Joint Meeting between TTI Roadside Safety Pooled Fund and AASHTO/AGC/ARTBA Task Force 13

Wednesday, September 25, 2013

Texas A&M Transportation Institute, College Station, Texas

Roger Bligh welcomed all to the meeting and hoped everyone enjoyed the crash test. Joint meeting is designed to discuss topics of mutual interest and review different perspectives.

Will Longstreet made a presentation on proposed guidance for retrofit of Existing G4(1S) strong steel post w-beam guardrail. Bligh asked if anyone experienced settlement of posts once they have been pulled? Mark from PennDot says the maintenance crew attached a chain to a front end loader bucket and looped it around the guiderail and pulled it all up. It settled unevenly. New Jersey specified remove and reset to make sure the post had a good foundation at the new height. Only timber blocks may be raised because we do not have any experience with the bending capacity of recycled / plastic material. Roger noted that TTI has a contract with Federal Lands to look at the minimum height you can tolerate for w-beam guardrail and still have a TL-2 barrier. Artimovich offered to present this to the ATSSA Guardrail Committee Highway Hardware Task Force next month. [Editor's note: The ATSSA Highway Hardware Task Force members indicated that raising of posts in place is not a solution: the posts will sink back into the soil. This option will be removed from the FHWA guidance.]

Chiara Silvestri Dobrovolny of TTI presented the research on wood post systems and raising the blockout. FHWA $50K seed money for a study completed in June 2012 set up the framework of the clearinghouse. Looking for funding under NCHRP, TPF Pooled Fund, or Roadway Safety Foundation. FHWA supports the pooled fund concept. Bligh's report is available to anyone interested in supporting the clearinghouse.

Ron Faller presented on Cable Barrier Test Matrices. Now have funding to take to final step. Updating status just like in Lincoln with meeting with MW pooled fund group. TTI and MWRSF met with TCRS at the New Orleans meeting in July of 2013. Have developed drawings that will correspond with the tables. Test Numbers now correspond to MASH test designations. 46 foot wide ditch was determined to be the worst case for 4:1 to 4:1 ditched medians. For 6:1 situation used CarSim and LSDyna and concluded that 30 foot ditch is critical. As of now, run all tests for 4:1 in 46 foot ditch and run all tests for 6:1 in 30 foot ditch. Artimovich mentioned that SUT falling on a barrier may be considered failure, but Dave Bizuga noted that the tripped truck was prevented from incursion into opposing lanes. Consider working width of tripped truck.

Other topics of interest?

Implementation of 31” guardrail in the states? Which states have gone to 31”?

- Louisiana (Bruner) in process of developing standard. Still considering 8 v 12 inch blockouts.
- Pennsylvania noted that buried in backslope for 31” is critical to moving forward, but they are not there yet.
- Don Gripne noted NM has gone to 31” with 8” blockout. (AZ has a new standards engineer and status is unknown.)
- Caltrans at 31.
- Nevada after Jan 1 going to 31”.
- NJ will be going to 31” but have questions about bridge transitions. Also have issues with reduced post spacing to reduce deflection in front of fixed objects. [NJ uses Modified Thrie where more than 12% trucks and 60 000 adt for 4 lane divided.]
- TX DOT fully implemented with 31” with 8” blockouts. Trying to teach district offices about 31” terminals.
- Tennessee has gone to 31” with 8” blockout.
- WV is at 31”. Only question is how much has to be damaged to raise to 31”?
- Minnesota is working on 31” standards with 12” blockouts but are dealing with bridge rail transitions, too. Hasn’t met any resistance to the new systems. The fact that there is overlay tolerance when you install 31” systems is a selling point. No states are installing at other than 31”

Gripne asked why pooled fund sponsored systems can’t be posted to TF-13 and used by other states? Bligh noted that TX DOT is in favor of sharing and TTI will help facilitate.

