car test is most critical in luminaire pole testing as secondary impact of the pole with the roof causes the lion share of the damage. In the testing of a TB3-17 the base didn’t activate. Subsequently they evaluated the TB1-17 with a modified 50ft steel pole length. OIV passed 3.7 but had 6” of roof crush. Thus, the test failed. 40ft steel pole failed both the OIV and roof crush criteria.



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Testing showed that aluminum posts fare better and can passed both the OIV and roof crush – 3.8 m/s and was less than 4” roof crush. (Supply issues – there is a 15-month lead time on alum bases... question about cost difference between steel vs alum was also discussed) Final reports for this testing are not available publicly yet as it’s on-going research.

- Work Zone Traffic Control Devices  
Type 2 Barricade – square tube – wood board - @ 90 and 0 degree with the small and pickup truck. They tested with wood but believe that plastic would also be acceptable. They added an alum sign (4x4 diamond) on top. Both 0 & 90 degree passed for the small car and pickup.
- [NCHRP 20-07 Task 043](#) Revision of the AASHTO Policy on Geometric Design of Highways and Streets  
Summarized the report – gave some highlights of testing to date.

### **AASHTO Policy Resolution PR-1-23 (Continued Imp. Of MASH) Presenter Kristin Schuster – MI DOT Chair, TCRS**

Gave background on MASH: published in 2009... Transition for DOTs to adopt after was more assumed... New Devices meeting MASH criteria were slow to become available... discussed the [AASHTO & FHWA action and joint memorandum agreement. Policy Resolution PR-2-20](#) Moved the ball forward. Encouraged states to move to MASH wherever they can and manufacturers to develop MASH products. Establishment of a [AASHTO TSP](#) (pg. 20) to assist with implementation issues. MASH Specification work is still ongoing... Draft will be Summer 2024 – balloting later 2024-25 – (AASHTO, TRC and Counsel of Highway and street) Publication is due 2025.

Over half of the states have given input – for the memo of Policy resolution dated May 2023.

Question – if no other MASH product is available and one is developed -1. Can it be adopted solely by a state? 2. Would it be bid up against NCHRP 350 devices. The answer given was that it’s up to the individual state as to how they are going to address this issue.

If a state makes a modification to a MASH item to fit their “Pay Item” for example changing length of need – States will be encouraged to use that AS tested configuration.

### **Business Session**

- Approval of Minutes from April 2023 meeting – minutes were seconded and voted on approved as written.
- **Treasurer’s Report - Presenter Eric Smith**
  - Balance \$22,415 after the Spring meeting. 16 paid attendees for Zoom and 43 Paid for in person. Only 6 didn’t pay with Square. Hopefully will have 100% using the square option in the future.
  - Expenses \$150 – Zoom, \$600 domain registration, \$5,300 guide maintenance, and updates. New expenses from hosting meeting. \$32,580 in account.

### **Subcommittee Reports and Discussions**

- **Subcommittee #1 Publications Maintenance – Presenter - Eric Lohrey**
  - Went over what has been recently done with the website - merged the main website with the



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Hardware guide. He went through the various tabs on the website and into a number of the guides.

- Discussed capture of new systems. The base for that has been the issuance of an FHWA letter. Ten new systems have been added. He gave a brief overview of each of the systems. (Callout went to Valtir with their Sqr-Loc<sup>®</sup> yielding sign support system – single post for using the TF13 format in their drawing FHWA letter application as it makes it easier for us to get it into the TF13 guide)
- Started revising some of the 1995 guide drawings that were done in Metric units – he has been updating these drawings to have dual units. Used term “1-space, 2-space 3 space & 4 space etc. to indicate standard 6’3” and 12’6”, 18’9” & 25’ post spacing respectively.
- New M180 standard specification was published – (Comment was made that we would like for TF13 to add in the MOU for AASHTO to issue free relevant publications for our TF13 publications group to have as it will facilitate keeping the guides and drawings current) We will be dating all of our W-beam drawings.
- Discussed changing the name of a number of hardware items such as BCT & MELT end sections due to lack of use.
- Questions came up about stamped vs welded symmetrical and asymmetrical transition sections if both are in the guide.
- Labeling of components – Extra-long posts – Came up with a standard for labeling extra-long posts. (Was noted that M180 used this format to make recommendations on labeling W-beam sections)
- Systems with No FHWA letter – discussion was had on various conditions:
  - Interpretation of failed tests, waived tests, what is a significant or insignificant modification, consideration of computational mechanics replacing testing. Eric stated that he would prefer an objective determination for consistency. The issue of proprietary systems being treated differently (more stringently) than generic systems was discussed...
  - Systems that were developed within a NCHRP or Pooled fund program are currently only being added to the guides if requested by a state.
  - Looking at the next level of consideration for adding systems to the guide should they appear on a DOT APL/QPL list. The question was proffered to the audience: should a device be added if it only had appeared in “x” number of DOT’s listings... how we determine “x” number. Should the bar be set at requiring a minimum of 17 states (1/3 of all states) should the system then be added to the guide? The number 17 was set arbitrarily... consensus discussion on this was that 17 was a very high number states to hit for proprietary systems and alternate methods should be looked at. An option discussed was to consider the overall sized in geographical territory that a system is being used and used an overall size-based method in real estate (i.e., CA vs RI) for allowing new systems in the guides. Another option was to look to what are considered more “expert states” that have adopted systems (TX, NY, CA, WA) and go with that approach.
    - Question came up about Canadian Provinces do they count as states – answer was “as they are a member of AASHTO then they would.”
    - Short Radius Guide Rail – was used as an example where the system was developed under an NCHRP project but never applied for an FHWA letter.
  - Was noted that there is no process in place to declare system MASH crashworthy on a national level.



