AASHTO AGC ARTBA TASK FORCE 13
May 5 & 6, 2008, HERSHEY PENNSYLVANIA

To Do List

1. ATSSA has approved the proposed labeling for Longitudinal Channelizing Barricades developed by TF13. This should be added to our website.
2. Roger Bligh to check TTI's IT personnel to find a candidate for the co-chair position for the Publications Maintenance committee.
3. Barry Stephens to develop a problem statement on current use of reduced-offset guardrail systems to submit to Artimovich for FHWA funding and to NCHRP for a 20-7 project.
4. Low Maintenance Attenuator designation by FHWA should be coordinated with the AASHTO TCRS for consideration in the Roadside Design Guide update.

Sunday, May 04, 2008

Will Longstreet hosted a dinner meeting to discuss the progress of the Barrier Guide, Mac Ray's work, and the drawing approval process. About 12 Task Force members participated.

Monday, May 05, 2008

Introduction: Co-Chair **Pat Collins** welcomed all to Hershey, and thanked Co-Chair **John Durkos** and his family's Registration team. He also recognized **Will Longstreet** of PennDot who made the arrangements for the meeting. **Collins** discussed state DOT budgets and shortfalls compared to what their needs are. Many states are loosing funding, while others are just treading water. The good news is that we are all here for a day and a half.

Approximately 15 attendees raised their hand when asked who was here for the first time. **Collins** thanked the newcomers for their interest in the Task Force. We come here to share our stories, but we have a series of hardware guides to work on and get published which is the focus of the Task Force's charter. The individual introductions show the great mix of people that we have in one spot to exchange information – manufacturers, contractors, researchers, state and federal DOT engineers and others.

Collins asked for adoption of the minutes of the Fall 2007 meeting in Seattle, but noted a change needed from canalization to channelization. The minutes were approved with that note. The link to our minutes on the web site is:
http://www.aashtotf13.org/pdf/SeatlleTF_13_Minutes.pdf

Task Force Secretary **Nick Artimovich** reviewed the activities of the 8 subcommittees and their publications from our last meeting in Seattle, Washington.

SubComm#1 Publications Maintenance

Ali Atahan of Worcester (Mass.) Polytechnic Institute presented the work of **Mac Ray** (did not attend) on the standardized formats for the hardware guides.

Co Chair **Divyang Pathak** of PennDot is looking for an industry co-chair.

Pathak reviewed their mission statement: Goal is standardized format for electronic publications that advances with technology improvements. Publications may be seen at the work-in-progress page on our website. The ProBoards link is:
http://barrierguide.proboards31.com

Members need to access the proboards site anytime a drawing is updated, and review it. It is proposed that all of the Task Force's publications be posted on the same site and available for review and use.

Access to SharePoint seems to be easier to use than ProBoards. Here is a link to the proposed SharePoint software. The username and password are included in the email that distributed these minutes.
https://ttiresearcher.tamu.edu/demo

SubComm#2 Barrier Hardware

Co-Chairs: Will Longstreet of PennDot and Bob Takach of Trinity Industries

The focus of the Barrier Hardware subcommittee is the development and revisions to the Guide to Standardized Highway Barrier Hardware (see current version at http://aashtotf13.tamu.edu)

Barry Stephens, Co-Chair of the Work Zone SubComm, went thru the drawings of various work zone barriers to be added to the Barrier Guide. **Longstreet** took comments.

Longstreet recounted the Seattle discussions and approvals. A number of drawings were sent back to the owners for corrections/changes. He also discussed a revision to the SubComms mission statement.

Longstreet then went through the roadside barrier drawings that were ready for voting, noting the various comments that were made and incorporated. Some minor editorial comments were noted that will be corrected before voting on SET03.

Durkos suggested that guardrail be marked so that the radius can be identified in the field. Some use a paper tag for shipping only. If it was hit, a maintenance crew would have to measure the radius. Some states would reject it if there were any markings on the rail. Does not seem to be much potential for coordination, here.

Also discussed RTM07, PTE06-07, SGR28, which will be returned for corrections and then brought before the Task Force in Savannah for approval. The Task Force then discussed PDB13 and PDE17 which will also be revised and re-voted.

Longstreet then covered the use of the ProBoards site. Our current wording on the website shows drawings as "not approved" which is causing some confusion. The devices HAVE been accepted by FHWA but the drawings themselves have not been approved by Task Force 13. A watermark indicating the draft status of the drawing may be appropriate.

SubComm#3 Bridge Railings and Transitions
Co-Chairs Roger Bligh and ?

The meeting was called to order by **Roger Bligh** and he informed the committee that the online guide for bridge railings was active and 113 railing systems have been uploaded to the site. These railings need to be reviewed and verified prior to approving them for use. A comment was made that a more obvious "watermark" should be placed on the drawings to indicate that they have not been officially *approved* by the Task Force even though the hardware may have been *accepted* by the FHWA.

