Task Force 13
Rehoboth Beach, Delaware
September 21-22, 2009
Final Draft Minutes of December 14, 2009

To Do List:

Verify AASHTO, AGC, ARTBA metric policies for publications.

Update Website with meeting minutes and invitations as soon as TTI gets our web site up and running. Also post WZ barrier/barricade labeling and FHWA W-beam repair guide.

See Subcommittee #5 and #6 notes below for additional To Do items.

Drew Boyce of Delaware DOT and Co Chair **John Durkos** welcomed us to Rehoboth Beach. Durkos thanked Drew and Lisa for their work. Co-Chair **Pat Collins** was not able to join us.

Durkos asked about the joint meeting of TF13 and AFB20. Heard a comment that it made for a long week. Others appreciated the savings in travel costs by combining meetings that most of us go to anyway.

Had a brief discussion of logistics for meals, and individual introductions of participants. **Artimovich** reviewed the subcommittee minutes from San Antonio.

Durkos mentioned that 2010 RDG will focus on Task Force 13 web site as the location for up to date information on product specification. Our web site will be the tool that the RDG depends on to keep up to date. Participants were told to please ask questions – this product belongs to us – TF13 members are the owners and should have a product that they want.

Subcommittee #1 Publications Maintenance:

Wes Duffard of TTI, Subcommittee 1 Co-Chair and Webmaster of our site, noted that the analysis has taken longer than expected. He thanked **Roger Bligh** for getting TTI involved. Three separate websites currently involved: VDOT (original volunteer hosts of the TF-13 website), Worcester Poly (hosting the products produced by Dr. **Malcolm Ray**, P.I. for each of the four guide documents under contract), and TTI (now under contract to assimilate the original website and the guide documents.) **Duffard** demonstrated the current status of the website, showing how designators were set, and how files could be uploaded. Also showed how searches could be performed by guide, by function, or by component.

September 20, 2009 Delaware Presentation.ppt

Carl Ochoa noted that European websites do a good job of showing capabilities, limitations, etc.

Subcommittee #2 Barriers:

Subcommittee Co-Chair **Will Longstreet** showed a presentation on Subcomm 2. PDF available.

Recommends that all members log onto the site and review the drawings.

The following drawings were submitted for initial review.
SGR31 Low Profile Concrete Barrier
SER03 Low Profile Concrete Barrier End terminal
STC01 Three cable transition to BCT end terminal

SCT01: Should note for low tension systems only. **Karla Lechtenberg** took notes on this and the other drawings.

Durkos noted that the thoroughness that we have reviewed these three drawings today is the same that will be needed once these are posted on line and in-person reviews are no longer conducted at TF-13 meetings.

Reviewed the drawings that we commented on at the last meeting. Seems there are still glitches that need to be worked out. For example should a barrier that has both median and roadside versions be on one drawing? Common feeling was that SGR should be kept for roadside barriers only and SGM for median barriers only.

Subcommittee # 3 Bridge Railings and Transitions

The following notes were submitted by **Kurt Brauner** of the Louisiana Department of Transportation and Development.

Roger Bligh opened the meeting by updating the subcommittee on the status of the online bridge railing and transition guides. **Bligh** also reminded the group about the four review groups (concrete, steel, transition, and other) and invited any new members to volunteer.

Bligh then opened the online barrier rail guide and gave the group a demonstration on how to use the site to search for various rail systems. It was noted that the default search criteria is "TF 13 Approved". However, during this initial review period, this search term should be changed to "Any" or "In Development" in order to pull up the systems in need of review.

Using the search feature, **Bligh** opened a random barrier rail system and walked the subcommittee through a typical series of checks a reviewer might perform. The summary table should be accurate with all relevant data fields completed. The primary picture

should be attached and should be representative of the system. There should be at least one cross section detail with key dimensions labeled (height, width, etc.). All supplemental files should be checked to ensure that they are correct and not redundant. Finally, any hyperlinks should be verified.

Next, **Bligh** demonstrated how to submit comments using the comments feature on the site while reminding the group that comments will not immediately appear until they are approved by the site administrator. It was suggested that a conference call arranged by the working group leader might be an expedient way to complete the initial review of systems within each group.

The subcommittee suggested that drawings uploaded to the online guide should contain a "For Informational Purposes Only" stamp / disclaimer.

