Wednesday, September 12, 2007

Introductions, Chairman Keith Cota and member Dick Albin welcomed members to Washington. Cota summarized the interim meeting in Wood’s Hole Massachusetts in May, 2007, where we looked at the 350 update, chapter by chapter and offered final comments. Also discussed Clear Zone definition and coordination with Green Book authors.

Cota noted that we want to be able to ballot 350-Update document so that we can send it forward for balloting to SCOD and SCOH. TCRS has made extensive efforts to keep AASHTO aware of the status of the research and implementation plan.

Roster Review.

FHWA staff changes will result in recommendations for change to numerous positions. McDonough and Artimovich will discuss this with Cota.

Cota updated list with Terry Soos of Maryland State Highway Administration.

Activity report for NCHRP projects.

17-43 includes Length of Need consideration.

Albin questioned one of the proposals: Factors assoc with MC and barriers. We should have input on this to ensure that there is no overreaction and demands for changes to barrier design. TRB should make sure that TCRS is involved in the development of this study. Albin was asked to research this to see if there is a problem statement prepared on this topic.

King Mak has agreed to join us with RDG review. We will need to discuss just how we will use King’s services.

Dean Sicking: Prepared a handout detailing responses to our questions generated at Wood’s Hole which are covered in the following discussion:

CEN 1317 is still underway. Opiela noted that 350Update refers to us “closely monitoring” CEN activities to make “every effort” to harmonize. We are not doing this as we have backed off.

Vehicle weights.

Truck weights are increasing on average. Avg weight gain was 3.0% The 2270P is a 90 percentile vehicle and we may need to raise this unless this trend reverses.
Small car average weight gain was 5.8 percent. Only one car is smaller than 1100C range, so again the only change would be to raise the weight, not lower it.

Vehicle weight variation. Since these are ballasted weights, keep tolerance as is.

**Cable test length:**

Deflection curve really begins to flatten out at 600 ft. Capture characteristics at 600 ft and 1200 feet is very similar, but deflection will increase slightly (for example, one barrier was estimated at 7 foot defl at 600 ft and 7.8 foot defl at 1000 ft.) **Dave Little:** If you are worried about 8 tenths of a foot deflection you should not be using cable barrier. We need to include guidance on this issue in Chapter 6. **Cota:** can FEM be used to estimate increase in deflection above 600 ft? **Opiela:** feasible. **Sicking:** We can do that. Depends on post spacing and post stiffness.

**Steve Walker:** Can we amend the Implementation Plan to require cable barriers to meet 350 update requirements? **Cota:** This certainly needs to be discussed under implementation plan. We would have to explain this to the states and be able to justify why we would discriminate against cable systems. Current cable barrier systems are performing well, and we’d better be cautious if we propose something different. **Gregg Frederick:** Doesn’t current successful cable performance show that 300 foot test lengths are OK?

**AASHTO** will work with SAE to include **Appendix C**.

**Appendix H** is Side Impacts. Is it essential? **Opiela** asked if we want this to be updated? **Focke:** Is including this a liability issue by states? **Sicking:** if not required, it is not an issue in courtrooms. Voted to remove side impact from appendix and simply reference.

**TL-4 Truck.** 90 kmh, 15 degrees. When they lower ballast from 67 to 63 inches, simulation shows just barely passing. Bridge engineers have real heartburn with any test procedure that would fail the NJ at 32 at TL-4. This could be tested under the 22-14(03) project and is seen as a necessary “pass” to put forward. Vote to accept 63 inch cg, and ask test be run. Majority carried (2 neg).

**Mak** was asked to revise the wording of length-of-need. LON should be exclusive of the terminals / end anchors. OR we could leave text the same and increase LON for testing to 175 for w beam. Voted to allow cable terminals to be included in 600 feet. This will be modified to include weak post w beam as well as cable.

**Angle of impact on tests 32 and 33.** Test non-gating at 15 deg. Test gating systems at 5 degrees. Gating systems have no problems at high angle impacts, but anecdotally we have seen some rail penetration at low angle impacts of gating systems. This is how it is in current draft. Retain.

