

**AASHTO TECHNICAL COMMITTEE ON HYDROLOGY AND HYDRAULICS
SPRING 2007 MEETING MINUTES**

**May 1-3, 2007
Amelia Island, FL**

AGENDA

Tuesday, May 1, 2007

8:00 am - 8:15 am Dave Henderson - Call Task Force Meeting to Order

Housekeeping and Introductions

8:15 am - 8:30 am Welcome - Rick Renna, Florida DOT

8:30 am - 9:30 am Jorge Pagán - FHWA Perspective

9:30 am - 10:00 am Kelley Rehm, AASTO Update

10:00 am - 10:15 am Break

10:15 am - 11:55 am Open Discussion; TC Direction, Progress, Concerns, Ideas

11:55 am - 1:00 pm Lunch

1:00 pm - 2:45 pm Subcommittees - Work Session I

2:45 pm - 3:00 pm Break

3:00 pm - 4:00 pm Subcommittees - Work Session II

4:00 pm - 5:00 pm Reconvene Full Committee for Discussion

Wednesday, May 2, 2007

8:00 am - 10:00 am Subcommittees - Work Session III

10:00 am - 10:15 am Break

10:15 am - 11:55 am Subcommittees - Work Session IV

12:00 pm - 1:00 pm Lunch

1:00 pm - 2:45 pm Subcommittees - Work Session V

2:45 pm - 3:00 pm Break

3:00 pm - 4:00 pm Subcommittees - Work Session VI

4:00 pm - 5:00 pm Reconvene Full Committee for Discussion

Thursday, May 3, 2007

8:00 am - 10:00 am	Subcommittees - Work Session VII
10:00 am - 10:15 am	Break
10:15 am - 11:55 am	Subcommittees - Work Session VIII
11:55 pm - 1:00 pm	Lunch
1:00 pm - 2:15 pm	Full Committee Discussion on Progress
2:15 pm - 2:30 pm	Break
2:30 pm - 3:00 pm	Technical Committee Business Session
3:00 pm - 4:00 pm	Concerns of the States
4:00 pm	Dave Henderson - Adjourn Technical Committee

TECHNICAL COMMITTEE MEMBERS	STATE	JOINED	REGION
Bill Bailey	Wyoming	1994	4 (absent)
Brooks Booher	Arkansas	2002	2
Glenn DeCou	California	1994	4 (absent)
Merril Dougherty	Indiana	1994	3
Hani Farghaly	Ontario	2004	3
Mike Fazio, Vice-Chair	Utah	2001	4
Preston Helms	South Carolina	2001	2 (absent)
Dave Henderson, Chair	North Carolina	2000	2
Andrea Hendrickson	Minnesota	2005	3
Rae Van Hoven	New Mexico	2004	4
Roy Mills	Virginia	1999	2
Te Ngo	Oklahoma	1991	4
Matt O'Connor	Illinois	2001	3
Jorge Pagán-Ortiz, FHWA/Secretary	Wash., D.C.	2003	1
Karuna Pujara	Maryland	2005	1
Richard Phillips	South Dakota	2002	4
Lotwick Reese	Idaho	1996	4
Rick Renna	Florida	2001	2
Jim Richardson	Kansas	1996	3 (absent)
Norm Schips	New York	2002	1
Duc minh Tran	Quebec	1999	1 (absent)
Alvin Shoblom	Oregon	2005	4 (absent)
Amir Soltani	Nevada	2005	4 (absent)
Amy Ronnfeldt	Texas	2006	4

A) WELCOME AND INTRODUCTION:

