Joint Meeting between Midwest Pooled Fund Study and Task Force 13

April 29, 2015

Embassy Suites, Lincoln, Nebraska

Bob Bielenberg welcomed all to Nebraska. Referenced crash test just concluded at the MWRSF testing grounds. Noted Dr. Ron Faller was absent.

AASHTO FHWA MASH Implementation Plan – Joe Jones, Missouri DOT. Showed latest draft of the plan and discussed the various features. Wants discussion on each point, and wants to take feedback back to AASHTO HQ.

- Bligh: Cable barrier matrices are the only major change from MASH 2009 to MASH 2015. [Secretary's note: See attached summary of proposed changes.]
- What about repair of damaged hardware not meeting MASH 2015?
- Bizouga says that without additional FA Highway Funds he would not vote in favor of the Implementation Plan. NJ has higher priorities than obsolete hardware that has never been hit.
- Wyoming is developing and submitting in their budgets now for 2016. The proposed plan is overly aggressive and there it not enough time to get devices crash tested and added to state standard plans. [Secretary's note: TCRS advanced all dates by one year.]
- MASH hardware, such as the MGS, may have higher construction and maintenance costs due to greater damage upon impact.
- Lohwrey: is there data showing MASH hardware is performing better than 350 hardware?
- Since MASH was developed as a "living" document should the sunset dates be a living document as well?

RFID Tags – John Durkos: Can be remotely detected over distances ranging from a few inches to hundreds of feet depending on technology used.

What problems have hindered development/implementation of MASH hardware? Cost of tests on hardware that are not required to be tested to MASH. There is no motivation yet because there is no sunset date.

What is required of an MGS terminal? Need to establish where we make the shift from splice-on-post to splice-between-post.

Artimovich: Will there be guidance on what info must be submitted to justify a modification that is insignificant? Will we still allow common waivers on WZ devices like allowed in 350, and use either pickup or small car test on certain WZ devices. Limit full MASH matrix to terminals and attenuators.

Bielenberg discussed the tests of the generic high-tension 4-cable median barrier system using the MWP (MidWest Post) that caused tears in the vehicle floor pan. Can some level of

penetration be allowed if it does not pose serious injury to the occupants? Extensive discussion ensued both pro and con. [Secretary's note: as MASH calls this out as a "Fail" AASHTO will need to rule on this before FHWA can consider such results.]

Thursday, April 30, 2015

Task Force 13 Meeting Begins

John Durkos welcomed participants to Lincoln. Thanked the organizers Larry Bock, Ron Faller, Bob Bielenberg and the Gang from MWRSF. It takes a lot of effort to put together a meeting. Had a moment of silence for Chuck Niessner form FHWA and NCHRP.

Summarized Wednesday's crash test and joint pooled fund / TF13 meeting. Also went through the To Do list. Noted that TF13 needs an additional co-chair who is from AASHTO. Gave us a preview of the agenda for the next day and a half.

Durkos moved to approve the minutes from Shepherdstown. Karla Seconded. Minutes approved.

Future of Task Force 13

King Gee addressed the Task Force, representing AASHTO, AGC, ARTBA joint committee. Formerly with FHWA, Gee is now Director of Engineering and Technical Services for AASHTO. Thanked all those in TF13 for all the hard work we are doing. Website is straightforward as to what we are doing and why. Briefed us on the Joint Committee that began in with AASHTO and AGC 1921. ARTBA joined in 1972 and added focus on New Highway Materials and Technologies chaired by Art Diniz until last summer. 45 task forces set up, did their job, and were dissolved. TF13 is about the continuous and incremental update of safety hardware. Subcommittee on New Materials and Technologies stopped reporting to Joint Committee in 2006. AGC and ARTBA feel as if they don't know what TF13 is doing.

The Joint Committee reconstituted TF-13 as a Subcommittee dealing with standardizing and updating of highway and bridge hardware. TF13 has been consistent and true in using the Joint Committee Logo but the other two orgs don't really understand what we do. According to the Joint Committee bylaws, TF-13 members must be members of AASHTO, AGC or ARTBA. Alternatively TF-13 becomes a different entity. If we remain part of the Joint Committee they also want to share in publication of our guides.