The subcommittee also raised the question of what to do with systems that pass NCHRP 350 but fail the MASH criteria and how would this be handled on the online guide. What test criteria should be listed and what notations should be made? This issue was referred to the AASHTO Technical Committee on Roadside Safety for advice on how to proceed. The AASHTO TCRS has referenced the guide in the update to the Roadside Design Guide that is expected to be published in 2010.

It was also suggested that the supplemental files be given file names that describe the material contained in the file. This would prevent a user from having to open every file looking for some desired information.

The subcommittee agreed that every entry in the guide have a link to the FHWA acceptance letter. However, it might be necessary to keep a copy of these letters on the TTI servers to prevent broken links due to any restructuring of the FHWA website.

Another suggestion from the subcommittee was to try and format the screen to fit into a "one screen" view with more side by side information. Also, any drawings submitted to the guide should be scaled and sized properly so as to be clear when viewed online without having to click on the drawing to open it.

With the remaining time, **Bligh** gave a quick update of recent MASH tests including the Pennsylvania W-beam transition, the Midwest Thrie beam transition, the 32" permanent concrete Jersey barrier, and the TXDOT Type 1F Bridge Rail.

And as time expired, the meeting was adjourned.

#5 Sign and Luminaire Supports

Gregg Fredrick thanked **Rick Mauer** for his service to the Subcommittee. **Mauer** noted they need drawing reviewers. The following notes were submitted by **Rick Mauer** Nucor Steel Marion Inc.:

Viewed guides on lines.
Small Sign Support Guide

- Looking for working group members to help review documents (generic) on the web site.
- Need the mfgs to review proprietary submittals on the web site.

Guide to Standardized Highway Lighting Pole Hardware (new title might be structural supports – name for new document is not final)

- Need reviewer for this manual as well.
- Need to hammer out the designators – need mythology – electrified – slip-base – etc.

Proposed meeting to review guide books the day before general Thursday / Friday meeting next taskforce meeting in Napa Valley CA. The formal meeting concept degraded down to a web-n-r. **Chad Heimbecker** offered to pull it together. Action item – need date for meeting. Mauer will put out an email to current volunteers.
Volunteers –
Joe Frazzetta - Joe.Frazzetta@nucor.com
Rick Mauer – Rick.Mauer@nucor.com
Gregg Frederick - Gregg.Fredrick@dot.state.wy.us
Matt Lupes Matt.Lupes@dot.gov
Joe Bowman Jeo.Bowman@hapco.com [is this accurate "jeo" ??]
Steve Arney Steve.Arney@hapco.com
Michael Feldberg Michael.feldberg@valmont.com
Lori Lisk LLisk@usachoice.net Franklin Industries
Greg Kirchgesker gkinchgesher@x-sqrd.com
Dean Alberson d-alberson@tamu.edu
Chad Heimbecker Cheimbecker@swiftwater-solution.com Consultant Extraordinaire

Dean Alberson suggested that we have a new area of standardization – Large Sign Supports. Large Sign Supports are considered to be 6" to 16" – 18" wide flange. No one in the room was aware of a guide for these signs.

The industry trend is that sign sizes are getting larger requiring larger sign sizes. – WY & TX are having blow down issues – cause has been fuse plate failures as well as other types of failures. TTI is working on a study for TX DOT regarding the large sign blow down issues. Transpo Industries has new software that they are promoting to design sign posts and wind loads for specific signs.

Keith Cota NH DOT - suggested another area of standardization for electrical signs. – **Matt Lupes** - FHWA commented that the MFGs are asking for approval based on "currently" 350 tested small sign support hardware. – **Dean Alberson** stated that TTI has done some testing on these devices. Any time they added mass above the center of mass (ie batteries, solar panels, etc) the rotation was slowed – thus safety was increased. FHWA commented that they require that the attachment hardware needed to be strong enough to not release. He suggested that they be added to the luminaire book.

Electrical connection and quick disconnects – Dean is going to some research on what is available.

Chad / Dean / Wes **Duffard** noted we no longer have a need for separation of the manuals. Manual were a need years ago… now with electronic searches we as publishers just need make sure there are enough search criteria available to segregate out what the user is looking for – this would eliminate the need for separate books. Book titles can be easily supplanted by a search criteria.