Bligh also mentioned that the site has an area for the transition details but they have not yet been uploaded.

The discussion then turned to "how" to review the various drawings and details. **Bligh** suggested that the drawings could be reviewed using the online guide's comment field which is capable of archiving comments and suggestions. There was a brief discussion about site security and the need for a user verification feature.

Bligh then suggested that the committee form smaller, working groups and the 113 drawings be divided among these groups based on the rail's material type (concrete, wood, steel, etc.) Each working group would have a leader who could then report on their group's progress at the next Task Force 13 meeting. A sign-up list was passed around for the committee members to volunteer for the various groups.

Following this, the committee discussed "what" to review. The committee agreed to verify that the drawings were consistent with regards to materials, notes, hardware references, etc. Photos and links to the FHWA acceptance letter should also be verified. Again, any comments can be made in the site's comment field and attachments can be sent to the site's administrator using a provided e-mail link.

The committee then briefly discussed the need for a "voting feature" on the site to record the group's concurrence that the drawing was acceptable.

A link between the barrier rails and their compatible transition details was desired once both databases are populated.

Finally, **Bligh** encouraged the committee to go to the new online guide, test it out, and give feedback on the format, layout, etc. before things get finalized.

SubComm#4 Drainage Hardware
Co-Chair Nathan Paul
Did not meet as it typically meets in the Fall.

SubComm#5 Sign and Luminaire Supports.

Co-Chairs: Gregg Fredrick of Wyoming DOT and Mike Stenko of Transpo Ind**.**

Reviewed Minutes from last meeting. **Lance Bullard** asked that the minutes to be approved, Seconded by **Dean Alberson.**

Malcolm Ray was to give an update on the website. **Ray** was unable to attend, his colleague **Ali Atahan** made the presentation in his absence.
The guide is located at the following web site:
http://civil-ws2.wpi.edu/Documents/Roadsafe/Guides
(Make sure that you capitalize the D, R, and G)

Ray would appreciate any comments directly at MHRay@wpi.edu

We were encouraged to go to the site to review the current submissions.
Website is still in progress and needs to have some links completed.
We can markup drawings and send them as attachments.

Open Discussion
Dean Alberson stated that TTI had tested the TX DOT standard round pipe slip base with the Dodge Ram pickup to the MASH standards. The test article support was a single round post with a sign mounted 7ft bottom mounting height, 10ft top of support. The system passed with little roof deformation.

New mandates in the Manual on Uniform Traffic Control Devices coming up in 2013 are that all sign supports within the clear zone on all roads need to crash worthy. There was debate on weather it was all roadway or weather it was just roadway over 45 or 50mph that must comply. [Editor's note. The MUTCD requires that existing sign supports on roadways with posted speeds of 50 mph or higher be retrofit with breakaway supports by January 17, 2013, if not already breakaway. There is no deadline for compliance on roads posted at 45 mph or less but all new or retrofit installations within the clear zone shall use breakaway supports. For these lower speed roads, FHWA Office of Safety recommends that owners include an inventory and upgrading of their sign supports at the same time they comply with the MUTCD Retroreflectivity requirements.]

Notes submitted By **Rick Mauer** Nucor Steel Marion Inc.

SubComm#6 Work Zone Hardware

Co Chairs Barry Stephens of Energy Absorption

Barry Stephens gave a presentation on the End of Service Life of wz devices. Portable Concrete Barriers are subject to significant wear and tear on and off the job site, and uniform guidance on when they should be converted to artificial reefs at the ocean's bottom is needed. The subcommittee agreed to develop a problem statement for PCB that are acceptable, marginal, and unacceptable for submission to FHWA and NCHRP for 20-7 or other funding
What other devices need standardization? Work zone lighting? LCBs? Use warrants for LCBs?
ATSSA has approved the proposed labeling for Longitudinal Channelizing Barricades developed by TF13. These need to be added to the TF13 web site.

SubComm#7 Certification of Test Facilities

Co-Chairs John LaTurner – Etech Testing Services and Jeff Shewmaker – Safe Technologies, Inc

Minutes

John **LaTurner** presented a historical overview of the SC7 sub-committees activities concerning laboratory accreditation.

There was discussion and a presentation about a data processing methodology and/or "smell test" when working with data sets. Sample data sets were examined to illustrate the concerns.

A flow chart to accreditation was discussed including the associated time lines and costs.

At the start of the accreditation process, each laboratory will publish a Quality Policy Manual with a hierarchy of supporting procedures, forms, checklists and worksheets.