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- Question came up about tort liability – if one state relied on other states approval to add a device...
- Henry Ross made comment that he had some concerns about when & how a system gets added to a guide – specifically in the case when it doesn't have an FHWA letter. Subsequent assumptions could be made that by it being in the guide it's crash worthy... believes that this opens the door to liability.
- Carla Lichtenburg – Midwest - started a discussion about the welded vs stamped Asymmetrical transition piece – noted that the welded failed in testing (more info on this available on the [Midwest Q&A #828 discussion board](#)) They recommend the stamped version of this item only.
- **Subcommittee #2 - Barrier Hardware Review Groups Presenters Pyde/Eicher**
  - Discussed short radius guardrail system and TF13 drawings – as a generic system it's been added to the guide. Noted that it's been tested but doesn't have an FHWA approval – TF13 drawing SEW33a.
  - General discussion on the Short Radius Guardrail – Eric Emerson WI DOT – raised a question on using the system as it didn't have an FHWA letter and some of the tests in the matrix were not relevant to MASH –
  - Jim Kovar TTI said that in the conversion of MASH to a Specification as part of that process they weren't going to look at this system.
  - Dean Alberson – talked about not looking at systems were there isn't general consensus, and we should only put systems in the guides after there are being general consensus.
  - Dean Alberson – asked if the job that Eric Lohrey is currently doing for TF13 is transferable to another (thinking from a succession plan prospective)? Discussion concluded that it was, however, would be difficult to find an equal.
  - Requests went out to manufacturers and states to add photos of their devices to the guides.
  - Don brought up that a proprietary manufacturer wanted to get added into the guide – was looking for process...
- **Subcommittee #3 - Bridge Railing & Transition Hardware Presenter - Tony Ghioldi – Quality Bridge & Fab**
  - Looking for co-chairs. He explained the responsibility involved which include reviewing drawings and sending updates to the Publication Committee (Eric Lohrey) Put out a request for reviewers and any new systems that should be added to the guide.
  - 138 systems are currently in the guide. 3 new systems were added to the guide since last meeting. There are 16 new systems that are in cue for review.
  - Latest activity – looking to get more reviewers –
  - Action items- looking at NCHRP 350 systems that through engineering analysis will be able to meet MASH ([NCHRP 207-task 395](#) using this document as template on how this process could be done). This action item in the hands of another subcommittee – the committee is still in the initial stages of looking at what system would be added. Reported that further discussion was tabled until later in 2024.

**Subcommittee #11 – Delineation - Presenter: Nate Schulz TTI -**

- [AASHTO PE & AP](#) (Formally NTPEP) this is the new product evaluation process for tubular



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markers.

- The process now has an open submission cycle – They are looking to add a new cold weather testing facility – (vs TTI as they don't get that cold in TX!)
- Consideration for asphalt surface vs concrete
- [NCHRP 22-53](#) – Gave a brief description of the project. Delineation of roadside hardware and obstacles - investigating effectiveness of delineation on Roadside Hardware obstacle etc.
- [TxDOT 0-7171](#) – Gave a brief description of the project. Barrier Striping for the Reduction of Accidents – evaluation of effectiveness of concrete barriers with solid striping – considering applications to guardrail.
- Listed devices that aren't included in the current guide. There isn't a one place source for information for these various devices –below is an initial list of categories.
  - Tubular markers
  - Barrier retroreflective devices
  - Channelizing curb systems
    - Tubular marker
    - Vertical panels
  - Vertical / Pedestrian Panels
  - Others
- Noted that the subcommittee works in concert with ATSSA as they have a Work Zone Committee that also addresses these items.