Gee then went on to speak from AASHTO's perspective. It is not reasonable to expect private individuals to join AGC or ARTBA just to maintain membership with TF-13.Gee spoke with TCRS Chair Keith Cota. We have options:

1. Become a joint subcommittee by all members joining AGC and ARTBA.
2. Become completely independent
3. Become an AASHTO org, but only AASHTO members can vote.
4. Become joint org between AASHTO and some other org, such as ATSSA.

5. Become independent under some other organization, such as ATSSA.

This is a forum for state, academia, and industry to meet and discuss the common issues.

King wants to hear from AASHTO members.

Faller asked what AGC and ARTBA's concerns are. Gee said there was no accountability. Co-chairs must belong to one of the organizations, as must the TF members. Gee needs our answer by August to bring before the Joint Committee. Some AASHTO subcommittees are more liberal on private participation, but only state members can vote.

Durkos noted that for many years Art Dinitz reported back to Joint Committee and things were going OK.

Ray asked if we became part of AASHTO would we still be able to publish our Guides on line? Yes, we could continue. Also, our guidance would not have to be balloted by AASHTO member states. TCRS still wants to be able to point to our guides.

There could be exceptions for participants as "friends" but the majority would have to be members, with a few technical experts that are non-members.

Survey showed many people belong to ATSSA, which does have a Guardrail Committee. ARTBA and AGC do not.

Since our Guides and ILC serve AASHTO why can't we become part of AASHTO?

We have communicated with ATSSA about our situation and they are open to being part of us. So this may be a topic of discussion.

Ray suggested we discuss TF future before we can be comfortable in moving forward with discussing our role in FEA.

Subcommittee #1 Publications / TF13 Website

Mac Ray. RoadsafeLLC got the contract just over a year ago. Olaf Johnson is the webmaster and all comments or corrections should be directed to him. Ray's PPT presentation covers the details on the website. Should WZ devices and Crash Cushions be separated from barriers that are in the "Hardware Guide?"

Ray then brought up the Barrier Hardware Guide. Also noted that Transition Guide is active, but has not been populated with NCHRP Report 350 or MASH devices. Should non-crashworthy hardware like turn down trailing ends and BCT be shown? TF members agree they should be shown but listed as Not Tested. Should longitudinal barriers, WZ hardware, terminals, and crash cushions be sorted into a separate guide? Is there any guidance on maintenance of devices? Manufacturers may provide this information to be loaded or linked on the guide.

Subcommittee #2 Barrier Hardware

Lechtenberg demonstrated the on-line drawing review process. Six drawings of Gregory Mini Spacer guardrail designs were reviewed.

Paul of E Tech will take over for terminal review group.

Subcommittee #3 Bridge Railing and Transition Hardware

Roger Bligh showed the functionality of the current TF13 Website.

The following Technical Review Groups are set up in SubComm #3:

Concrete: Kurt Brauner

Steel: Vacant

Other: Scott Rosenbaugh

Bligh solicited interest in participation in the three working groups and for a Steel Rail working group leader. Also showed a Reviewer's Checklist that he plans to formalize to help the working group members. Artimovich offered to provide links to Bligh and Ray of railings tested to GSBR These may be found on the FHWA web site at:

http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/barriers/bridgerailings/docs/appendixb5.pdf

The column titled "References" cites the reports in this numbered list:

http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/barriers/bridgerailings/docs/appendixb6.pdf

Bligh noted a number of improvements that are suggested for the website contractor.

Subcommittee # 3 BR and Transitions. 21 attendees. Reviewed content and features. Appealed for review assistance. Had suggestions for additional search features. Rail height. Open railing. Transition guide will be of greater focus in the future. Framework is there but needs to be populated with more systems. Will consider on line submittal process that can be used on the other TF13 guides in the future.

Subcommittee #5 Sign and Luminaire Support Hardware.

Subcommittee #5, Sign & Luminaire Supports, Meeting Minutes:

- Eleven (11) attendees present.
- The subcommittee still needs a co-chair from a government agency member (FHWA or state DOT). An individual from WVDOT is interested, but doesn't know if he can attend meetings regularly. So far, we are asking that candidates expect to attend at least one (1) meeting per year.
- The subcommittee currently maintains two (2) TF13 guides:
    1. A Guide to Small Sign Support Hardware.
    2. A Guide to Luminaire Supports.
- The following Technical Representatives were assigned to coordinate review activities for Subcommittee #5:

Small Sign Supports (less than 9 lbs/ft)
Greg Kirchgesner, Xcessories Squared, Inc.
No. of Reviewers: 6.