Real world assessor deficiency reports from internal audits and accreditation renewal audits were discussed. The mitigation process was discussed for addressing the deficiencies. The management review process was discussed as well as the test procedure audit.

This lead into a discussion about "Is accreditation worth it?" The consensus of the group seems to agree that it is worth it and all labs will improve their operations at some level.

A sample of the different laboratory Quality policy Statements were shown.

Nick **Artimovich** then updated the group on the FHWA's progress in requiring all labs to be accredited by October 24, 2009.

Marketing SubComm. **Andy Artar** noted that steel costs had a 50 percent increase in flat rolled and long products since last year. (Long products are made of either blooms or billets, which are, like slabs, considered a semifinished product and are cast by a continuous caster or rolled at a blooming mill.) Looking to 30 to 40 percent increase again this year. One of the major reasons is lack of imports, but lots of exports. This leaves a shortage. Add the increase in energy and transportation costs and you don't get a leveling of prices until later this year.

New products for standardization? Reduced offset guardrail systems. Exec Comm will look at them.

FHWA Issues. Artimovich and **Lupes** made brief presentations on the following topics:

FHWA Rulemaking requiring accreditation for crash test laboratories. The labs have until October 24, 2009, to achieve accreditation for their facilities if the tests are to be submitted for FHWA review.

Manual for Assessing Safety Hardware – 2008 Voting nearly done by AASHTO Subcommittees on Design, Maintenance, and Bridges and Structures. Next step is approval by AASHTO Standing Committee on Highways and FHWA approval of Draft Implementation Plan).

FHWA Website – numerous acceptance letters were posted recently, and website will undergo extensive revision in the near future.

Retroreflectivity: FHWA has adopted new traffic sign retroreflectivity requirements that are included as Revision 2 of the 2003 MUTCD. To comply with the new requirements, public agencies will have until January 2012 to implement and then continue to use an assessment or management method that is designed to maintain traffic sign retroreflectivity at or above the minimum levels specified. For additional information on this rulemaking and sign retroreflectivity, please visit the FHWA retroreflectivity web site www.fhwa.dot.gov/retro.

Executive Committee met immediately following adjournment on Monday. In attendance were: Artimovich, Lupes, Pathak, Takach, Longstreet, Collins, Durkos, Brauner, Shewmaker, LaTurner, Bligh, Artar, Stephens, Hare, Patterson

Collins: Need to move forward and get a permanent website host. Need a boost of money out of the Task Force's treasury while other funding sources develop. TTI's estimates they can do this for approx $7K to $10K.

Durkos – we have that much in our bank account. For the major funding we go thru **Jim McDonnel** as our AASHTO advocate and for NCHRP projects. Our registration fees have been increased to add to our funding. This meeting was close to the cost per person, but we will probably increase our funds by $3k to $5k per year. **Artimovich** proposed $300 per person for Savannah with a $25 discount for going on the Document Review web sites. The $7k estimate for the TTI conversion of our website was a one time fee.

Annual maintenance would not be that high, but we're looking at a pooled fund study for long term updating of drawings and web site.

La Turner moved to appropriate Task Force money to move our web site to TTI. **Pathak** seconded. **Longstreet's** proposal could be used to move forward with TTI. **Bligh** willing to work with us to get accurate pricing and progress schedule.

Collins suggested a motion to increase registration fee to cover more of our expenses. **LaTurner** moved. **Pathak** seconded. The motion passed.

Collins: What about review process? How can we get members to review the drawings on line so that we don't take up time at our meetings? If we could have a group of people review each drawing on line the approval of the corrected documents could go smoothly at the Task Force meetings. Webinars would work but actually get expensive at $2000 or so each. It was proposed that we just try a conference call and get people to work on the same drawings on line. PennDot and Barrier Systems each have conference call facilities.

Subcommittee Co-Chairs are needed for Work Zones and Publications Maintenance. **Durko**s: very few members know the details of the online system to qualify as a co-chair. **Bligh** offered to check with a TTI IT person who oversees our website to participate in SubComm #1.

New areas of standardization. **Stephens** to develop a problem statement to submit to **Artimovich** for FHWA funding and to NCHRP for a 20-7 project.

1) Reduced offset guardrail systems. Other than simply allowing them into the guide, what will we do with them?

2) **Artar**: Hi Tension cable barrier systems came on the scene and the variations are all over the place. TF13 was involved with standardizing the thrie beam and transitions, and components, why weren't we involved with standardizing cable barrier systems? **Collins**: since it takes years to develop guidance it is no surprise that cable barriers have moved on before the TF could react. Now we recognize that guidance is needed even in areas of proprietary products.