**CIP for terminals.** Test 3-34 should have a more aggressive CIP location and this is how current draft reads. Really need FEM to determine this.
Criteria K and M have been dropped in favor of a non-required exit box criteria.

LCBs will be re-labeled “Longitudinal Channelizers.”

TMAs. Requires 50, 51, 52 to be conducted with max allowable support vehicle mass. Test 53 should be with lightest allowable support truck. OK

Truck measurement of CG – require measurement for each vehicle (approx cost $200) OK

**NCHRP 22-12(02)**

Development of Guidelines for the Selection of Highway Safety Features by Sicking

We saw this in Toronto and asked for B/C ratios. Given hwy conditions, when should we use TL2, 3, 4…Developed numerous site-specific tables for inclusion. Can do individual b/c ratios for site specific sites. Can we include this guidance in the RDG now, or should we wait till later? We will discuss this at our meeting next year, once we have had an opportunity to review the final report.

We should also consider the effects of this work on bridge railings and median barriers. There is an NCHRP project that is pending in this area, actually a follow on to 22-12(02) just waiting for Dean’s final report. Fossier volunteered to be added to the panel for (03). There was also a nominee from MassHighways.

Albin: FHWA’s guidance on barriers did not provide details on foundations on barriers.

**RDG User Survey** by Jim McDonnell, will summarize further in upcoming email. Survey seems to validate the improvements we are making and giving useful advice for the direction of our current rewrite efforts, especially with respect to urban and low volume situations.

Niessner: NCRHP Project status. See similar info from TF-13 minutes. 17-11 data problems have been corrected and can now go forward to come up with revisions for RDG guidelines.

**NCHRP Report 350 Update and Implementation Plan**

Cota is comfortable with current draft with Sicking’s final comments and finalization. Document will be balloted parallel with Implementation Plan. Should balloting process include Bridges and Structures?

McDonnell: If TCRS approved both the 350 Update and the Implementation Plan within 2 weeks a ballot can be sent to SCOD and Br and Str, they have 30 days to vote. Will take 6 weeks. When AASHTO receives responses, TCRS will have to resolve comments.
The four possible responses to the survey are Y, N, outside the scope, or address it in the next go-round.) Could take up to a couple of months to resolve these comments. Then the documents will be sent to SCOH who are the chief engineers, two months. SCOH comments, if any, are policy related. This timeline shows approval within 4 to 5 months. Probably will have to add time to address comments. May have a webinar to meet with key dissenting states in order to resolve major comments. Sicking will need to be on board with other projects and will be available to explain issues to the states. The NCHRP Panel has completed its work on this project, and TCRS works with Sicking to resolve issues. Artimovich proposed that TCRS members who are 22-14(3) members be responsible for the initial review of the comments. So moved and agreed. They will also draft a cover letter outlining the changes and comment resolution for state CEO consumption. Niessner will ensure Sicking is available.

Implementation plan: IF FHWA process to adopt the Implementation Plan generates changes, AASHTO can re ballot the Implementation Plan only. FHWA will begin process as soon as TCRS approves.

January 1, 2010 was adopted as the deadline for FHWA review of 350 tests.

**FHWA will encourage the upgrading of turned down approaches, blunt ends, no connection at guardrail transitions to bridges in our Federal Register process.**

FHWA acceptance plan needs to be updated. This will be done after the Implementation Plan and 350 updated are completed.

Paul Fossier moved to vote to adopt 350 Update Document for balloting by SCOH and SCOBS. Seconded by Little. Unanimous approval. Mak will work with Sicking to resolve the final few comments received today.

Buchan moved, Steve Reese Seconded to adopt implementation plan. Accepted with unanimous approval.
**Update of RDG**

Dave Little’s process to update Chapter 8 was seen as a good model.

We have retained King Mak to assist us in this process. Mak is not there to write the chapters but to ensure they are consistent and include latest research.