### Subcommittee #7 Certification of Test Facilities - Presenters: Jim Kovar TTI & Karla Lechtenberg Midwest

- Reporting and documentation of ILCs
  - Satisfy proficiency testing requirement of lab accreditation – min 5 yr plan – labs determine schedule – they choose area of interest which is relevant.
  - Most recent ILC – standardization of reports – all are in support but progress hasn't been made until late. This has been pushed forward (Dr. Bligh is PI on the conversion of MASH to a Specification and there is a chapter within this on Documentation – thus unique opportunity has come up to tackle two birds with one stone)
    - Currently complying the reports from various labs and are summarizing.
    - ILC will come out with highlighting what's common and what is different between the labs reporting methods. They will develop a draft template that can be used in the MASH specification.
    - Preliminary comments – currently a strong level of consistency – Quantitative Data is tabular vs qualitative material are more text base.
    - OIV and RDA vs Vehicle damage data can vary in terms of what has been specifically recorded between the various labs.
    - Summary sheet – is very consistent due to 508 compliance requirements.
    - Figure heavy vs figure light – due to 508 compliance some photos are getting left out or deleted due to the added descriptive language required to be compliant.
    - There is variation in reporting topics such as soil testing / concrete testing etc.
    - Consistency for camera angles was discussed.
  - Review of Upcoming ILC schedule:
    - Lab interpretation of test results evidence according to MASH evaluation criteria – 2023-24 - MwRSF.
    - Documentation of ballasting location and their weights 2024-25 – E-Tech
    - Uncertainty in Measurement – 2025-26 Caltrans
    - OIV, ORD, THIV, PHD, ASI, ROL, Pitch, Yaw 2026-27 – TTI



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- How Impact Speed is calculated 2027-28 – FOIL
- SUT box attachment, ballasting, length of truck, etc. is hydraulic lifting kit OK? 2028-29 SwRI
- CIP selection of given barrier systems selection of angle for testing with a range (potentially CIP for 3-34/36/37 & angles for 3-32/33) 2029-30 TBD
- Measurement of Pickup truck CG 2030-31 TBD
- Measurement of OC Deformation 2031-32 TBD
- New Ideas – Dean Alberson had some comments - waiting until 2030 might be too long for some of the items in the cue for ILCs:
  - Wheels on trucks – steel vs alum wheels
  - Types of pickups selected for testing – TTI Uses Dodges – there can be differences in engines within the same model v6 vs v8 (water pumps are in different locations and could change outcome... Chevy vs Ford - running one mfg vehicle for one test vs another... as there might be advantage one way or another... or even selecting one mfg model for a particular test within the MASH matrix...

### Subcommittee #5 Sign, Luminaire & Traffic Signal Support Hardware – Presenters: Eric Lohrey / Scott Jollo OR DOT

- Noted that there are 8 MASH systems in the guide that have FHWA Letters – This is not including sign supports that don't have Fed letters.
- Initial guide had luminaries supports and bases – the base components were separated out. The question now is looking at them together as a “system”. The problem presents itself in the number of variations / iterations that aren't likely to be able to be tested.
- Current Testing has been focusing on TL3 vs lower testing performance levels.
- Questions about Adding items such as battery boxes to tested designs.
- [NCHRP 03-119](#) – Application of MASH Test Criteria to Breakaway Sign and Luminaire Supports and Crashworthy Work-Zone Traffic Control Devices – this project is going to be continued under 03-119(01) – unsure if an intrum report will be issued.
- [NCHRP 22-43](#) – Proposed AASHTO Guidelines for Implementation of MASH for Sign Supports, Breakaway Poles, and Work Zone Traffic Control Devices - guidelines for implication of how far design can be from what was tested.
- [NRHP 22-55](#) Implementation of MASH Surrogate Test Vehicles for Sign Supports, Breakaway Poles, and Work Zone Traffic Control Devices - Implementation of surrogate vehicles.
- [NCHRP 15-67](#) Wind Drag Coefficients for Highway Signs and Support Structures – work is completed (Final – NCHRP Report 1012)
- Oregon DOT Project Proposal for Pooled Fund
  - MASH evaluation of Square Tubing Slip Base Sign Supports (2024-04-BD)
  - Evaluation of Multi-Post Large Sign Supports with Slip Base and Slip Hinge (2024-03-BD)
  - Evaluation of triangular slip base for breakaway Luminaire supports (2024-02-BD)
- Question came up about Mailbox supports and if they are being looked at? Answer was how this is addressed varies based on the state. For example, TxDOT has tested all of their systems to MASH. TxDOT installs the mail boxes on state highways (support only not the box)