Beginning of Task Force 13 Meeting

Wednesday September 26, 2013

Durkos welcomed members and thanked Linda Chatham and Roger Bligh for their work in arranging the meeting and venues. He showed photo from our meeting in the spring of 2003 where we witnessed a pickup crash test and took a group photo. Noted passing of Tony Scheidt with a moment of silence.

John recounted the crash test yesterday. It was unusual in that the intent was to kill the driver. He also discussed the presentations and discussions held at the joint meeting on Wednesday.

For the benefit of first time attendees, Durkos showed a timeline of crash testing criteria and TF13 standards documents. RDG references TF 13 guides and we have more work to do. We have a contract with TTI to update web site and our documents. The products we talk about have been crash tested. Each has a TF13 designator. Showed "Johnny Football" and "Johnny Guardrail" pics.

Group Dinner to be at Messina Hof at 6:30.

Thanked Karen Boodlal for help with registration and with Adobe Connect. Thanked subcommittee Co Chairs for their work. Please get your meeting minutes to Nick promptly. Please get registration in as early as possible to help with meeting logistics. CEU forms are available for those who asked for them.

Bligh moved to approve the minutes. Motion was seconded and passed.

Subcommittee #1 Publications Maintenance / TF-13 Website

In order to be worthy of TCRS we need to keep our website updated. Eric Lohrey and Chad Heimbecker have the NCHRP 20-7(328) contract. Their effort is to look at all drawing content, especially the systems. Generic systems have individual components that have drawings. Proprietary systems only have a system drawing. Contract has been underway for a year and is now in the final phase. Have had a positive response from 23 of 31 device owners. Got updated content for 61% of non proprietary devices. Have 657mb of info in 647 designator folders. Have FHWA letters for 220 of 336 systems. Hoping to get a uniform search interface across all guides. After Nov 1 when contract is done, TTI will need to incorporate Chad's data into database. There have been new products added, some deleted. There have been conflicts of ownership, along with reluctance by some manufacturers to provide info for the guide. What should we do with designators where the owner refuses to provide drawing? Chad is providing the data including gaps and TF needs to determine how we want to handle that. Some who refused said their product was only for European sales. Chad told them that AASHTO and TF-13 are used world-wide. TTI contract does not include manipulation of drawings, so manufacturers need to provide drawings in TF-13 PDF format.

Dusty Arrington noted that Phase 2 has ended and he provided a scope for Phase 3. He needs to see what Chad has done and what the Subcommittee wants before he can finalize the Phase 3 proposal. Having Review Group Leaders upload their own drawings will free TTI to work with website content. Many of Chad's drawings still need to be reviewed by TF and approved before uploading. Arrington

gave a brief review of how to log in and to use drawing review process. If you click “resubmittal and re-approval required” you need to give information in the comment box to justify your comment.

Durkos noted how important it is to be part of this review process. If TF13 is to get where it needs to go then we all need to be part of the drawing review process.

Subcommittee #2 Barrier Hardware Review Groups

There will be a wave of crash cushion and barrier terminal drawings in the near future but none are ready for review yet. La Turner and Mauthner are the Review Group Technical Representatives (Tech Reps) of those two groups respectively. When Chad submits his products, we will need to determine what has to go through review vs what can be posted directly. Durkos asked Tech Reps to set up a conference call for one hour with their members per month and review these drawings.

Lechtenberg listed 9 drawings that were reviewed and approved in Lincoln. She also showed some of the common / typical comments on the drawings. We then reviewed a number of drawings interactively, many of us online. Mauthner asked how the other reviewers would learn of the disposition of their comments. There is no feedback built into this, so it is up to the Tech Rep to inform the commentor of major actions.

Arrington can set up an on line meeting and demonstrate the functionality of any part of this drawing review. Just ask.

Subcommittee #3 Bridge Railings and Transitions – Submitted by Kurt Brauner

Roger Bligh gave an overview of the Bridge Rail Guide contents and function. Kurt Brauner solicited volunteers for the various bridge rail review groups (concrete, steel, and other).