Medium Sign Supports (9 - 45 lbs/ft)
Eric Lohrey, P.E., ECL Engineering, PLLC.
No. of Reviewers: 4
Luminaire Supports
Barry Sladek, P.E., Valmont Structures.
No. of Reviewers: TBD.

- Sign Support Guide: Currently 21 designators with status "In-Review", as follows:
  Five (5) are out for review, and are expected to be completed by next meeting.
  Four (4) have had drawings & photos submitted since the last meeting, and are expected to be sent out for review & completed by next meeting.
  Four (4) have commitments from manufacturers that drawings & photos will be submitted by next meeting.
  Eight (8) are from manufacturers who have not yet responded to requests for information. Several members volunteered to attempt further contact with them.
- Luminaire Support Guide: Currently only 2 pole system manufacturers are represented in the online Guide. The subcommittee is working on a plan to contact additional pole manufacturers and solicit more participation in the Guide. Options to simplify the Guide may be investigated in order to encourage more participation.

Subcommittee #6 Work Zone Devices

Karen Boodlal and Victoria Brinkly facilitated meeting. Greg Schertz step-down as chair and selected Victoria and due to work conflict Tony Capella could not attend.

Recap last meeting in Shepherdstown, WV

- Truck Mounted Attenuator Delineation was put onto list of Problem Statements for National Committee On Uniform Traffic Control Devices. Rick Mauer will continue to monitor progress of the issue with the NCUTCD.

- FHWA Resource Charts – Work Zone Steel barrier charts are complete. Plastic-water filled barriers and temporary concrete barriers are in DRAFT form and waiting on FHWA review.

- The last meeting we discussed the Safety Effects of damage to portable concrete barrier – New Jersey has done a study on this and Dave is to send it to us.

- TTI has been hired to update a TMA Host Vehicle Roll-ahead Distance chart; current one is the Humphrey-Sullivan – 10 yrs old). However, since Dean or Barry was not present, this topic was tabled to the Fall 2015 meeting.

New Topic:

Concerns of Work Zone products being implemented to MASH. One manufacturer has tested a TL-3 barricade to MASH and has been waiting approval from FHWA for a year now. NCHRP 03-119 project has a temporary sign support MASH criteria. Clarify that the sunset dates were for use and the question was what happens to systems that were being stocked and the cost involved.

Subcommittee #7 Certification of Crash Test Facilities

Joined online by: John Jewell – CalTrans, Mike Dunlap – KARCO, Steven Matsusaka – KARCO

Sign in sheet sent around – make sure your name is on the list if you wanted to receive email correspondence in regards to ILCs. If not present at the meeting, email either Karla Lechtenberg (kpolivka2@unl.edu) or Lance Bullard (l-bullard@tamu.edu) if you want to receive ILC correspondence and have not been.

ILC discussion

- Accrediting body (A2LA) asking for a "plan" of at least 4 years of ILCs
- Each lab to email Karla Lechtenberg (kpolivka2@unl.edu) and idea for an ILC to be added to the "plan" by July 1, 2015.
- Need to add more "teeth" to the ILCs that are being conducted. Currently only sending out the results, but not discussion on who is correct and why the other labs are not. A report is needed that presents a description of the ILC, the results of the ILC, the differences between labs, the issues of why all are not matching/coming up with the same answer, and resolutions to the differences/issues.

Multiple accelerometer systems in a test vehicle discussion

- All labs use redundant accelerometer systems
- All labs do not analyze nor report all the accelerometer systems used in the tests
  - MwRSF – analyzes and reports all data/systems
  - Holmes Solution – only uses primary system, compares to other physical results. Only looks at and/or reports the secondary unit data if near the required limits for occupant risk
  - TTI – only report primary
  - TRC – only report primary
  - CalTran – only look at primary unit, only analyze secondary unit if primary has issues. If within uncertainties, just use primary.
  - TRC – analyzes and reports all data/units
- Most labs only mount the accelerometer systems at the x,y location of the c.g.
- Some labs stated that if primary fails or does not work then look at the secondary unit. If the occupant risk numbers are close to the threshold then the lab may have to rerun the test since it is unknown what effect not being mounted at the c.g. has on the occupant risk values.
- Consensus of laboratory representatives and FHWA present
  - must report primary accelerometer unit (one at or within 2" of c.g.)
  - may report all accelerometer units used, but must denote which is primary and secondary
  - Placement of all accelerometer units must be noted within the reports.