### Subcommittee #6 Work Zone Hardware - Presenter - Eric Perry

- Still looking for a cochair



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- Gave the mission statement for their committee – most of the info is included on the [national work zone safety hardware site](#).
- 3 new letters this year.
- Typically, only include barriers in the guide.
- 91 products in the guide, 60 of the items are MASH.
- ATSSA's temporary traffic control committee is looking at temporary barriers – producing a quality guidelines booklet (what's acceptable what's marginal what should be retired)
  - Question came up about what are they going to do about concrete barriers?  
Was stated that TTI has done a study on this and has some hard data on when a concrete barrier needs to be retired.
  - Longitudinal channelizer – question was asked if they were going to be in the guide.
  - Question was why aren't work zone signs included in the guide? (THIS QUESTION WAS NOTED TO BE ON THINGS TO DO LIST)

### Subcommittee #9 Marketing

Presenter:

Rick Mauer

- Redu of current newsletter with Subcommittee on WZ being feature.
- Survey to mailing list of needs
- Make presentation to AASTHO meeting – County Engineers Meeting – ATSSA (ATSSA Chapter meeting)

- **Revise ASHTO M180** – Group Discussion -  
Ostensibly the new revision is primarily purported to be for Guardrail Labeling – Extra Long Wide-Flange Guardrail Post etc. Other issues were brought up about the new revision.
  - Subject of the revision will be brought up at the next ATSSA Guardrail meeting and a new task force is going to be formed comprised of Guardrail producer – with the intent of assisting DOTs to adopt the revision.
  - David Price - RG steel - Read excerpts of parts of the document... Opened up discussion to the group of “what’s going to happen if a state adopts M180.”
    - Discussed the pit falls of implementation.
    - A specification needs to be put out with a date, most of the states just refer to M180 vs M180-19 or M180-23. Questioned if DOTs understand these issues.
    - The base metal thickness for the rail elements is increasing... how is this going to affect the market – current crash tested items...
    - Buy America was brought up about being a problem where items were label.
    - How is will the new material interface and react to the 25 million feet of rail that is installed every year...

### Update from the *Roadside Safety Pooled Fund Program Meeting* - Presenter

Schulz

- Overview and priority of projects in 2023/24 program (Link to the [Roadside Safety Pooled Fund Program](#) where more details project can be found)
  - Currently [TPF 5\(343\)](#) Closing soon.
  - [TPF 5\(501\)](#) ongoing
  - 26 new projects
  - 8 projects prioritized for future work.
- Recently completed projects - brief description of various projects.
  - Development and evaluation of a non-proprietary sign support for MASH TL-3
    - 3# /ftt uchannel 7ft mounting height 24"x30"





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- MASH Test 3-62 Passed 90 & 0 degrees.
- MASH Test 3-62 – 8ft mounting passed.
- Development & Evaluation of a TL3 MASH median rail transition to median F-Shape Barrier
  - Design and evaluation was done through FEA modeling.
  - MASH Test 3-21 Results are pending.
  - Report pending.
- Evaluation of open joint concrete bridge rail system.
  - Looking at what cover plate is required, If the joint can be left open, Report will expound on details of plate if used.
  - Survey of existing joints
  - Simulation of final design
- MASH TL3 evaluation of Signpost with Flashing Beacon Equipment
  - Looking at the array of types of equipment and various configurations
  - Goal is to test the worst-case
  - Intend to test the full MASH matrix.
- MASH TL3 Transition design with storm drain inlet
  - Tested small car and pickup with 4in curb
  - Completed – all the way through crash testing – report is pending.
- MASH Testing of Guardrail on 1:1 slope
  - Developed thrie-beam design option with or without rub-rail.
  - Conducted FE simulation to evaluate design
  - Tested small car & pickup
  - Report posted on website
- Optimize grade separation with concrete median barrier
  - Status – literature review is completed
  - Polling member states to determine range of separation required
  - Design of deck being checked.
  - Waiting on report
- Testing and evaluation of flaired MGS system at TL 3
  - 3-11 on 11:1 flare failed
  - FE is looking at 15:1 flare with rub rail
- MASH TL3 testing and evaluation of large signs slip bases on slope
  - 3-62 on flat passed (base line testing)
  - 3-62 on 6H:1V slope – passed
  - Report pending
- [Guidelines for Attaching MASH-compliant Thrie Beam Transitions to Rigid Concrete Barriers other than the Rigid Barrier Tested \(616001\).](#)
  - Reviewed transition crash test
  - FE sim study evaluated transition to tall wall.
  - Developed guidelines and recommendations.
  - Report is pending.
- Multi directional slip base design for steel beam nonproprietary large sign supports
  - Status – on-going
    - MASH test 3-60 passed
      - Route market
    - MASH 3-62 failed
      - Large guide sign
- Evaluation of a 4 bolt slip base breakaway luminaire support for various pole