#6 Work Zones

- Call To order
  - Meeting called to order by Substitute Co-Chair **Barry Stephens**
  - 16 people in attendance
- Approval of previous meeting minutes
  - Minutes from fall meeting in San Antonio were reviewed and approved
- New Business
  - Reviewed mission statement & scope of subcommittee
  - New Co-chairs **Ken Smith** (myonname@netzero.net)and **Greg Schertz** (greg.schertz@fhwa.dot.gov) were unable to attend. Action item – contact these new co-chairs and inquire about their plans to attend future meetings.
  - Reviewed the following topics;
    - Most WZ devices are not covered in the Roadside Design Guide, but are instead covered on the WZ Clearinghouse web site (http://www.workzonesafety.org)
    - TRB joint subcommittee is being formed to focus on positive protection in work zones. Sponsoring TRB Committees include ABB55, AFB20 and AFH10. Jim Bryden (jbryden@nycap.rr.com) is the Chair. Dean Alberson was in attendance and serves as a member and believes the first meeting will be held in January during TRB. Action Item – those interested in volunteering should contact Jim Bryden.
    - Suggestion to drop the use of the term "Temporary" to describe roadside safety hardware for crash testing since testing is the same for all devices. At San Antonio meeting the group voted and passed a motion to suggest to the main Committee that this term be dropped except for products specifically requested by a manufacture. Action Item - **Matt Lupus** (FHWA) mentioned that he would like to investigate and do some follow-up work to address this issue.
    - ATSSA members poled but not willing to contribute $$ for testing of existing temporary sign supports to MASH. General feeling that existing devices are doing a good job. From San Antonio meeting, Sicking feels that new 2270p MASH test may be

necessary for many devices. Exception would be if no portion of the device extends about the 2270p hood.

- Discussed idea of generating standards for inertial barrel arrays (sand barrels).
  - Standard barrel sizes (200, 400, 700, 1400, 2100)
  - Sand CG height - min.-max. windows for each barrel type
  - Recommended sand (ASTM C-33)
  - In cold climates add rock salt to sand to prevent freezing
  - Address intermixing of brands
  - Address use of elevating pallets
  - Address use on elevated curbs or islands.
  - After good discussion, concluded is that the sand barrel manufactures already embraced most of the above items and the need for an official standard is not high. Recommendation of the group was to table this until a higher need could be established.

- Open question was discussed on the need for new WZ device standards. None were brought forth during the breakout, but see "action-item" below.
- Adjourned this breakout group at approximately 2:00
- Action Item (added topic tied to whole-group TF-13 discussion) – Consider developing a standard covering Portable Concreter Barriers (PCBs) – shape, steel reinforcing, connections, lift points, attachments for accessory items, etc. **Dick McGinnis** (Bucknell University) is working on a synthesis research project to identify the types of PCB used on the NHS. Review this topic during the next WZ subcommittee meeting in Spring 2010.

#7 Certification of Test Facilities

Jeff Shewmaker and Kelsey Chiu are the Co-Chairs. Chiu provided the following notes:

- TTI Accreditation Presentation by Lance Bullard (standing in for Gene Buth)
  - Presentation of TTI's experience with ISO 17025 Accreditation.
    - Explanation of what ISO 17025 is and what it meant to the operation of TTI's facility.
    - [Editor's note: As of September 24, 2009, all the laboratories submitting crash tests for FHWA acceptance must be accredited.]
- Lab Accreditation Status
  - MWRSF in progress ('09 – '10)
  - TRC in progress ('09 – '10)

- Southwest Research Institute in progress
- Safe Technologies, E-Tech, TTI, KARCO finished.

- TRAP Update presented by Roger Bligh of TTI
  - THIV calculation issues
  - New MASH criteria will be addressed in the new TRAP
  - Seeking input from the users of TRAP for improvements that could be useful.
  - Seeking funding for the TRAP update.
    - Possibly from FHWA, or a pool fund from the labs or users of the TRAP software.
    - FHWA has apparently agreed to fund the update.

- Interlaboratory Comparison
  - Data set being prepared
  - Will be emailed in the next few weeks to be processed within a month.
  - Overseas labs have thus far not shown an interest in participating.
    - Will be contacted in the near future for the ILC requirements

- MASH Soil Strength performance test presentation by John LaTurner of E-Tech
  - Several labs have explored this area already
  - Presentation
    - Description of MASH test requirements including setup and results
    - Minimum load per deflection requirement
    - ASTM D2166 Compressive strength test for native soils
    - ASTM D248 classification for both native and fill soils
  - Dr. Ochoa (of Vista Engineering) has researched other factors that can affect the post strength, which includes how cables are tensioned
  - Lance Bullard (of TTI) has also seen material specifications being a factor.