Brauner gave an update on the activities of the Concrete Bridge Rail Working Group. He discussed progress and some issues encountered with the review of several concrete bridge rail systems. Some issues included difficulty finding photographs and FHWA eligibility information for some of these generic rails. He then presented on recent activity to finalize one of the rail systems in the guide. Finally, Brauner offered assistance to reviewers to assist with cross section drawings or other issues encountered during the review process.

Faller gave an update on the activities of the Other Bridge Rail Working Group. This group reviews bridge rails comprised of wood, aluminum or materials other than steel or concrete. The review of an aluminum rail system has been successfully completed. Faller noted that the cross section sketches contained in the guide need heavy line weights and only a few key dimensions so that they are legible as a thumbnail without having to open the drawing. There are still 9 bridge rails in the review queue (3 wood, 5 aluminum, and 1 other). The reviews of these systems are at various stages of completion. *The Midwest Roadside Safety Facility (MwRSF) agreed to review two of the wood rail systems (SBD02c and SBD04a). TTI agreed to review the remaining wood bridge rail (SBD03b). Nick Artimovich, FHWA, agreed to complete the review of one of the aluminum rails (SBA02b), and Eric Lohrey agreed to review*

SBC20b. Lastly, Faller updated the group on several bridge rail systems that he had been assigned to review which included a low-profile concrete barrier and two steel barriers mounted on timber decks.

William Williams gave an update on the activities of the Steel Bridge Rail Working Group. Williams discussed the review process and the use of a check list. It was reported that several systems are ready for final approval. Details of the review of three new steel bridge rail systems were described. The use of a 3D CAD image (e.g., Solid Works) was proposed for systems that lack a photograph if one cannot be found.

Before closing the meeting, *Bligh suggested we revise the guide language to change "Approval" to "Status" and have the following values:*

In Review
TF-13 Reviewed

Given that some rail systems in our guide have not received FHWA eligibility letters, there could be potential confusion seeing the word "approved" next to these bridge rails.

Note: *Action items for Subcommittee #3 are indicated in italics*

Subcommittee # 4 Drainage Hardware

Did not meet, but still intend to evaluate state interest in an updated guide.

Subcommittee #5 Sign and Luminaire Supports – Submitted by Eric Lohrey

There was a lengthy discussion regarding implementation of MASH, and new requirements for full-scale crash testing of breakaway hardware.

New evaluation criteria for windshield damage and occupant compartment deformation (roof crush) may present problems for some currently-accepted small sign supports. TTI Report No. 0-6363-1, Development of Guidance for Sign Design Standards, February 2012 was cited as a reference.

The subcommittee may prepare one or more research problem statements to solicit funding for additional research in this area. Potential topics include:

1. Simulation or full-scale crash testing of single-post breakaway sign supports to evaluate the effects that mounting height, sign area, post weight, and impact speed & angle have on impact performance, in order to identify problematic configurations.
2. Simulation or full-scale crash testing of multiple-post breakaway sign supports with hinges to evaluate the effects that panel stiffness, mounting height, sign area, post spacing & weight, and impact speed & angle have on impact performance, in order to identify problematic configurations.
3. In-service performance evaluations of currently-accepted breakaway supports and their applications to identify successful and potentially problematic configurations currently in use. Results could assist in comparing laboratory test results with in-service performance assessments.

The subcommittee discussed assigning technical representatives to facilitate on-going maintenance and updating of the Sign Supports and Luminaire Supports guides. Individual technical representatives are proposed for three (3) sub-categories, as follows: small sign supports (<9 lbs/ft), large sign supports (9 to 45 lbs/ft), and luminaire supports. Initial volunteers are:

Small Sign Supports:	Joe Frazzetta, Nucor Steel Marion, Inc. Kay Smith, Diversified Highway.
Large Sign supports:	Eric Lohrey, ECL Engineering, PLLC.
Luminaire Supports:	None.

The volunteer period for these technical representative positions will be open for 1 or 2 more meetings before they are assigned to allow for those not present to express interest.

There was a brief discussion on potential new standardization areas, such as: overhead sign supports, high-mast lighting supports, traffic signal supports, and barrier-mounted supports.