Collins: Should we offer reduced registration fees for DOTs who want to attend? AASHTO meetings are $500 to $700, ours are already cheap. What fee would be ok? PennDot people denied participation because of registration fee, time lost, what is State going to gain? Louisiana has no problem with registration. Would CEU hours be a draw? Not to Louisiana. Does the venue make a difference? Jackson Hole vs Lincoln Ne? State employees sometimes have a harder time getting approval for locations seen as more desirable (even if travel costs are actually less) while private industry members frequently favor the more exotic locations.

Artimovich will send invitations to state DOT chief and the local FHWA Division office. Offer three free positions for locals? Offer discount for full meeting and/or free

attendance for the second day? This may be a good way to attract people who will appreciate what they see and join future meetings.

Meeting needs to be knowledge based. Some states save hundreds of thousands of dollars because of the knowledge that has been implemented due to their employees' participation. The tech presentations lead directly to the standards we are looking at today. Networking is a major value to participants.

Collins: Cost is not really the problem but justifying the cost/out-of-state travel are the problems. We should offer scholarships to the second day and the tech presentations to the host state and to neighboring states as well. May not comp entire registration, but at least inform/invite them.

We need a one pager expounding on the benefits of Task Force 13 so that others can justify their participation. (Editors note: A flier is being developed focusing on TF13 benefits. It will be included in Fall meeting mailings)

Location of the Spring 2009 meeting? Open offers have been received from **Faller** – Lincoln. **Stephens** – Chicago. **Bligh** – TTI

Artimovich noted a manufacturer's dissatisfaction with the "Self Restoring Crash Cushion" category on the FHWA list of impact attenuator acceptance letters. Discussion led to a recommendation that it be renamed "Low Maintenance Attenuators" and that a paragraph be added to FHWA web site explaining that all systems require maintenance. This should be coordinated with the AASHTO TCRS for consideration in the Roadside Design Guide update.

Tuesday, May 06, 2008

Longstreet invited interested participants to meet after the Task Force adjourned in Gettysburg for a tour focusing on the second and third days' battles.

Durkos wanted to make a point to our "first timers" that the hours of drawing review that we spent on Monday was atypical because we are in transition from hard copies to web site to electronic publications with help from **La Turner**, VDOT, TTI, etc, and we are heading in a direction where drawing review will be held prior to the meeting and our time together will not be consumed by this.

Mentioned ATSSA highway hardware task force meeting that will meet and continue for 3 hours beginning at 12:30. Approx 19 will be in attendance.

Cannot stress how much work is done behind the scenes, especially **Longstreet and Pathak** who put so much work putting this meeting together.

Fall meeting of Task Force 13 will be Sept 29 and 30 in Savannah, Georgia.

Update on Roadside Safety Research

Chuck Niessner gave a presentation on NCHRP project updates. He introduced NCHRP and its programs. States contribute 5.5 percent of their 2 percent R and D funding from the Trust Fund. Roadside efforts have picked up significantly in the last couple of years due to TF13, TCRS, etc. In each case below the link to the NCHRP Project page is included for active projects.

16-04 Design Guidelines for Safe and Aesthetic Roadside Treatments in Urban Areas
Just completed. Tool kit developed as well as new chapter ten for RDG.
http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=418

17-11(2) *Development of Clear Recovery Area Guidelines*
This project is about ready to start as the panel has accepted proposal.

17-22 *Identification of Vehicular Impact Conditions Associated with Serious Ran-Off-Road Crashes*
Data from this project was used to update 350 and develop MASH-08. It incorporated data from various other studies.
http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=448

17-43 Long-*Term Roadside Crash Data Collection Program*
NHTSA data collection efforts lack info on roadway. This contract will pay NHTSA to collect roadway and roadside data.
http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=1637

20-07 (257) *Synthesis of Crash Tested Precast Concrete Barrier Designs and Anchoring Systems*
http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=2339
This contract is pending with Dick McGinnis of Bucknell University..

22-12(2) *Selection Criteria and Guidelines for Highway Safety Features*
http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=681
Draft Final Report being prepared by Sicking.

22-14(2*) Improved Procedures for Safety-Performance Evaluation of Roadside Features*
[Update of NCHRP Report 350]
http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=687
Report being balloted by AASHTO Subcommittees. Once voting is completed the TCRS will resolve comments, then send the report to SCOH (Chief Engineers) as MASH-08 (Manual for Assessing Safety Hardware – 2008)

22-14(3) *Evaluation of Existing Roadside Safety Hardware Using Updated Criteria*
http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=686
Ten or twelve tests were done under original (2) project. Panel meets with contractor next month to select devices to be tested.

22-20 *Design of Roadside Barrier Systems Placed on MSE Retaining Walls*
http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=693
Crash tests to be run to validate designs.

22-21 *Median Cross-Section Design for Rural Divided Highways*
http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=694
Phase 1 completed.