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- configurations
  - Status Ongoing
  - Survey completed
  - Design components selected
  - MASH TL3 crash testing
  - Waiting on parts
- Portable sign stand with mounting height variation (perforated square tube – non proprietary short and tall (7ft))
  - Design is completed
  - MASH TL3 testing is pending
- Barrier Deformation at lower Impact Severities
  - Selected systems for evaluation
  - FE simulation is in process
- Optimize Guardrail blockout
  - Evaluation of the shortened blockout – looking at if there are other benefits – They will make considerations for both wood and plastic blocks
  - Conducted engineering analysis and component testing
- Variation in guardrail approach transitions connected to rigid barriers
  - Identified different variations
  - Final report posted to web site
- Fence mounted on roadside TL4 barrier single slope
  - Conceptual design and simulation analysis is being done
    - 36” tall barrier
    - Construction of barrier in process
- Steel-Post W-Beam Guardrail in Asphalt Mow-Strip
  - Bogie Testing of post in various asphalt thicknesses and offsets
  - Completed testing still evaluating data
- TL-5 Concrete Median Barrier w/ shallow embedment of footing in asphalt.
  - Design was conducted using simulation.
  - Construction and test 5-12
- W-Beam Guardrail in front of retaining wall rip rap
  - Simulation is in process
- MASH Crashworthy Pedestrian and simulation traffic signals
  - Lit review underway
  - Engineering analysis being conducted
  - Full testing matrix pending
- Buried-in-Backslope Terminal variations in slope and ditch configurations.
  - Recently started
- Guidelines for overlapping precast concrete portable barriers
  - Single slope and F-shape
  - Recently started
- MASH TL3 Evaluation of a short thrie beam approach transition
  - Initial design failed crash testing
  - Addition of a rub-rail was added in redesign
  - 3-21 test – conducted
  - Report is pending
- Strain Gauge Deck Barrier Optimization for road safety
  - They have implemented the gauge in one TL4 test so far
  - Look for other projects to use the gauge on to get more data



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- Phase 2 three beam retrofit – application of new design without a curb for MASH TL3 & improvement for TL4
  - Still in simulation phase
- New prioritized projects:
  - Short Radius Guardrail System – Additional Testing to be done
    - Objective is looking for modifications and enhancements to what was tested in NCHRP 15-53
  - MASH TL-3 Design, Testing and evaluation of flared guardrail system – Phase 2
    - Looking at modifying flare to 15:1 – 21:1
    - Possible use of rub-rail
  - Determine TL3 and or TL2 compliance of MGS with ½ post spacing & ¼ spacing with and without soil backup plate
  - Evaluation of multiple large sign supports with slip hinge
  - Bridge rail end treatment guidance for constrained sites
    - Development of attenuator style system
  - Deflection distance for MGS TL2 (TL-1) with shorter post spacing
  - Evaluation of Sqr tube slip base sign supports
  - Determine TL3 – and or TL2 compliance with MGS with ½ and ¼ post spacing.

### Safe Roads Research - Presenter: Dean Alberson

Recent research their group has done:

- Talked about the “The innovations Academy” Jesse Hopkins project to train local DOT on about highway hardware. (Guardrail garden Canadian Style)
- Showed test of a 23” W-beam guardrail system – impacted with a ford transit van @ 100 k - 25 degrees – rolled the van 2-1/2 times
- Showed what happens after a guardrail repair – without retentioning the cable - rolled multiple times
- In honor of Ron Faller dislike of trees in the clear zone – they tested a live poplar tree – 9 ½ inches 60 ft tall... it worked at TL-2!

### TF13 General Business:

- Greg Neece resigned as Secretary of TF13 - Rick Mauer was nominated by John Durkos to be the new secretary – nomination was seconded by Greg Kirchgenger. Vote was held. Nomination was affirmative.