<u>Subcommittee #6 Work Zones</u> – Submitted by Greg Schertz

Greg Schertz and Tony Cappella chaired meeting and review the topics from the last meeting in Lincoln, NE.

Topic: Harmonizing TMA Delineation

Problem Statement was submitted to NCHRP as a Synthesis Project and was not accepted. The group proposed to bring up this issue to the MUTCD as a "shall" condition; Part 6 Work Zone chapter. The group suggested doing a literature search on the various delineation markings, as well as doing a state survey to determine why some states have used a certain delineation and why others have not.

Action Items:

- Conduct a literature search – on existing research on various markings, e.g. Emergency Vehicles Visibility and Conspicuity Study. Rick Maurer to lead group with Greg and Karen.
- Conduct a Survey of States – create a questionnaire on why states have a standard delineation and why some don't. This questionnaire will then be forwarded to AASHTO. Group Eric Smith, Kris and Donna.

Team to have a conference call on December 16th, 2013 to report status.

Topic: When do you retire a damaged portable concrete barrier?

This was a past topic in 2008 and it was sent to NCHRP in 2010 "Determine the Safety Effects of Damage to Portable Concrete Barrier and Development of Procedures to remove Inadequate Section, but the topic was not accepted. A task force was formed in the last ATTSA meeting in the Temporary Traffic Control Committee. John Durkos and Donna Clark are involved in this group as a liaison to Task Force 13. The team agreed to wait on the outcomes of this committee. Donna is to forward to ATSSA the previous problem statement developed by this TF-13 Subcommittee in 2010.

Other Discussion:

ATTSA is developing a TMA training courses that includes a section on roll ahead for TMA driver. This was a previous topic from this committee, so any volunteers to assist in developing the training.

Dusty – MASH testing for flagger stands (tripod) with a light attached for night work. Testing to be done for the lowest mounting height since it has the higher potential to strike a vehicle. Ref. NCHRP 61-43 and 66-46.

Subcommittee #7 Certification of Crash Test Facilities

Arrington discussed Film Analysis of crash tests. Need to be sure they meet impact criteria. MASH tolerances of impact conditions are tighter than were 350. Measuring speed and angle depend on identifying 'stadia' on the vehicle and observing them over 40 frames or 100 frames. Now looking at using a GPS. Proposed Inter-Laboratory Comparison on film analysis. Filmed a railroad cart that had stadia targets on it, and had orange and green lines painted on the ground at two different angles. Karla noted that they have lens corrections. All labs present supported Film Analysis as the next ILC.

Dick Zimmer from TTI discussed the ongoing ILC on TRAP. Tried this last year but bugs in TRAP caused issues. They just sent out crash data to all labs and got results from 5 so far (TTI, Karco, TRC, MWRSF, and SWRI.) Results showed that some labs used TRAP to produce all results required by MASH and EN-1317. The standard has changed from using a moving average to a digital filter. All labs go the same ASI when using TRAP 2.3.10 but there were some variations when they used their in-house methods. Really need to look into the differences and figure out what can be done to resolve them. The rest of the labs should run these data and report back.

Bob Bielenberg discussed 2013 ILC – Dataset 23-2. Pointed out their assumptions. Noted the differences and looked into why. Comparison is much better than last time, but still differences exist. Need to contact En1317 regarding their fixes needed. Then can run ILC again.

Ron Faller reviewed proposed changes to MASH. Discussed cable barrier matrix work. Other changes include soil related testing, but this would have to be under a future contract.

Will Longstreet discussed FEA and V&V. First covered FHWA's FAQs on FEA. FHWA and the rest of the world need some sort of accrediting body to agree that these people are qualified. Recommended a new TF13 subcommittee on FEA. Bullard supports this effort but thinks Subcommittee #7's plate is full. A new subcommittee is in order, but FEA labs don't all participate in TF-13. It may have to be a virtual group. TRB is not allowed to prescribe standards, only research. New FEA subcommittee could meet in conjunction with AFB20(01) Computational Mechanics the evening before the meeting, or meet during the Barrier Guide subcommittee. When we build this group and more see how this affects their livelihood, it is anticipated that participation may increase. Durkos notes we need to make a decision. Shall we have Subcommittee #9 meet jointly with TRB at their times of the year? Logistics would be difficult, but let's keep talking. Editor's note: A conference call to discuss the topic is scheduled for October 21, 2013.