Need to review changes and provide feedback promptly.

Chapter authors need to have their re-writes to Mak in six months?? Some are ready to go now.

**Julian** noted that the RDG course has been rewritten to include a separate section on crash testing and test levels so that this info could be pulled out of the various chapters.

**Cota:** Do we want to keep RSAP in RDG? Do we want it as a priority in 2009 research program?

**Little:** TCRS needs to set a date for finalization and then make commitment to review and comment. He has made 5 drafts of Chapter 8 and has got very little feedback. Recommended organization changes need to be coordinated with other chapters. Unrealistic to consider 2008 as finalizing RDG draft, more likely we will be making final revision at the 2009 meeting.

**Thursday, September 13, 2007**

MUTCD is revising name of LCBs to Longitudinal Channelizing Devices.

**Ken Opiela.** Gave us an update on TFHRC and NCAC Activity

ADD KEN’S LATEST PPT AS IT INCLUDES UPDATED INFORMATION ESPECIALLY ON CABLE HEIGHTS FOR PROPRIETARY SYSTEMS.

**Dick Albin** updated us on the review of “clear zone” between RDG and other publications. ASK DICK ALBIN FOR HIS PPT

**Karen Dixon and 16-04** Oregon State University. GET PPT from Keith,

Interesting recommendations:
Increase lateral offset at horizontal curves.
Establish buffer zone around taper that should remain object free.
Establish control zones at intersection returns free of objects
Put poles on the near side of driveways, not far side.

Toolkit may end up as an appendix and will be submitted separately.
Karen’s study is important for the next update of the RDG.

**Update to the Roadside Design Guide**

We identified FHWA memos and Research studies that need to be considered when updating the various chapters.

Chapter 1. Need current crash info from Artimovich. Try to get 2006 data. Chapter 1 will include FHWA/AASHTO Implementation Plan. See Table 1.1 and get info for both first harmful event and most harmful event for all those years. Move info on FHWA Acceptance Process from other chapters into chapter 1.

Chapter 2. will be expanded to include Test Level information as well as info on in service performance evaluation. Selection Criteria work by Sicking (22-12) will not be included in the next RDG.

Chapter 3. Revise with Clear Zone definitions per Albin’s work. Keep tables 3-1 as is. Do not add info on higher design speeds nor on lower volume roads. Mark Ayton had extensive list of recommendations.

Chapter 4. Reese didn't find additional update material on breakaway supports. FHWA needs to review this carefully. Comments were offered regarding omni directional supports, references to Task Force 13 publications which show all hardware, 4.1 needs to be brought up to date to refer to 350 update (or move it to chapter 2). Some chapters need to retain info on crash testing in order to maintain a sense of history. Or this could be placed in an appendix.

Chapter 5. Rod Lacy, chapter author, is not present, but we did discuss:

How should we deal with alternate runout lengths for LON? Tell the states they have flexibility based on the research.

Radius guardrail will be moved into Chap. 5.

Chap 8 includes grading requirements and they need to be discussed in Chapter 5.

Table 5.9 discusses tolerance and the +/- 3 inches is too wide. Can only allow a minus 1 inch on 27 inch tall guardrail.

Artimovich to provide suggested wording to amend 5.2.3 to satisfy NTSB.

Chapter 6 Was just re done but is functionally 2 years old. Info on cable median barriers is a fast moving field.
Chapter 8 has undergone extensive rewriting. Removed much detail that is already on the Task Force 13 documents. Provide comments by November 1.

Chapter 9. Not much underway ex NCHRP project on crashworthy WZ devices.

Chapter 11 Remove “Erecting” from title
Should it be a separate publication, too? Insurance companies may be interested for their homeowners. Cota: 3R scan tour one state tells property owner and they need to get a letter from their insurance co that it is OK in order to leave in the roadway. 99 percent of the time that means the box is changed. Look into involving Task Force 13.


Appendices will be generic products only.

Glossary: Chapter authors need to review them for any changes.