- European Testing presented by Jeff Shewmaker of Safe Technologies
  - EN-1317 testing
    - Must be an EU Notified Laboratory to perform the test
  - SafeTech is now an EU Notified Laboratory

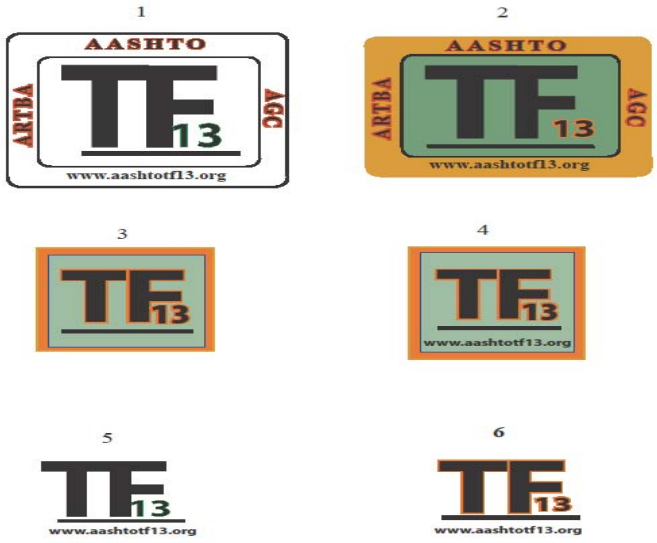
- Requirements do not take effect until 2011

John Durkos reminded all co-chairs to get their minutes to your secretary.

Marketing Subcommittee

Andy Artar said this was a timely meeting as the website will be going live in the near future. Plan to develop a logo and a newsletter. **Donna Clark** and the ATSSA marketing group put together some logos for our consideration. Some logos incorporated ARTBA, AGC, and AASHTO. Agreed that the web site address should be present. The six logos shown here were drafted by the Subcommittee for the Task Force's consideration:

Let's Vote



Members voted on the above logos and the results were:

#1 9
#2 zero
#3 2
#4 11
#5 4
#6 16

Mary McDonough also offered that FHWA marketing could generate additional suggestions. **Artar** also showed a meeting flyer that would go out with a newsletter. **Dave Lewis** generated the newsletter idea, and we could use it to publicize our meetings. Post it on our website and on various association websites, distribute at trade shows, mail to customers, etc. Frequency? Distribution method? Accept ads? Cost for ads? Many questions still remain but the concept of a newsletter was agreeable to the membership.

It was agreed that we should post the registration form on the website so that folks could register on line.

Mary McDonough gave a presentation on the FHWA Office of Safety Design and their responsibilities.

Executive Board Meeting

Durkos, Longstreet, Fredrick, Bligh, McDonnell, Brauner, Stephens, Cota, Takach, Butler, Artar, Shewmaker, Chiu, Hare, Patterson.

Topics:
Website issues from Wes:
Durkos noted that what we heard from **Duffard** is exciting to the TF and we are very pleased that the TTI team is on the job. Question about designators: products that are both median and roadside barriers should have two separate designators. Different height systems would have the same designator

Can we allow manufacturer to assign designators? Should FHWA assign them? Where is the most forward point? Currently **Longstreet** and **Takach**, TF13 authorized users, may set designators. Other 'attributes' need to be captured during the approval process. Subcommittee co-chairs should be the authorized user that can set designators and attributes. FHWA could assign designator and have submitter add it to the drawing prior to the drawing being posted.

Suffixes show inconsistency. When designators go 01a through 01f the database ought to assign 01a, 01b, 01c, etc., but all point to the same drawing.

Web site should also include WZ committee created labeling for longitudinal channelizers and the FHWA booklet on W-Beam Guardrail Repair.

Durkos noted that the drawing templates need to be posted. Old minutes need to be posted. Info for next spring meeting should be included as soon as possible.

Spring meeting with AFB20 in NAPA. Marriott: **Stephens** showed costs which show $84 for room rate and costs for food that are not outrageous. Need to know food costs when you add taxes and gratuities.

Did not discuss the following in great detail: Roadside Design Guide; Logo; Get minutes posted; Post info on upcoming meetings; Systems meeting 350 failing MASH

Tuesday, September 22, 2009

Durkos welcomed AASHTO TCRS members.

Lance Bullard moved to adopt the minutes, **Bob Takach** seconded. All approved.

Asked for opinion of last night's dinner. All agreed that Victoria's was an excellent restaurant. **Durkos** noted that an evening get-together is a big advantage.