### TF13 Executive Meeting

- Putting Systems in the guides with no FHWA letter. Generic and proprietary – collective thinking has been if “some” authority has deemed the system is MASH compliant or if it has an FHWA letter the product can then go in the TF13 guide.
  - Short Radius Guardrail System – due to lack of formal MASH matrix of testing couldn’t be technically a MASH system... Additionally because it was tested at the FOIL to avoid conflict of interest the FOIL didn’t submit it for a FHWA letter.
- Inclusion of the WZ letters in the HW guide. – Consensus was that they are all proprietary systems and didn’t want it to be a product listing... **To do items was to “Send out a questionnaire to MFG that have WZ letters if they want to be in the Guide.**
- Discussion on what we thought about the broadcast – 53 people online – consensus was that it was great.
- **Request for Nauman @ TTI have his group do a presentation on 508 compliance for next meeting.**



## TASK FORCE 13

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Thursday and Friday ○ October 19<sup>th</sup> & 20<sup>th</sup>, 2023 ○ College Station, TX

- Marketing – CE credit –
- Spring Meeting April 24-26 in Lincoln – Fall meeting will be in College Station
  - State participation for full meeting today was only 2 people.
  - **Recommendation is to advertise directly to DOT – EV's connection at TRB**

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### Affiliated Committee/Activity Reports

- American Traffic Safety Services Association (“ATSSA”) Eric Perry
  - Introduced ATSSA’s new logo.
    - 1500 members, 28 chapters covering 45 states
    - EXPO Feb 2-6 San Diego, CA
    - New Products Rollout and Innovations Awards – Showcases new and innovative products.
    - Resources
      - Connected Arrow Board Benefits Resources
      - Roadway Worker Protection Toolkits
      - Case Studies
      - New Learning Management System – Issuing Certificates and renewal
      - W-Beam Guardrail ID & Repair guidelines
      - Newly Formed Council – Risk Management – Litigation (First meeting will be at the EXPO – Sunday Feb 2 7am-9am)
    - Guardrail Committee Update
      - Developed a QPL / APL form for states to utilize and standardize this type form
      - Crash Testing of Battery Vehicles – Joint committee formed last year to monitor impacts of EV’s with HW Hardware
      - Guardrails Safe Lives Campaign – will be revamped and rolled out
      - Future Guardrail Training – Looking at updating training tools, Installation, Inspection, & Design
      - Tracking new MUTCD release expected in 2023
    - New Work Zone Safety for Short Term Projects – Free course (approx. 4hrs)

### TRB Committee AKD20 Roadside Safety – Atlanta GA Summer meeting- Presenter Fadi Tahan

- (John Donahue is stepping down April 2024– Fadi Tahan is stepping in)
- Gave the Vision and Goals of [AKD20](#) and instructions on how to become friend of the committee
- ADK20 (1) Computation Mechanics
- ADK20 (2) International research
- ADK20 (3) Inservice performance Evaluation (ISPE)
- Activities:
  - Have 2 meetings a year – Annual & Summer meeting
  - [Ken Stonex Award](#)
  - Best Paper Award
  - Highlighted the Annual Cycle of events & papers due dates
- Gave an example of the Summer Meeting Agenda ([Summer Meeting Minutes- Atlanta GA July 2023](#))



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- Went over Research Needs and Funded Research for FY 2023
  - [NCHRP 22-29B](#) Evaluating the Performance of Longitudinal Barriers on Curved, Superelevated Off-Ramps
  - [NCHRP 07-33](#) Evaluate the Benefits of Increasing Clear Zone at Higher Speed/Traffic Volume/Crash Locations
  - [NCHRP 22-37](#) Development of a MASH Barrier to Shield Pedestrians, Bicyclists, and Other Vulnerable Users from Motor Vehicles
  - [NCHRP 22-57](#) Procedures for Development of MASH Full-Scale Test Matrices for Additional Roadside Safety Device
- Annual Meeting Jan 7-11 2024
- 2<sup>nd</sup> International Conference and Peer Exchange on Roadside Safety – June 23-26 2024
- [MY TRB Account](#) – went over how to set up an account.

### AASHTO Technical Committee on Roadside Safety- Presenter:

**Eric Emerson**

- TCRS – discussing the roadside design guide –
  - Traditionally developed by having the members each do a section. Since covid they have hired a consultant to do the work. Lidos – Joe Jones –
  - New process is Lidos develops the chapters and sends out to select individual TCRS committee members to edit an individual chapter. After all the chapters were internally reviewed the completed document would then be reviewed by the entire TCRS committee.
  - Issue that has arisen – with inconsistencies in drawings. New contract was released to Lidos to update the drawings and make the drawings consistent between chapters.
  - Due date of April 2024 likely won't be met. (Writing contract will be, but graphic contract hasn't been completed yet) Likely May or June – will send to AASHTO Members for balloting
    - Balloting will take place in the summer –
    - End of Lidos performance contract is 12/31/24.
  - Be aware that Joe Jones – will likely be looking for photos to add into the guide and will be looking to the members of TF13 to supply them.
- Technical Assistance Program at TCRS – setting up a committee – still forming the committee leads – anticipated top 3 topics – Computer Modeling, Self-Certification, Training for DOT personnel taking on Roadside Safety Roll.
- Gave a presentation to AASHTO committee on Electric Vehicles about how the heavier weights will likely impact the existing hardware.
- NHTSA is sponsoring a new EV.