Executive Board Meeting In attendance: Durkos, Artimovich, Mauer, Mauthner, Bligh, Longstreet, Schertz, Brauner, Patterson, Hare, Bullard, Lechtenberg, Lohrey, Clark, La Turner, Takach, Arrington

Topics:

- Chad's voids,
- drawings not reviewed but not in site,
- need for status of drawing review,
- next spring meeting,
- TTI Contract,
- new subcommittee 9,
- pay pal for registration.

PayPal is used for AFB20, but PayPal keeps 3 %. It would make it easier, but cost us $600 to $1000 per year. Will discuss it with TF tomorrow.

TTI Contract. Dusty needs answers to other questions about Chad's effort before TTI can finalize the Phase 3 Contract proposal.

Probably should not post a preliminary drawing on line. Could post FHWA letter and other info, but not post drawing until it was approved by TF. Each designator has a folder. Drawing and FHWA letter are in folder. So is all the other stuff submitted for that designator. We need to have something available for each designator, even if no drawing will never appear, or if it is in the TF-13 review process. When is the designator assigned? Other subcommittees want this functionality too. Dusty will talk with Chad and TTI programmers, then have conference call with us to finalize contract. Roger does not see much value in TF13 to have a place holder that just has the designator and FHWA letter. Durkos noted that RDG advertises us as the go-to place. Could still fill in grid of attributes, and only missing the drawing. At what point do we want a device to appear? FHWA Letter? Or full TF-13 drawing?

Spring 2014 will be in Lincoln week of April 14. Joint Session April 16. TF-13 will be April 17 and 18

[AFB20 will be July 13-18.] Fall 2014 will be in West Virginia.

Longstreet will have conference call on Subcommittee 9.

Friday, September 27, 2013

College Station Hilton

Reminder to all members: Please sign up with a review group and help with drawing reviews: LaTurner for Crash Cushions, Mauthner for Terminals, and Lechtenberg for Longitudinal Barriers.

Our thanks for the whole crew at TTI for a good meeting.

Durkos emphasized the need for early registration – it helps keep our costs down if we can know how many members will be present.

Donna Clark gave a presentation on ATSSA

Artimovich gave a presentation on AFB20 and TCRS annual meeting in New Orleans in July. (Please email me at nick.artimovich@dot.gov if you would like a copy of my notes from New Orleans.)

NACE will meet in April in Baton Rouge.

Marketing Subcommittee: Rick Mauer Looking for more articles for the Newsletter. John Mauthner offered to prepare an article.

New Standardization Areas: FHWA needs help in determining who is qualified to conduct finite element analysis. There will be a teleconference in October to discuss another subcommittee to address this, perhaps during TRB in January or during the AFB20 Summer Meeting. Will report back in the spring. Any other areas of standardization needed?

Problem statements may be submitted by State DOTS, TCRS, or FHWA. TCRS is one subcommittee of Subcommittee on Design.

Updates on Safety Research

Mark Bush: NCHRP Mark touched on many more projects than listed below, but these are the principal projects related to roadside hardware. Click on the Project Number to be directed to the NCHRP website for that project.