¼-pt offset vs. centerline impact discussion (terminal/crash cushion)

- Currently impact is ¼-point offset which is critical for vehicle instability
- Not currently required, but centerline impact might be more critical for vehicle decelerations and occupant risk
- Staged devices – concerns for ORA vales
- Non-staged devices – OIV/ORA occurs before the vehicle yaws out
- Consensus of laboratory representatives present

o Conduct the estimation procedure similar to the 1500A vehicle but with an 1100C vehicle could determine if that might be a critical impact.
o Should be done for staged devices due to possible effects on ORA values

Debris "present undue hazard" discussion
- Began discussion
- MASH subjective on this topic. Not very clear.
- EN1317 uses 2 kg mas as the maximum debris
- Need to develop a consistency among the testing labs
- This topic needs more discussion.

Discussion on future home of Task Force 13. Donna Clark of ATSSA

Options:

1. Stay under joint committee, but would need 3 co-chairs, one from each org.
2. Go Totally independent
3. Be under AASHTO. Only AASHTO members could vote.
4. Create new Joint Committee like AASHTO-ATSSA
5. Go independent under some other organization like ATSSA.
6. Open for discussion.

Need to decide if we are going to stay where we are, or if not, then decide what we want to do next.

Clark,: ATSSA management is willing to take on TF13 but have no vested interest either way.

Bligh: If we went under ATSSA would all members need to join ATSSA? Confirmed. Majority are ATSSA members anyway, so TF13 could continue to operate as we do w/o any requirement to join ATSSA.

Would it be easier for state DOT people to participate if we stayed affiliated with AASHTO? Bizouga – would not make a difference? Divyang- not as easy if there is no affiliation with AASHTO.

Ray: We have not really had affiliation with the Joint Committee for 30 years so #1 does not make sense. Since we do our work for AASHTO we should be part of TCRS. A new joint committee between AASHTO and ATSSA would be a good solution. Bligh agrees with Ray. Not sure we could fully operate as a pure AASHTO sub organization. Durkos agrees witih Ray and Bligh.

Durkos asked Gee what would be the ramifications of being part of AASHTO? Could we become a working group under AASHTO? AASHTO does not take positions without a state vote. A working group under AASHTO is possible under AASHTO bylaws. Bligh: would our leadership have to change to only AASHTO members? Could only AASHTO people vote?

Maintaining some relationship with AASHTO is critical, then ATSSA

Ray: If we are a WG under TCRS providing recommendations, is that OK? Yes, but still need AASHTO participation in our leadership.

Clark: Joint AASHTO/ATSSA partnership would be optimum because we would not have to change how we operate. Roger Wentz is in favor of such an arrangement.

Christine: What would ATSSA get out of this arrangement? Clark could bring GuardRail Committee and Temporary Traffic Control committee perspectives to TF13.

An AASHTO/ATSSA arrangement would allow TF13 to operate as we do. Artimovich agrees this is optimum.

Greg Kirchgesner: Should we reach out to TF members who are not here in Lincoln? Karen could put together a survey on the various options, the plusses and minuses, and the opportunity to voice their opinion. [Secretary's note: A survey was sent out to the entire membership in June. The results will be discussed at the Fall 2015 meeting.]

Clark will relay this discussion to ATSSA.

Divyang wanted DOT opinions. Minn DOT agrees with AASHTO/ATSSA. Wyoming supports AASHTO/ATSSA, ATSSA has many active chapters around the country and they have close relationships with many states.

What about University perspectives? They are in favor, too, as are the test labs. New arrangement is more relevant.

Task Force first day Meeting Adjourned.

EXECUTIVE BOARD MEETING

Durkos, Lechtenberg, Ray, Bligh, Mauer, Gee, Brinkly, Lohrey , Artimovich,

Derwood Shepherd of Florida DOT volunteered as new Tech Rep for Terminals.

Durkos noted that a couple of state DOT people show up at most of the meetings. Durkos does most of the work, and can continue to do this, but there is that role that a state DOT member plays that is important.

Lechtenberg: we do not have a large backlog of new drawings. Chad and Eric's work will take some time. We do need to get these uploaded. Ray suggests that Tech Reps look over these drawings and vet those that need to be sent forward, altered, or discarded. There are numerous drawings submitted thru Chad that are going nowhere.