Chuck Niessner presented an update of the roadside safety related National Cooperative Highway Research Program projects. If this works as planned, you can click on the blue underlined project numbers below and be linked to the TRB site for that project.

NCHRP 16-05 Guidelines for Cost-Effective Safety Treatments of Roadside Ditches
17-11(2) Revising lateral encroachment relationships
RFP Issued

NCHRP 17-22 Identification of Vehicular Impact Conditions Associated with Serious Ran-Off-Road Crashes
Draft final report being revised.

NCHRP 17-43 Long-Term Roadside Crash Data Collection Program
Will pay NHTSA data collectors to get more roadway and roadside data as they are at a crash site. Proposals received.

NCHRP 17-44 Factors Contributing to Median Encroachments and Cross-Median Crashes
Literature review and survey underway.

NCHRP 20-07/Task 257 Crash Tested Precast Concrete Barrier Designs and Anchoring Methods
Preparing draft final report.

NCHRP 22-14(03)Evaluation of Existing Roadside Safety Hardware Using Updated Criteria
Completed crash tests. Compiling final report.

NCHRP 22-20 Design of Roadside Barrier Systems Placed on MSE Retaining Walls
Draft final report received.

NCHRP 22-20(02) Design Guidelines for TL-3 through TL-5 Roadside Barrier Systems Placed on Mechanically Stabilized Earth (MSE) Retaining Walls
RFP issued

NCHRP 22-21 Median Cross-Section Design for Rural Divided Highways
Drafting final report

NCHRP 22-22 Placement of Traffic Barriers on Roadside and Median Slopes
Developed finite element models. (rigid and semi rigid)

NCHRP 22-23 Criteria for Restoration of Longitudinal Barriers
Preliminary draft final report being reviewed by project panel.

NCHRP 22-24 Guidelines for Verification and Validation of Crash Simulations Used in Roadside Safety Applications
Finalizing guidelines.

NCHRP 22-25Development of Guidance for the Selection, Use, and Maintenance of Cable Barrier Systems
Draft outline for guidelines submitted for panel review.

NCHRP 22-26Factors Related to Serious Injury and Fatal Motorcycle Crashes with Traffic Barriers
Conducting literature review on MC crashes.

NCHRP 22-27Roadside Safety Analysis Program (RSAP) Update
RSAP survey distributed.

Affiliated Committee Reports

AASHTO Subcommittee on Bridges and Structures

Gregg Frederick noted presentations by Roger **Bligh** and Dean **Sicking** on MASH implications were well received by Bridge Railing subcommittee.
Need to look into pier protection, pier design, barrier design.
Invited researchers to show bridge rail crash testing to Spring Meeting in Sacramento.
Upcoming NCHRP Project: Sign and Luminaire specs will be updated to LRFD specs.

Technical Committee on hydraulics and hydrology – plans to attend next meeting and explain TF-13 and ask for participation in our Subcommittee #4.

We need to educate Bridges and Structures people why 32" Jersey Barrier failed and what the implications are for the future. **Bloschock** noted that a number of states use TL-4 bridges. AASHTO has left this to the states to decide. **Jiten Soneji** said that the subcommittee's main concern was what height of jersey barrier would pass? Sicking noted that possibly 34 would pass…

AASHTO

Jim McDonnell received printer's proof of MASH. [Editor's note: MASH has been published. FHWA recognizes October 15, 2009, as the date it became available. All crash test matrices of new and redesigned roadside hardware begun after that date are to follow MASH) Has PPT.

Noted dramatic drop of highway fatalities. MC fatal crashes are still going up.

AASHTO Highway Safety Manual is almost complete. Expected publication in Jan 2010.

RDG new edition to be balloted in 2010 with publication in early 2011. Will include new local roads chapter recognizes money not available for 30 foot clear zones on miles of local roads. Urban area chapter updated. Coordinated wording on clear zone issue.

RSAP update scheduled to be done with new RDG.

RDG will go to SCOD in Fall/Spring.

Handed out copies of comparison between 350 and MASH, and the Implementation Plan. Went over implementation plan in detail.

Authorization of new Federal Transportation Bill.

ATSSA

Donna Clark. Add PPT

The ATSSA Guardrail Committee looking for more contractor members. Its Task Force on Hardware Issues has worked closely with FHWA on development of guardrail FAQs. Working on the development of Guardrail Installer Training (GIT) certification program. Discussed GIT and Longitudinal Barrier Systems Training. Have a GIT Certification Program. Have a model training specification.