22-22 *Placement of Traffic Barriers on Roadside and Median Slopes*
http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=695
Work has begun by Roger Bligh. Interim report due in 2 months.

22-23 *Criteria for Restoration of Longitudinal Barriers*
http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=696
Clay Gabler is executing work plan. Initial guidelines have been developed. Currently doing pendulum and full scale testing.

22-24 *Guidelines for Verification and Validation of Crash Simulations Used in Roadside Safety Applications*
http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=697
This topic will be discussed at the AFB20 meeting Jackson Hole in the Computational Mechanics subcommittee

22-25 *Development of Guidance for the Selection, Use, and Maintenance of Cable Barrier Systems*
http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=1640
Just underway with George Washington University.

Following are the FY 2009 approved projects:
17-44 Investigation of Contributing Factors Associated with Cross median crashes…
22-26 Identification of Factors Related to Serious Injuries in Crashes of Motorcyclists into Traffic Barriers.
22-27 Update of Roadside Safety Analysis Program (RSAP)

Updates on Related Committee Activities

AASHTO Subcommittee on Bridges and Structures – May 18-22 in Omaha. **Collins**: Mary McDonough is on the Agenda to discuss FHWA position on MASH08. [Editor's note: McDonough did not participate as FHWA's position is not finalized.] Also Dean Sicking will be discussing MASH-08. Presentations of interest to TF members include wind loading and galloping leading to fatigue in ancillary structures.

AAASHTO Technical Committee on Roadside Safety (TCRS) The RDG update will reference TF13 web based documents. For example, RDG will reference FHWA and TF13 web sites for complete lists of crashworthy hardware. This link gives our

documents greater importance and more visibility. We may be able to use this to leverage funds from AASHTO for our work.

American Traffic Safety Services Association (ATSSA) **Donna Clark**. Guardrail Committee is looking to add contractors to their membership. ATSSA has a series of 6 webinars including ones on Beam Barriers, Transitions, End Treatments, Crash Cushions, Cable Barriers (June 24, 2008), Other Barriers. The Guardrail Committee also drafted input to ATSSA's book on reauthorization. They have formed a TF on highway hardware issues. GIT (Guardrail Installation Training) and LBS (Longitudinal Barrier Systems) courses are offered as co-sponsored events. Go to ATSSA.COM and click on Education and Training to sign up for email notices of these webinars. In Sept. ATSSA will have a Leadership Program, Legislative Visits, and Mid Year meeting in DC. The National WZ Safety Awareness Week was held in Sacramento in April. Next year is tenth edition and will be in MD. MD also hosted the event in Baltimore evaluating 11 devices for guiding disable pedestrians through work zones. ATSSA plans to develop brochure on that, next. Final Rule on Sign Retroreflectivity is done as is the Final Rule on high visibility garments is done. Notice on MUTCD amendment is open for comment right now. ATSSA Feb 1-5 in San Jose, CA. $11.9 million Safety Grant is working on worker safety training, safety development, and safety guidelines training, plus 5 additional courses. All info is on web site. ATSSA published reauth policy "Towards Zero Deaths."

No NACE members in attendance.

TRB AFB 20 Committee "Roadside Safety Design" – **Roger Bligh** volunteered to give an update. Roadside Safety Design Committee sponsored 3 paper sessions in January. Adopted a strategic plan which addressed need for collaboration with other roadside safety groups like TF13. Upcoming summer meeting is in Jackson Hole in June 15-18. Theme is recent advances and innovations in roadside safety, including longitudinal barriers – 31 inch W-Beam, taller high containment barriers, advances in simulations, implementation of the AFB20 strategic plan. Also develop research problem statements for NCHRP. The International Research subcomm will look at breakaway hardware. Computational Mechanics workshop will be June 18 and 19.

New and Old business. Exec Board meeting was held Monday evening.

Moving ahead with a website host to put all info at TTI. Will take one-time funds from our treasury to pay TTI to move our site. Will Longstreet will look into a pooled fund study for permanent funding. Washington State pooled fund study will be a fall back position. A continuous revenue stream is needed to fund our activities. To bolster our account we will be increasing our registration fees, but our fees would still be a bargain. We may offer a discount on registration fees for visiting web site and making comments.

We understand that drawing review is not what we want to do at the meeting, which is why we want to have members review drawings ahead of time. Prior to future meetings the SubComms will do this by conference calls while logged into the TF web site.

Two subcommittees need co chairs – need one for Work Zones from the public sector: please let us know if you have a volunteer. Publications Maintenance also needs an industry co chair.

In the area of new standardization ventures for the Task Force we discussed the re-use of work zone devices, 31 inch high guardrail, and high tension cable barriers (much research underway at this time on cable barriers.)