Should we include non-crashworthy hardware in the guide, like trailing end turn downs? We don't want people using this hardware, but we need to let people know what these look like when inventories of roadside hardware are being done. Eric noted that an FHWA letter was required to get into the Guide. But there are tested devices that have never been submitted to FHWA. 1995 guide has hardware that will be transferred to on line guide, but non crashworthy hardware drawings can be marked ARCHIVE ONLY.

Newsletter. Mauer did not see need to continue newsletter. Now we need to increase exposure and get the word out about the new TF-13 situation once it is resolved.

Future of TF. There is great interest in continuing TF13 and AASHTO affiliation is important. How much effort is required to create mission statement, bylaws, etc. What do we have that we can use?

If AASHTO and ATSSA agree to cooperate there will only be minimal formalities to create a Joint Committee. TF13 website clearly describes our purpose.

Ray: we need to formally inform Joint Committee that we no longer want the association. Then inform AASHTO and ATSSA of our intention.

Next meeting is week of October 19 in College Station October 21 for joint meeting. 22 and 23 for TF13.

AFB20 is the Research arm of TCRS. TF13 is the implementation arm.

AASHTO is reviewing their own committee structure. If we came with ATSSA to AASHTO at this time they could consider us in the restructuring.

Exec Board agrees we want to dissolve relationship with Joint Committee. But want to continue association with AASHTO.

2016 meetings? Still continue to meet with pooled fund meetings.

Friday, May 01, 2015

Drawing reviews will be set up as appointments like telephone calls. All members please schedule at least a half hour to review drawings so that we may reduce our backlog.

Affiliated Committee / Activity Reports

AASHTO SubCommittee On Bridges and Structures: Mac Ray: TF13 report was read at the meeting in Saratoga Springs, NY. SCOBS appreciates our work on the On-Line Bridge Rail Guide. That group is one of our major audiences.

AASHTO: King Gee:

1) In November AASHTO Adopted a new strategic plan in honor of their 100th anniversary. Have 16 new CEOs in the last six months.
2) Articulate the importance of transportation investment. [see on line]
3) Comprehensive review of AASHTO Committee Structure. There are 220 groups today. This committee structure was put together 50 years ago and there have been many changes in DOTs and many new private organizations that are now doing some of the same functions as AASHTO.
4) Towards Zero Deaths national strategy. Work with 7 other organizations. Every single fatality is one too many. Move beyond the slogan and get agencies to change their culture and improve safety. Looking for new partners. CDC has an effort to reduce highway fatalities.

5) TCRS: Working with FHWA on MASH timetable. We are under pressure to have a schedule for implementing MASH. Also working on updating MASH to add new cable test matrix. Want to ballot Plan and MASH in September. Also moving forward with RDG update.
6) Continuing work on Highway Safety Manual.

ATSSA Donna Clark is handling the Legislative Fly-In this week working towards a new highway bill. Current funding ends May 2015. John Durkos gave the presentation.

1) Mid year meeting in August in San Diego, August 12-15.
2) Tampa 2015, New Orleans Jan 29-Feb3, 2016, Phoenix 2017, San Antonio 2018.
3) Emerging Safety Countermeasures released in February.
4) NWZ Awareness Week March 24, 2015, Arlington, VA. Toledo Ohio April 11-15, 2016.
5) 130 meetings with House and Senate in 2014. Ongoing now April 28-29., 2015.
6) Push for reauthorization of the Highway Trust Fund. HSIP funds should be reserved for infrastructure safety projects. Pushing to require updating of safety hardware to 350 or MASH. Want guardrail installation training to be eligible under Work Zone Safety Grant. Want $1.5 million per year for Roadway Departure Safety Information Clearinghouse.
7) Numerous courses under development.
8) 24 active chapters nationwide. Public agencies are represented in 48 states.
9) ATSSA leadership program. This is an investment in yourself and your company,
10) ATSS Foundation raises scholarships for children of highway workers killed on the job. Memorial has visited 127 sites.

National Roadway Departure Safety Information Clearinghouse- Roger Bligh.