Webinars: End Treatments Targeted to be presented in December. [Editors note: it was later determined this Webinar will be presented February 25, 2010.] Remaining yet are Crash Cushions, Other Barriers, re-do Cable Barriers.

FHWA Highway Safety Grant, have scheduled some 600 courses over 3 years, one year to go.

ATSSA efforts to reauthorization "Toward Zero Deaths." Also advocating HR 3355 for Older Drivers and Pedestrians, High Risk Rural Roads, meeting lots of people on Capitol Hill.

40th Anniversary ATSSA Expo in San Antonio February 15-20.

Durkos asked **Bloschock** to discuss concrete barrier standardization. Bloschock noted the variety of precast barrier segments in casting yards. Standardization would be a great way to save money, connections, weights, lengths.

Durkos noted that we are more 'cataloging' hardware, but in this issue of concrete barrier we have a potential for real standardization. Asked **Stephens** to take this back to the Work Zone Subcommittee.

Discussed AU and NZ requirement of TL-4 portable barriers. Since there is no Report 350 accepted TL4 concrete barrier system we are not in a position to specify it.

Durkos summarized Executive Board meeting, especially discussion with **Wes Duffard.**

Spring 2010 meeting in Napa Valley, CA, in conjunction with AFB20. Looking at May 17 to May 21 for our joint meeting.

Albin agreed that AFB20 joint meeting was successful in San Antonio.
May be able to end AFB20 at noon on Wednesday, and TF-13 go for the next day and a half.

Technical Presentations:

Karla Lechtenberg: Crash Testing at Midwest Roadside Safety Facility
PPT with extensive test videos is on file.
MASH testing of WZ sign stands.
Tested with 2270P and 1100C vehicles. Rigid sign panels hit at 90 degrees destroy the windshield.

MGS compatible W-beam Bridge Railing – Rural roads, low cost design, use on longer than 25 ft bridges. Side mounted post, in socket. Half post spacing. No blockouts. Mounted to the edge of an 8 inch thick deck. Dynamic deflection was 40 inches with test 3-11. Sockets were reusable except 2. Used standard weak post guardrail bolt.

NYDOT Pinned PCB. 32 inch Jersey. 20 feet long. Anchored with 4 un-threaded rods on back side. Just barely passed. 9 inch dynamic deflection.

Dean Alberson: Texas Transportation Institute:
Alberson brought forward a proposal "should NCHRP Report 350 Test 3-39 – Reverse Direction, be supplemented with the small car test for cable barrier systems? Under MASH is test 3-37 impact location moved to contact rigid backup devices. Test of small car on w-beam and cable terminals show that small car test may be more critical. If the impact location with small car is at the point where the greatest deflection would be expected you will find the worst case performance.

Bloschock, NTTA: Slip Forming of Concrete Barriers
PPT Available
Test houses cast barriers in place with full vibration, etc. But what really happens out there in the real world? Slipforming reduces the cost of constructing concrete barriers by 8 to 12 dollars per linear foot. Showed improved brush work with just a little extra effort. Can then leave barrier unpainted [even when concrete is painted, it will evolve to a partially un-painted wall in a few years]. He was able to examine some slipformed barriers that had been cut and removed from a reconstruction project. Careful examination showed little difference in damage between cast in place and slipformed.

When you use curing compound the paint does not stick. Slipforming takes a lot of work to get a good product but it can be done. Requires ultra-high level of inspection.

Ochoa Importance of Mathematical Models for FEA.
PPT Available.
Reviewed the ASME validation method. V&V 10 2006 Guide for Verification and Validation in Computational Solid Mechanics. 1. Path from C&M models to comp. Models. 2. Role of C&M models in V&V of FE models. Shows ASME guide does not allow building models from experimental data.

Tuesday, September 22, 2009, afternoon in conjunction with AASHTO Technical Committee on Roadside Safety

Re-introduced ourselves, including TCRS.

Topic #1 Cable barrier placement. This is based on Ron Faller's recollection of the discussion of where you should test if you want to verify performance of crashworthy cable barrier systems on 1:4 sloped medians.

Scenario No. 1 – barrier may be placed anywhere in the median
Test 1A – 2270P vehicle impacting cable barrier placed between 12 to 13 ft from slope break point on foreslope using a 46 foot wide ditch based upon what ditch width shows to provide the worst case (most critical evaluation) in MwRSF crash testing program. Later crash testing evaluations would use one ditch width for this 2270P test from that time forward.
Test 1B – 2270P vehicle impacting cable barrier placed between 12 to 13 ft from slope break point on foreslope using a 30 ft ditch width based upon what ditch width shows to provide the worst case (most critical evaluation) in MwRSF crash testing program. Later crash testing evaluations would use one ditch width for this 2270P test from that time forward.