### Update of ongoing research projects related to Roadside Safety and/or Safety Hardware

- Update NCHRP projects- Presenter: John Durkos
  - Gave list of on going projects -
  - [NCHRP 15-79](#) Development of guidance for non-standard roadside hardware installations –
    - Nathan Shultz– gave a brief description of the project.
    - Listing of site constraints – where site conditions don't meet those of the crash testing done for the system.
- CCSA/George Mason University- Presenter: Fadi Tahan
  - Ditch traverse testing
    - Showed Holmes Solutions testing of a cable barrier in a 46ft ditch @25 deg 100k – using the 1100 MASH vehicle.



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- Showed video of FOIL test – 6:1 & 4:1 slope shaped ditch – no barrier used.
- Ditch width 32" 25 deg – impact speeds varied 31, 43.5, 62 mph. They tested the GEO Metro, Ford Taurus & Dodge Ram.
  - Focusing today's presentation on 100k speed. 32' ditch
  - Geo Metro – traversed the ditch and hit the inclined side of the ditch (all 4 wheels were off the ground)
  - These tests usually resulted in suspension failure for all the test vehicles.
  - Geo Metro – Rolled over after impacting the back side of the ditch.
  - Same test configuration used but changed the vehicle to a 2001 Ford Taurus – same set up – by changing the vehicle showed it work in that condition.
  - 2004 Dodge Ram – successfully transited the ditch.
- Simulation – 2022 Hyundai Accent – (5<sup>th</sup> Generation model year 2017-22) 500K elements. Validated the Frontal Impact @ 56k into a wall. They also performed barrier validation at MwRSF using a concrete barrier.
- Simulated – single unit 2014 International 43000 SUT – they have been improving the model - up to 1.4m elements. They used a Rigid Pole, and barrier testing was done using a TX 36" concrete vertical wall, also validated it against previous three beam testing.
- 2023 Mercedes Sprinter Limousine – In progress – still digitizing the model.
- Future simulation work – will be modeling the VW Tiguan & VW ID.4 BEV.
- Discussion was had with Eric Emerson WI DOT – regarding simulation – and thoughts of reactivating of a previously sunset committee – to look at accreditation for the facilities doing simulation work.

### Midwest Roadside Safety Facility- Presenter : Karla Lechtenberg /Rosenbaugh

- Update MwRSF current research (Link to [MwRSF Research](#))
  - High Tension 4 cable median cable barrier – 6:1 v ditch 8' or 16' post spacing
    - All level terrain testing has been completed.
    - Cables are at 15.5" 23", 30.5" & 38" heights.
    - Post is a HSS 3x21/8"x78" long weaken with holes
    - MPT-3 MASH Test 3-10 @ 8' post spacing – pass but had rear window fracture – deflection was 94.4"
    - MPT-4 MASH Test 3-11 @ 16' post spacing – passed – deflection was greater than was expected – redirection was good. 145.5"
    - Remaining tasks were to test median barrier on slope & reports to finish  
Question was asked about previous testing and resultant deflections:
      - MASH Test 3-11 MPT-1 2270P @ 62 – 8' post spacing 102.1" deflection
      - MASH Test 3-17 MTP-2 1500A @62 16' post spacing 146.4" deflection
  - Cable terminal
    - NY wanted to modify their existing design:
      - 10' post spacing cable heights 17", 24", 31" & 38". Used a S3-5.7 posts with standard J hook bolts.
      - MASH Tests 3-34 passed, MASH Test 3-37b passed.
      - MASH Test 3-30 on the nose failed.
      - MASH Test 3-32 – posts #1-8 were HSS 3x2x1/8", post # 8 was HSS @ 78" long with two 2" holes at ground line. Post #9-29 were