Also want to reduce registration fees to State DOT people. We will invite members from the host state and nearby states, especially to come to second day of our meeting. It was proposed to draft a flyer to highlight benefits of the task force. If anyone has a testimonial, give it to **Andy Artar**. **LaTurner** noted a number of these bullet items. This flyer can be sent with TF13 mailings as a PDF. (Editors note: Mark Bloschock has prepared a testimonial, which has been given to Andy Artar)

The Fall 2008 meeting will be in Savannah on September 29 and 30. Tuesday, September 30 will be in conjunction with TCRS, who will stay in Savannah and meet for the rest of the week.

Spring meeting proposals: We try to have a mix of locations, from fancy surroundings to working level venues. Potential venues with willing hosts included: TTI, MWRSF, and Chicago. A vote was taken among these potential sites:

TTI: 26
Chicago: 15
MWRSF: 12

Location may depend on where TCRS has their fall 2009 meeting. [Editor's note: The TCRS Fall Meting will be in Delaware.]

Chad Heimbecker asked if everyone in TF13 thought that it was fair and equitable to give the website work to TTI. Heimbecker had given the Task Force a formal proposal and was concerned that it did not appear to be considered. The Executive Board is discussing the matter.

Technical Presentations.

***Weathering steel*. Artimovich** has gathered anecdotes regarding weathering steel over the years. He was specifically asked to rule on whether crashworthy w-beam guardrail terminals would be acceptable if fabricated from weathering steel and answered "no" for two reasons: 1) none had been crash tested with this material and it is unknown what performance could be expected with the higher-friction "patina," and 2) there have been numerous reports around the country that the "patina" never stops developing where you have an adverse environment, especially where the steel does not have the opportunity to dry (i.e. the lap splice of w-beam, and inside box-beam rails.) A number of TF attendees offered their perspectives: MD had problems with joints rusting. Washington State has

had good experience. New York State has prohibited weathering steel. **Durkos**: at some point we need a definitive statement on weathering steel**. LaTurner** fully agrees that terminals should be tested with weathering steel before allowing their use.

Recent TTI Research: **William Williams** briefed us on the Washington State pooled fund study which includes AL, CA, LA, MN, PA, TN, TX, & WA.
He showed crash tests of:

Box culvert design 12 ga W beam meeting TL3 – posts welded to plate and bolted to the top of the slab. They designed W6x9 posts with HILTI adhesive anchors to develop full strength of post. Used 9 inches of fill atop simulated culvert slab. 6 foot 3 inch post spacing. Test 3-11 rail height 27 inches. Rear of pickup went over length of barrier but truck was redirected. Rail was ruptured on the back slap. TTI believed it met performance criteria, called it a pass. **Artimovich** is not convinced this should receive an FHWA Letter of Acceptance as the agency prefers barriers that do not separate upon impact.

New anchored barrier system made by pinning CMB at edge of deck. Uses drop pins (no anchor bolts or thru deck bolting. Used an angled drop-in pin essentially perpendicular to the slope of the barrier. Passing design was with pin at 40 degree angle, two per barrier segment. 12.5 foot Oregon pin and loop. A 1 ¾" pin was used in a two inch hole in the deck. Fairly high roll angle. Passed and appeared to be no more severe than most jersey barrier impacts.

TX Type HT TL5 Bridge Rail. Essentially adding pipe rail to the top of a safety shaped parapet. Three bolts per base plate with bolts on centerline of parapet. Parapet at 32 inches, height of center of pipe rail approx 48 inches.

***Recent research at MWRSF*. Ron Faller.**

Temporary Concrete Barrier transition to permanent barrier. MW pooled fund group. The 42 inch tall single-slope barrier was chosen as the worst case for snagging. The transition from MWRSF F shape TCB was test to MASH-08. Used pin in asphalt design. Used nested thrie beam to close gap, and a cap rail to prevent snagging at end of the single slope barrier. This was a median situation so you had thrie-beam on both sides. Evaluated two CIP locations, one right at the transition, the other about 3 segments ahead of the parapet, right where you first began to use pins. The connection consists of three loops at either end of TCB segment. Passed.

***X-Tension, next generation of guardrail terminal*. John Durkos**

Both roadside and median versions were evaluated. Energy is absorbed by tension at the head, not compression downstream on the rail. Cables travel to post #7 and contribute to tension in the system. The full 350 crash test matrix was run including the reverse direction test. This is the only non-gating terminal available to date.