Test 2 – 1100C vehicle impacting cable barrier 4 ft up the back slope from the ditch bottom using 46 ft ditch width – soft soil condition - TBD
Test 3 – 1100C vehicle impacting cable barrier 4 ft up the back slope from the ditch bottom using 46 ft ditch width – strong/hard soil condition similar to 350 soil condition and compaction
Test 4 – 1100C vehicle impacting cable barrier 4 ft down the back slope from the back-side slope break point using 46 ft ditch width – strong/hard soil condition similar to 350 soil condition and compaction

Dean Sicking recounted the four or five tests that would allow a cable barrier to be placed anywhere on a 1:4 to 1:4 ditch.

Mauer: we should not be trying to catch a vehicle in the air. We have gone beyond the rational for crash testing. **Mauer** believes the 1:4 to 1:4 slope should be shielded by barrier on both sides.

Sicking noted MASH still requires flat ground testing. Worst Case Scenario ditch testing should be represented by that matrix.

Mauer noted most impacts at shallower angles will contact cables high up on the vehicle that will damage the a-pillar and windshield damage and roof crush.

Sicking - seems middle and lower cables are causing the problem of damage to upper part of the vehicle.

Mauer believes a test at shallower angle is necessary to evaluate the a-pillar cutting problem.

Sicking said they most often see it in high angle hits. Most failures are penetrations on moderate slopes. Also a preponderance of mini vans going through the cables.

Richard Butler noted Brifen was first to do slope testing. Why place cable in the worst place on the median and risk failure? Brifen is placed 4 ft from the break point.

Contractor sees consistent violations at drainage, and 1:4 at superelevations.

Faulkenbury of Gibraltar agrees with Brifen that you should capture vehicles early.

Butler says everyone should test to MASH for consistency.

Takach agrees that placing cable system at optimum location is best.

Mauer agrees that barrier should place system at optimum location but states are placing them anywhere in the ditch.

Albin: States need flexibility to locate a barrier anywhere on the median. Placing it 4 ft from the break point will place it closer to one side of the roadway and result in more impacts.

Sicking: doesn't see evidence in crash records that placement closer to the middle leads to worse performance.

Artar believes cables on both sides is preferable. Did MASH testing and got high deflections.

Bligh says we may loosing sight of what we are trying to do. In the event a state DOT wanted a system that was crash worthy anywhere on a slope we need to have a test matrix to accommodate that.

Durkos asked state people if they were going to place two runs or one.

Steve Walker said that Alabama placed 6 miles of 1: 4 CASS but they regraded slopes to 1:6. Would prefer to have a system that would allow them to use a single system. Sometimes 'forced' to place cable in locations that are not crash tested.

Rory Meza: put in over 400 miles of cable median barriers in Texas., 12 ft from travel lane for deflection purposes. Have had many, many more captures than failures. See many hits where vehicle crosses ditch and hits from the back side. They are capturing vast majority of hits. But TX DOT does need the flexibility to place barrier anywhere.

Meza is also chair of NCHRP Project Panel 22-25 (see above for link) and hope to put out that guidance at the end of the year. Use 20 foot spacing, but asking if closer spacing is more appropriate. Typical run is 1000 to 2000 feet but some are 7 miles long. Do not expect manufacturers to say that these long systems will only have 8 ft deflection. Most barrier has mow strip that doubles cost of barrier installation.

Bernie Clocksin of South Dakota says they use low tension cable and like the flexibility

Sicking was working with MO DOT for years. Most was low tension. Did not see a significant difference in crashes between low tension in center of vee ditch to high tension placed just off the break point.

Butler says we should agree to a matrix and other details. Does the whole run need to be in the ditch?

Cota: medians less than 50 feet need protection, comes down to cost effective approach. Agrees dual cables or dual w-beam would do a better job but increase the number of hits. Prefer to use a single line of barrier. Has not used cable because of some of the uncertainty heard here.

Dhafer Marzoughi under the 22-25 project looked at engagement of vehicle on different slopes and different ditch configurations. Should also consider vehicles going between barriers. This should use the mid size sedan. Same size, greater mass. Need to analyze using vehicle handling models to find the impact point that will find the two cables that have the max vertical spacing. Project will advise placement, not include guidance on testing criteria. Low tension systems need contact with two cables, high tension cable may get away with only one cable. Have looked at one system from each manufacturer.