More than half of highway fatalities are due to roadway departures. Need a single site with design and hardware information. DOTs are becoming short on technical expertise as senior engineers retire. The Clearinghouse will be actively managed to locate, verify, and post new information. Goal to save lives. Goal to save time in finding information. FHWA seed money developed a detailed plan and possible content and features. Recommended a framework and architecture. Three is now a state pooled fund pooled fund project looking for states right now. Asking for $15 K for three years. (see solicitation page for link)

TRB Committee AFB20. Roadside Safety Design. Mid Year meeting will be in Chicago Sunday July12 and will end Wed July 15. Making Roadway Departure Safety a Priority. TCRS business meeting will be held Wed through Friday. Computational Mechanics meeting will be held beginning Wednesday afternoon. Sunday meetings will include both subcommittees and joint subcommittee on positive protection. Will have a session on TCRS Strategic Plan and one on pioneering MASH. Registration site is active and open now.

NACE: County engineers have to be frugal with their funding and roadside safety rarely gets addressed.

Subcommittee #9 Marketing.

It was the marketing committee's initial desire to formally disbanded due to the fact that it hasn't produced a News Letter since Winter of 2013.

Due to the upcoming changes that to be made to Taskforce 13's affiliation with AGC, ARTBA & AASHTO, and FHWA's desire develop sunset dates for 350 devices and implement MASH devices, the committee reconsider its position of disbanding. We felt it necessary for the marketing committee to communicate these changes and get a publication out as soon as possible. The next News Letter we be a summary of Kin's AASHTO's and Artimovich's FHWA TF13 presentation. Future News Letter will focus on each of the TF13's sub committees.

Potential Standardization Areas: Subcomm #8 on RXR doesn't want to compete with AREMA and may be sunset. Sucomm #10 on computational mechanics has much work to do yet. Ron Faller mentioned Vehicle to Infrastructure technology.V2I is coming, and we need to stay on top of this and follow in the future. It was also suggested I.S.P.E. methods if and when RFID tags or other data collection methods are implemented.

Technical Presentations – Recent Research in roadside safety

Mark Bush NCHRP Over 12,200 attendees at annual TRB meeting in January. Neil Pederson is new Executive Director (Formerly MD DoT director) Discussed the executive director's emphasis areas for TRB to increase value of TRB, ensure continuity and stability.

111 new projects were requested and 45 were approved for funding in FY2016. None of the 5 TCRS priority projects were selected for funding. Ask for Mark's presentation.

Dusty Arrington, Texas A&M Transportation Institute - Recent crash testing.

3 foot mounting height sign on wedge anchored support for "Wrong Way" sign. 3x3 foot sign hit the windshield but did not cause a hole.

Indiana DOT Anchored Concrete Anchor. 12 inch or less deflection using JJ hook barrier. Placed brackets on backside of barrier. Resulted in 8 inch dynamic deflection.

Sim: Buried terminal design evaluation for use with 31 inch guardrail through FEA. FEA shows compliance with Report 350.

Karla Lechtenberg MWRSF - Recent Crash Testing

Weak post MGS for use with mow strips. Used 4x4 inch tube with 9 inch soil plate in 4 inch thick asphalt. Got significant damage with 18" and 24" embed, but worked well with 30". Full Scale test used S3x5.7 posts spaced at half post spacing, 3ft 1 ½" apart just like the MGS bridge rail. Asphalt cracked up to 2.5" over a 60 foot length. Tried same thing with posts in 4"

unreinforced concrete. Veh was successfully redirected but there was some tearing of the rail when the edge of the post contacted the rail element.

Energy Absorbing concrete barrier with rubber supports. There was some wheel snag on the rubber posts. Did not affect occupant risk. Concrete barrier segments are 20 feet long an 31" high. There is a box beam rail mounted on top.

MGS Working Width for Reduced Speeds. Resulted in a table of WW for 50, 70, 100 kmh, behind curb with and without blockouts, level terrain.

All reports and many videos on mwrsf.unl.edu Tech Transfer Tab.

Karen Boodlal – KLS Engineering

NCHRP Project 15-53 Roadside Barrier Design Near Bridge Ends with Restricted Rights of Way. Reviewed tests by SWRI, TTI, and MWRSF. First testing done in 1987. Washington State and Yuma County designs were tested under NCHRP Report 230. Recent TTI test uses thrie beam and sand barrels. Only two states reported they had a single crash each in a short radius situation. Typically have 20 feet or less to work with and a 50 mph design speed.