Friday, September 14, 2007

Chuck needs problem statements by October 10.

2009 Research Proposals
1. Development of a high performance portable barrier: Opieia: NCAC has already done a project for optimization. We ought to look to that evaluation for optimum design. NYS is having MWRSF test NJ with box beam bolted to back in order to reduce deflection, defl was reduced to one meter. For use on bridges where you must minimize deflection. Rory Meza: TX has the X bolt connection with 2 foot defl max. Maybe we need a synthesis instead. Seemed to have some support. As a 20-7 project it might be quicker as a synthesis would have to compete next summer. Would have to be submitted in next couple of days. Recommend? Recommend 20-7? Recommend Synthesis?

2. Curbs in conjunction with CC and GR End Terminals.
Support for this project.

3. What factors lead to cross median crashes? Interchanges? Volume? Conflicts? These are still unsolved problems. More of a geometric question even though it is still needed. Can we get concurrence from Geometric? Too late now, but they may be able to support this project. Is this a high roadside priority project?

4. In service evaluation of semi rigid long. Barrier systems. Endorsed last year but it was not funded. Focuses on 31 inch high systems. 350 update has a section on studying new systems. We already have procedures in place. We need to get states to do the work.

5. RSAP – In the event that it isn’t funded under 2008…

6. Albin: Motorcycle crashes. See handout.
The following were voted on to carry forward in this order, with the TCRS contact noted.

1 RSAP     Keith Cota  
2 MC       Dick Albin  
3 Curbs    Rod Lacyn  
4 Medians  Dick Albin  
5 ISE      Dean Focke

Clocksin: Summary of MWRSF Pooled Fund Study

20x20 safety grate on a 3:1 slope. Passed TL-3.  
MGS located at break point of a 2:1 slope 2270P went over 27 ¼” rail.  
MGS at 31 inch at same slope break point.2270Passed.  
Short radius guardrail. Failed again. May be OK for TL2 but states will discuss future.  
Bridge pier protection system for bridge piers. Wall passed with 2000P  
TL5 CMB that Sicking showed us as passing. Wall with little peak on top. 42 inch OA.  
Low Tension low cable barrier next to 1.5 to 1 slope. Failed  
Redesigned Low Tension 4 ft from break point, 3 foot cable spacing passed 2000P  
Four Strand hi performance, hi tension cable. 16 foot spacing for 2270P 43 inch top cable. Three tests to be run down a 4:1 slope.  
Other projects coming up on concrete barriers, 4 strand cables, MGS performance limits,  
MGS behind curb, MGS transitions, MGS Bridgerail.

New England Consortium tests mostly structures, pavement, Cota will send info out.

Washington, Louisiana, Texas, Al, CA ,TN, MN, PA Pooled Fund effort will meet in November to select projects. TL2 radius guardrail will be considered.

New name for test document. Manual for the Assessment of Safety Hardware 2008

Discussion with FHWA on needed research needed.

McDonough described our technical products like Dick Powers’s WBeam Terminal CD and Artimovich’s Tree DVD. We plan to have more feedback from the field and from DOTs. FHWA would like to know what technical products that TCRS states need.

Albin: guidance memo encouraging states to use taller concrete barriers. Footing is in question because its cost would never be cost effective for a median – the crash tested design was a bridge rail.

Cota: There is a lot of research, a lot of needs. It would help to get that research out to the field. Has to be located where it can be found and marketed to the right people. Opiela gave out 3 CDs at the May meeting – didn’t get any feedback.
Cota: There are a lot of hardware in our toolbox. When we place barrier, what happens when we have to omit a post, such as a catch basin? What deviations are acceptable?

Cota: FHWA is looking for research topics and advice on getting this info out to the field.

Opiela has made the offer to be a clearinghouse for ISE. Can arrange NCAC library to allow state DOTs to get info for free.

McDonough: Technology is on our side and the Internet can provide lots of info. Ken can provide a demo of NCAC capabilities. Email Mary with suggestions.

Fossier: LA is active on work zones and is looking for info.