Selection Of Optimum Strong Post Guardrail Release Loads In Relation To Support Post Section Properties **Carl Ochoa,** Vista Engineering (This summary was provided by Dr. Ochoa)

Dr. Ochoa provided some generic insights into how to optimize W-beam release loads in relation to strong-post section properties. He was guided to examine this as an area of concern by his own proprietary nonlinear dynamic analysis method. Ochoa says that this new proprietary nonlinear analysis method is somewhat unique in that it does not rely upon ”ex post facto” (after-the-fact) iterative “tuning” of friction or other artificial physics adjustment factors in its solution approach- such as appears to be relatively common for some BARRIER VII and LS DYNA analyses in matching full-scale crash test data. He suggests the possibility that “tuning” is necessitated by inadequate physics modeling assumptions, given that he has been able to replicate and study various aspects of inadequate physics assumptions.

Ochoa notes that W-beam guardrail barrier performance has been characterized by some researchers as being random and unpredictable. He offers some explanations as to why this has been the case. He suggests that substantial improvements may be achieved by orchestrating individual posts to release prior to vehicle wheel failure, and to fail only after release has occurred. By implementing this orchestration the wheel is more able to overcome individual released posts in an orderly fashion rather than snagging hard or tearing the rail. This kind of orchestration is a key part of his suggested strategy for circumventing local problems at individual posts that may initiate failures on a larger scale- possibly triggering the barrier failure modes commonly known as hard wheel snagging, vaulting, and pocketing.

Ochoa indicates that it’s the weak-direction strength of strong posts that is particularly important in selecting appropriate release loads. This is because of neutral-axis shifting that tends to favor weak-direction response- even when applied loads are only slightly offset from being aligned with the strong direction of the post. The resulting release loads are closer to 2kips, rather than the 4.5 to 6.5 kips associated with a single ply of rail releasing via bolt head pull-through when blockouts are present.

He points out that while blockouts are intended to offset the rail from the post to address the problem of wheel snagging, the same “mechanical advantage” that blockouts use to bend the long post bolt to release the guardrail when the guardrail moves axially, is reversed to become a mechanical disadvantage against release of the rail when a vehicle wheel snags hard on a post. He calls this the “reverse lever arm effect” and indicates that it cannot be fixed, because it is a built- in feature of blockouts of any depth.

He suggests that weakening of posts tends to encourage unstable failure of posts prior to release because bending combined with torsion produces complex stress states that may prematurely activate stress concentrations to fail the post. Brittle high-strength steel posts tend to have this same problem of “unstable brittle fracture”.

In conclusion, Dr. Ochoa says that this design approach helped to determine the optimum release load for GMS guardrail, to directly defuse major barrier failure modes, with the direct result of improving both the versatility and performance of GMS W-beam barriers over a range of post spacing, top-of-rail heights, post types, and post embedment.

***Fatigue design for existing ancillary structures*. Phil DeSantis.**

Dr. DeSantis' research was on determining the capacity of existing structures considering new code fatigue limits. He focused on cantilever structures where the motion at the end was limited two feet. Ohio never experienced fatigue failure on structures like these even though the new specs say they are overstressed by 50 percent. At the Ohio DOT web site you may find the drawing Dr. DeSantis referenced:
http://www.dot.state.oh.us/traffic/publication%20Manuals/scds/SCD_PDF/tc8120.pdf

***Effect of end anchor spacing and initial tension on cable barrier deflection.* Dhafer Marzougi**

Dr. Marzougi described a project taken on by George Washington University using computer models as well as full scale tests to determine the deflection of a number of variations of cable barrier systems. Their major findings include the need to have a strong interaction between the post and cables in order to reduce the deflection significantly. Taking a low-tension system and tensioning the cables to match proprietary "weaved" high-tension system (24 kn) does not reduce the deflection significantly. Systems with increased spacing between end anchors have greater deflection, but this effect is not as great with the weaved systems. Weaving has more effect than number of cables and more effect than barrier length between anchors.

***Update of NCAC/FHWA research activities*. Dhafer Marzoughi**

Dr. Marzoughi described recent FHWA RD&T outreach efforts and the agency's roadside safety research roadmap. He also discussed the National Crash Analysis Center project for support for MASH-08 which is evaluating impact of MASH-08 changes to various devices, as well as the NCHRP project on cable median barrier design and placement. NCAC is working on modeling 2007 Chevy Silverado, which meets MASH08 pickup. Reverse engineering of the vehicle and digitizing the model is on schedule. They are also modeling the TL-5 semi-tractor-trailer truck.

NCAC is also looking at cable barrier placement behind curbs, and the Single Unit Truck Box Truck for TL-4 tests.