What is worst case ditch? UNL is looking for funding to conduct the 30 foot ditch test.

Marzoughi noted that they have not looked at penetration through the cables. **Bligh** hadn't noted it as a problem, but it bears examination.

Albin noted that fewer penetrations with high tension systems may result from improved location and placement of barriers.

Cota noted that formal guidance on testing is MASH and responsibility of TCRS. In order to change MASH to accommodate this would take over a year. Heard that there is an immediate need for this guidance and may consider an addendum to MASH. New

Hampshire is looking into cable barriers in medians but are aware of changes in MASH and favor the newer test criteria.

Butler believes FHWA needs to make a statement about testing under 350 or MASH.

Sicking says MASH allows variations. Should test one or more systems to the new matrix and once we are happy with it adopt it as a provisional matrix.

TCRS will discuss this later in the week.

Durkos discussed the increase in documentation needed in MASH report. **Artimovich** noted that this was for info to be included in the test report - FHWA does not necessarily need this level of detail.

Jeff Shewmaker asked if he was required to submit failures to FHWA. The answer was no.

Topic #2 Open discussion on 350 testing vs MASH tested devices.

Durkos asked if he should test his products to MASH. What are other manufacturers planning to do? RSI has no accelerated plans to test to MASH in October. Watching for trends in the states before he jumps into MASH testing.

Until it is unprofitable to have only MASH devices, no reason to re test to MASH. New products as they are introduced will meet MASH and will eventually overcome 350 products. MASH is an improvement in some ways but not in every way. No reason to go out and redesign to MASH. A lot of manufacturers have taken a long time to develop devices meeting 350 and do not want to redesign and test them.

Durkos: At what point does a state decide to require all-MASH tested devices?
Cota: We don't know what point that will be yet. However they are looking at their specs and need to review the 350 references and add MASH. Will do this again in 5 years and may very well convert to MASH.

Artimovich asked if in 5, 8, or 10 years we see enough MASH tested devices that AASHTO will call for all MASH devices. Keith agreed that AASHTO will monitor this and may ask to modify the Implementation Plan.

David Nicol noted a state could decide that they wanted to use a MASH device, if it more closely matches their vehicle fleet, they can make a case to justify it.

Steve **Walker**: Alabama did not allow 70 mph attenuators until there were more than one manufacturer.

Soneji asked if state could specify MASH product even though there are multiple products meeting 350? PA and DE require a 20 day public announcement prior to using proprietary products. **Nicol** noted no such Federal requirement.

Does a proprietary process have the same restrictions as a proprietary product? Should not be a problem as 23CFR has restrictions on proprietary product.

Topic #3 Roadside Design Guide

May be balloted by TCRS this week. AASHTO Balloting in 2010. Publication in 2011.

Durkos explained TF-13 40-year history. Making a major change now by placing the drawings on line and being accessible in the Roadside Design Guide. Any discussion from the states on this partnering?

Cota noted that TCRS is more complimentary. This allows a more up to date source of information for the users. This comes at an opportune time for inclusion of TF-13 links into the RDG. TCRS commends TF-13 for their efforts.

Gregg **Frederick** asked if web links will change with switch to TTI? **Durkos** noted that all links in RDG should point to www.aashtotf13.org

TF13 is the group responsible for compiling the drawings, not design.

What are the hot topics in the RDG?

Incorporating new research, update to urban chapter, low volume roads chapter. Not much change in Median chapter.

What happened to appendices?

Some appendices with drawings will be dropped – reference will be directly to TF-13 web site.

Are FHWA Acceptance Letters going to continue being referenced?

RDG will reference both TF-13 and FHWA Acceptance Letters you can go to for information.

Artimovich noted that FHWA web site update is complete and adding new acceptance letters should be done in a timelier manner. However, the loss of Matt **Lupes** from our team to another assignment will leave the Office of Safey shorthanded and likely lead to increased review time needed for the foreseeable future.

Cota noted that Fall 2010 meeting will be in Kansas City, Missouri. Likely to be in September.

Durkos thanked Greg **Frederick** for his help with registration. Thanked Drew **Boyce** and **Lisa** and others at DelDot for setting up this meeting that went so smoothly.

The meeting adjourned at approximately 4:00 p.m.

Respectfully submitted, Nicholas Artimovich, Secretary, Task Force 13