GMU Dhafer Marzougi. Discussed Task 2 of Phase 1 of the same project. Looking at a generic design using curved MGS or using a crash cushion to shield the parapet and a cable barrier to prevent runout into river.

Cable Barrier Deflections. In NCHRP Report 711 they used FEA to study how parameters affect deflections. Max distance between anchors was 1000 m. This study went out to 1500 meter post spacing.

Assessment of impacts into trees and poles using computer simulation. Simulated 5 in, 6 in, and 7 inch diameter. 5" pass at tl1 to tl3. 6.5 inch tree fails at all three test levels. Began with wood model similar to GR posts. Then ran pendulum tests on actual tree trunks.

Toyota Camry coarse mesh model. Fine mesh model has over 2 ¼ million elements. Reduced it to less than half a million elements and will run 8 times faster.

Christine Carrigan TCRS Strategic Plan x TCRS wants input from all stakeholders. Be prepared to bring comments to the AFB20 summer meeting in Chicago. Bizouga noted that you have to address trees and utility poles to have any effect on roadside safety.

Spring 2016 will be back in Lincoln. Fall meeting will follow TTI Pooled Fund.

TF13 will not likely maintain the existing structure under the Joint Committee, but we want to stay close to AASHTO. We will survey membership. Need a State Co-Chair from a state. King Gee will work with AASHTO HQ to encourage a new state rep.

Adjourned Friday, 12:00 noon.

Brief summary of the proposed modifications to MASH2009

Page	Section	Change
11	2.1.2	TOLERANCES ON IMPACT CONDITIONS: Added paragraph on impact conditions relative to testing longitudinal barriers (eg. cable median barriers) on sloped terrain.
13	2.2.1	2.2 TEST MATRICES: Added discussion of need for testing longitudinal barriers on slopes, and the new test matrix for such testing.
14	2.2.1.2	Changed Table 2-2 to 2-2A. Added Table 2-2B for testing anywhere in the (4H:1V) median, and Table 2-2C for testing 0 to 4 feet from the slope break point (4H:1V), Table 2-2D for testing 0 to 4 feet from the slope break point (6H:1V) and Table 2-2E for testing anywhere in the median (6H:1V.)
15	2.2.1.2	Added Figure 2-2, 2-3, showing critical barrier placement. (to be added)
16	2.2.1.2.	Test 10 Add discussion of cable contact with A-Pillar. Tests 11 and 12 add discussion of primary concerns for cable barrier tests.
16	2.2.1.2	Added description of Tests 13, 14, 15, 16, 17, 18, plus discussion of critical impact points.
17	2.2.2	TERMINALS AND CRASH CUSHIONS. Removed note regarding all terminals being gating type. Added paragraph noting cable barrier terminals should still be tested on flat terrain.
37	2.3.2	IMPACT POINT FOR REDIRECTIVE DEVICES. Added discussion of how the CIP varies for rigid, semi rigid and flexible barriers. Goes into extensive detail on the primary evaluation factors for the new tests. Adds Table 2-6A Recommended post spacing for cables in median ditches.
64	3.4.2.1	INSTALLATION DETAILS. Added information on recommended installation for testing barriers on slopes.
65	3.4.2.2	Terminals and Crash Cushions: Reiterated that terminals should be tested on flat.
67	3.1.3.1	TEST INSTALLATION DOCUMENTATION. Amplified barrier placement with respect to ditches and slope break points, and other details specific to cable barriers.
69	3.4.4	TEST INSTALLATION DISPOSAL: Don't discard debris until FHWA has written the letter.
76	4.2.1	Table 4-2 revised to reflect changes in SUT and Tractor Trailer dimensions.
93	5.3	Evaluation Criteria - OCCUPANT RISK. Expands on test device contact with side windows and A- and B- pillars.

95	5.3	Discussion of deformation v intrusion when observing cable barrier contact with window and A- and B-pillars
97	5.4	POST-IMPACT VEHICULAR TRAJECTORY. Expand on discussion for cable barrier systems.
123	A2.2.1	LONGITUDINAL BARRIERS - Extensive commentary on new cable barrier tests in sloped medians.
128	A2.3	IMPACT POINT FOR REDIRECTIVE DEVICES. Added discussion of critical impact points for new cable median barrier tests.
148	A5.3	OCCUPANT RISK. Added discussion of deformation / intrusion concerns when dealing with cable barriers contacting windshield and side windows.