Adjournment

Durkos thanked the members for their participation, and especially thanked Will Longstreet for the arrangements at this chocolate infused venue. The meeting adjourned at 12:30 pm EDT. [5:30 pm GMT]

List of attendees. Task Force 13 Hershey PA May 5&6, 2008

Name	Affiliation
Alberson, Dean C.	Texas Transportation Institute
Allington, Chris J.	Holmes Solution Ltd.
Anderson, Jim T.	Designovations, Inc.
Artar, Andrew	Gregory Industries
Arney, Steve	Hapco Poles
Artimovich, Nicholas	FHWA Safety Design
Atahan, Ali	W.P.I.
Bilbee, Michael A.	Transportation Research Center - TRC
Bligh, Roger P.	Texas Transportation Institute
Borchardt, Tracy G	CTE Engineers, Inc.
Bowman, Joseph M.	Hapco Poles
Brauner, Kurt M.	Louisiana DOT
Bullard, Delbert, L.	Texas Transportation Institute
Burney, Will	Trinity
Butler, Richard R.	Brifen USA
Chiu, Kelsey A.	Karco Engineering, LLC
Clark, Donna M.	ATSSA
Coffman, Michael B.	L.S. Lee, Inc.
Collins, B. Patrick	Wyoming Dept.of Transportation
Conway, Steven J	Nucor Steel Marion. Inc.
Crosby Jason	American Timber & Steel Corp.
Del Rio, Alejandro	Forjas Metalicas, S.A. de C.V.
Dent, Cliff M.	Dent Breakaway Industries
DeSantis, Phillip V.	DeSantis Engineering Software Inc.
Dorr, Clark	R.G. Steel Corp
Draginis, Stephen E.	Barrier Systems, Inc.
Dunlap Michael, L.	Karco Engineering, LLC
Durkos, John C.	Road Systems, Inc.
Dyke, Gerrit A.	Barrier Systems, Inc.

Eicher, George T.	Gregory Industries
Endersby, Richard M.	Hill & Smith
Erickson, Rodney P.	Washington State DOT
Faller, Ronald K.	Midwest Roadside Safety Facility
Fansler, Shane	Guardian Cable Systems, LLC
Feldberg, Michael	Valmont Lexington
Gomez-Leon, Steve	Southwest Research Institute
Groeneweg, Kevin K	Mobile Barriers LLC
Hare, Michael A.	Qwick Kurb, Inc.
Heimbecker, Chad G.	Swiftwater Solutions SP
Hricisak, Karol	Southwest Research Institute
Hubblell, Daniel	O. W. Hubbell & Sons
Hudson, William M.	Nationwide Fence & Supply
Jenkins Jason D.	Transportation Research Center - TRC
Johnson, Don	Trinity Highway Products LLC
Keel, Andrew B.	Florida DOT
Kendall, James W.	South Carolina DOT
Kisiel Raymond	Northwest Pipe Company
Kothmann, Kaddo	Road Systems, Inc
Knapp, Dean C.	Di Highway Sign & Structure Corp
LaTurner, John F.	E-Tech Testing Services
Leahy, Matthew E.	X cessories Squared
Lindley, Neothies	Northwest Pipe Company
Longstreet, William P.	Pennsylvania DOT
Lovewell, William D.	Lovewell Fencing, Inc.
Lupus, Matt S.	Federal Highway Administration
Mackey, Gary	Ameron International PPD
Martin, Tory J.	MarCon, Inc.
Marzougui, Dhafer	National Crash Analysis Center (NCAC)
Mauer, Frederick	Nucor Steel Marion. Inc.
McGinnis, Richard G.	Bucknell University
Mettler, Chuck M.	Plastic Safety Systems

Niessner, Charles W.	Transportation Research Board - TRB
Noel, Steve R.	Dimensional Products, Inc.
Norton, Charles R.	Trinity Highway Products LLC
Ochoa, Carl M.	Vista Engineering
Pathak, Divyang P.	Pennsylvania Dept. of Transportation
Patterson, Charles W.	Virginia DOT
Peters, Eugene	Bekaert Corporation
Peterson, LeeAnn	Off The Wall Products
Porter, Richard	Nationwide Fence & Supply
Price, David A.	R. G. Steel Corp.
Reese, David A.	Road Systems, Inc
Riedl, Roy J.	Highway Safety Corp.
Sanders Chris	Nucor Steel Marion. Inc.
Scheidt, Tony	Energy Absorption Systems
Shewmaker, Jeff P.	Safe Technologies, Inc.
Shorb, Matthew R.	L.S. Lee, Inc.
Shorb, William J.	L.S. Lee, Inc.
Siadik, Jeffrey M.	Traffic Safety Services, LLC
Smith, Jeffery D.	SCI Products, Inc.
Stephens, Barry D.	Energy Absorption Systems
Stock, Brian	EASI-Set Industries
Takach, Robert M.	Trinity Highway Products LLC
Tharpe, Moffette	EASI-Set Industries
Williams, John	GSI Highway Products
William Williams	Texas Transportation Institute
Winn, John M.	Gibraltar
Yodock, Leo J. III	The Yodock Wall Co.