NCHRP 15-53	Roadside Design for Conflicts in Proximity to Bridge Ends and Intersecting Roadways
NCHRP 16-05	Guidelines for Cost-Effective Safety Treatments of Roadside Ditches
NCHRP 17-11(02)	Development of Clear Recovery Area Guidelines
NCHRP 17-43	Long-Term Roadside Crash Data Collection Program
NCHRP 17-54	Consideration of Roadside Features in the Highway Safety Manual

NCHRP 17-55	Guidelines for Slope Traversability
NCHRP 17-66	Evaluation of Opposite Direction Crashes and Appropriate Countermeasures
NCHRP 22-12(03)	Recommended Guidelines for the Selection of Test Levels 2 Through 5 Bridge Rails
NCHRP 22-20(02)	Design Guidelines for TL-3 through TL-5 Roadside Barrier Systems Placed on Mechanically Stabilized Earth (MSE) Retaining Walls
NCHRP 22-26	Factors Related to Serious Injury and Fatal Motorcycle Crashes with Traffic Barriers
NCHRP 22-27	Roadside Safety Analysis Program (RSAP) Update
NCHRP 22-28	Criteria for Restoration of Longitudinal Barriers, Phase II
NCHRP 22-30	In Service Evaluation of End Terminals

William Williams TTI Research:

- MASH W Beam Median Barrier – MGS with 8" Blockout. Standard w-beam guardrail failed the MASH test at 27". Passed at 31" MGS with 8" offset.
- MASH TL2 Bridge Rail 8" thick concrete deck T631 railing passed. Used weak post at 6' 3"
- Secure Mailboxes, car just drove over installation. (In multi box impact, Box hit bottom of windshield and broke inner layer.)
- Buenos Aires Barriers evaluation: New York 2 Rail, 2-tube box beam were the two most common rails on the elevated roadway.

Karla Lechtenberg MWRSF

- Low Deflection Temp Concrete Barrier (without anchoring). Typically get up to 8 feet of deflection. Could not change existing barrier except with additional material. Added bent steel cap over the joint, and added 5x5 tubes to both front and back of top of barrier. Deflection reduced to 43" all MASH criteria met. Sponsor wanted 30 inch deflection. Modeled modifications thru LS Dyna. Tried connecting tubes to barrier better. That got deflection down to 39" but barriers fractured due to their increased loading. Have reached the limit of what they could do with existing barriers.
- Breakaway steel post applications. Universal breakaway steel post was developed in bullnose project. Appears to be viable alternative to CRT posts in long spans and end terminals. Full scale crash testing will be needed.
- Guardrail to temp concrete barrier transition. Increase overlap of GR with TCBs. Key to avoid pocketing. Running a CIP sensitivity now.

Dhafer Marzoughi NCAC testing.

Now with George Mason University Center for Collision Safety and Analysis CCSA

- Mid size vehicle model development – ran nondestructive testing before vehicle was disassembled and digitized. Did speed bump testing and ditch traversal testing using a 2012 Toyota Camry.
- 1100 c pendulum nose evaluation. Did full scale crash test into instrumented pole. Then generated honeycomb assembly to provide same stiffness. Kia Reo is somewhat stiffer than 1979 VW rabbit. Now are considering bogie that could tell us something about roof crush and windshield damage.
- G9 thrie beam retrofits – Half Blockout was only one to show significant improvement.
- Evaluate G4(1S) w-beam median retrofits – 31" version works (but AASHTO recommends MGS.)
- Develop integrated vehicle model for occupant safety analysis – includes modeling of seat, steering wheel, dummy, etc.

Mark Bloschock: Gave an in depth presentation on proper Epoxy anchor installation. This guidance is the result of NCHRP Project 04-37: Report 757 Long Term Performance of Epoxy Anchors.

Kay Smith and Randall Kraft.

- Ground Connection Installations – SS-178 Tested at TTI
- Anti Graffiti Coating – has no effect on the retroreflectivity and paint can be removed from sign face.
- Retroreflectivity coating for cable used in flexible barrier systems.
- Zinc rich primer for electro-deposited coating. It is the primer that does the job.

Future Task Force 13 Meetings April 17 and 18, 2014 in Lincoln, Nebraska. In September we will meet in West Virginia.

To Do List:

Finalize the Phase 3 Contract

Each subcommittee has work to do between now and the Spring 2014 meeting

All members should sign up to the TF-13 Website and Adobe, and join a review group.

Conference Call on Subcommittee #9.

Pay Pal can be offered to those for whom a check ahead of time is a hardship.