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- standard S3x5.7 posts - Test Failed. Rollover.
- Modified the system. Changed posts #1-12 to be the weekend 3x2x1/8" – Test was "deemed" a pass... gated through the terminal then gated back through the system at post #8
- MASH Test 3-33 – with the pickup was redirected – passed.
- MASH Test 3-35 – LON test – impacted at post # 2 – was a redirective test... and the truck gated through the system. Failed.
- Remaining testing will be to re-test of the MASH Test 3-35 – no mods to the system, only change will be to move the LON point – downstream on the barrier from post 2 to post # 5.
- Buried in back slope system for HI DOT
  - Had to come up with a test matrix – Modified Tests 3-32, 3-33, 3-34, and 3-35 Point just down stream from the block as effective "nose"
  - Test 3-37a & b (4x)
  - Testing both vehicles at rub rail downstream of termination
  - Testing both vehicles at upstream of transition
  - Showed the various ways that they are doing buried in back slope (BIB)
  - The rub-rail doesn't follow the slope and they wanted to evaluate the "gap" where the rub-rail doesn't cover the exposed posts.
  - MASH Test 3-32 failed. Significant vehicle damage & excessive ride downs. Snagged on posts 3-6.
  - They modified the system to change the rub-rail to follow the slope of the ditch and added 8" deep steel tubular blocks to stiffen the rub-rail. – Test was a PASS.
  - MASH Test 3-32 with pickup – Passed.
  - Remaining task will be to test 3-34 & 3-35 @ post 8

### Texas A&M Transportation Institute – Recent activity- Presenter: William Williams

- TxDOT T223 bridge retrofit design
- 2 options were designed:
  - retrofit the rail to use adhesive anchors on a 7" deck
  - 6" bolt through deck option
  - Analyzed both designs at 71kips @ 19inch.
- Shorter Thrie-beam Approach Transition – part of pooled fund (T4541-FE)
  - They were looking at the possibility of instead of using a 12.6" nested thrie beam can they get away with using a 6.3" beam. MASH Test 3-21 failed – snagged on the blunt end of the parapet.
  - Their goal was to redesign the system using the data from the failed test. Redesign added a C6x8.2 rub-rail. Retested MASH Test 3-21 - passed.
- Instrumentation project – Funding for strain gauge optimization for roadside safety issue / problems for member states. Project was for CODOT TXDOT SSTR with 8" deck – Test was a 4-12.
- Phase 2 Thrie Beam retrofit – Design without curb for MASH TL-3 and Performance and Improvement for MASH TL4 – it has a 6" curb
- MASH TL3 design and testing of Guardrail on 1:1 slope – MGS failed.
  - Modified the system changed to Thrie beam, longer post – system passed.
- Development of MASH TL3 Anchor Maryland PCB.
  - Modified design to make it work by adding wire mesh and steel straps.



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- Fall Protection Fence behind Long-Span Guardrail 25ft unsupported span– Washington Dot
  - They came up with a design and recommended offset from rail. Ran MASH Tests 3-10 and 3-11
  - 64” deflection – system passed.
- Roadside Safety & Physical Security Division – Retro Fit Bridges
  - TX DOT T2P bridge rail 6” - successfully tested to MASH TL4 – had 30ft of deck damage
  - AK DOD 2 Tube bridge Rail
    - Retro fitted bridge with curb 2-149
  - LADOT Median Barrier – retro fit a 36” and 42” barrier on either side of the deck.
- 508 Compliance presentation by Calspan Ben Metzger
  - Have been going back and forth on the commercial side ... don't need it... FHWA now allowing when making the submission – new check box that FHWA will allow customer to put the info on their own site – FHWA will link to that. It's a workaround for the 508 compliance.

#### **New/Old Business- Presenter:**

**John Durkos**

- Location/Dates of Various 2023/2024 Industry Meetings
  - TRB – Jan 7-11 2024
  - ATSSA – Feb 3-7 2024
  - TF13 Lincoln NB April 24-26 2024
  - 2<sup>nd</sup> internal meeting June 23-26 2024
  - Fall TF13 meeting location – not set – discussed the possibility of other test lab.
- Executive Committee Summary
  - Approach for adding system to the guides without FHWA letters
  - Short Radius Guardrail System – Mash or not Mash – talking AASHTO Roadside side
  - Work Zone Guide – Send out survey
  - Broad Cast – Deemed a success – (learned that we need 2 mikes next time)
    - OR DOT – Scott Jollo – His perspective – Budget issue with travel – appreciated the on-line approach was helpful – Our audio was great compared to other Zooms – Thought that the price was very reasonable.
    - Joe Jones – Lidos – thought that the on-line option was a fantastic opportunity & the price was right.
- Review of Task Force 13 “To Do List”, generated from meeting.
- Other items, as appropriate