1. Chairman Dave Henderson welcomed members and friends of the AASHTO Technical Committee on Hydrology and Hydraulics (TCHH) to the spring 2007 meeting and thanked Rick Renna for arranging this meeting in Amelia Island, FL. This is the TCHH meeting number 72. Chairman Henderson briefly talked about the massive fires in North East Florida. He indicated that there will be minor modifications made to the agenda as we move on during the next three days one of which was the addition of Joe Krolak's presentation on the new FHWA's HY-8 program.
2. Housekeeping items were discuss – continental breakfast served at the hotel's hospitality in the second floor, followed by introduction of everybody attending the meeting.
3. Rick Renna welcomed the TCHH to Florida on behalf of the Florida DOT. He briefly talked about the beautiful old Victorian houses in the old section of Amelia Island and that the area has not been overrun by tourism. The old section of the city was subject to a number of fights as pirates used to trade in this area. Rick recommended various places to eat in the vicinity of the hotel (O'Kane's Irish Pub and Eatery, La Bodega Courtyard and Café, The Crab Trap, and the Marina Seafood) and pointed out that the Crab Trap offered all-you-can-eat wings on Wednesday nights. Rick also highlighted that Florida is currently suffering from a drought since mid-February.
4. The committee welcomed the new NCHRP project manager, David Reynaud, who will be the NCHRP liaison to the TCHH.
5. TCHH roster was passed around for updates and corrections as well as the list of visitors (see Appendixes A and B).
6. Paul Wirfs represented Oregon DOT (for Alvin Shoblom) during this meeting. Paul took over hydraulics when Dave Bryson retired from Oregon DOT in 2001. The department decided not to participate in the TCHH after Dave Bryson retired, but has agreed to participate again. Paul has subsequently been promoted within Oregon DOT and Alvin is now in charged of hydraulics.

B) FHWA PERSPECTIVE:

7. Jorge Pagán made a presentation on FHWA Perspective (See Appendix C). He also briefly talked about the IBRD solicitations, distributed a copy of the IBRD solicitation memorandum (See Appendix D) and informed that the solicitation deadline of April 30, 2007, was extended by 2 weeks. Rick Renna recommended that FHWA should consider developing a 1-day training course on HEC-18/HEC-20 for non-hydraulics engineers, which would take out heavy theory and numerical calculations and instead handles these in a more qualitative manner.
8. Joe Krolak made a presentation on HY-8, Version 7.0. Anyone can go to the FHWA website to download this software, <http://www.fhwa.dot.gov/engineering/hydraulics/software/hy8/>, which was distributed by memorandum dated March 20, 2007. There is a quick start guide available, which tells what one needs to know before installing the software. The quick start guide presents highlights of the changes between the DOS version and the Windows version of HY-8. Old files format still are recognized by the new Windows version. The DOS version of HY-8 was based on Dr. Art Parola's 1983 master thesis dissertation at Penn State University. The program has now capability of viewing culvert entrance (front view) and roadway stationing. HDPE pipe is not available in the new version of HY-8, but with "n" value this pipe material could be evaluated. Joe mentioned that on the old version of HY-8, if one put a flow beyond capacity on a cross section of roadway (i.e., overtopping of roadway section), the program will put a vertical wall. With the new version, while it will do the same (put vertical walls), it gives a flag to the user about the cross section so that the user can do an engineering evaluation of the cross section. It was discussed that the old version of HY-8 did not do adverse slopes and that the new version replicates what the old program did. The next version of HY-8 would include adverse slopes, broken-back culverts and energy dissipators.

9. Joe Krolak made a quick demonstration of HY-8 capabilities and highlighted that if one has internet connection, one can locate culverts with the positioning feature of the program. The program does not allow changes on entrance coefficients (K_e) and Joe pointed out that if this is done, we could be going into a dangerous path. Inlet stations increased from downstream to upstream. The program can also generate a report with hydraulics parameters, curves generated, cross sections, which can be used on the project master file. Also, HY-8 version 7.0 contains help screens. The program should run in any Windows-based machines with 32 bit and 64 bit processors. The feature of whether or not one would be able to design or evaluate energy dissipators on the next version of HY-8 has not been thought about, yet. Chairman Henderson pointed out that FHWA has taken a big step towards supporting the DOT operations with this new version of HY-8. Joe Krolak indicated that this is one of the core programs that needs to be supported – and that HY-8 has been accepted by FEMA on flood studies.

C) NATIONAL HYDRAULICS ENGINEERS CONFERENCE:

10. TCHH members of the National Hydraulics Engineers Conference's (NHEC) steering committee gave an update on the conference. Andrea Hendrickson distributed a flier, which presents tentative arrangements for the conference and posted general questions for the TCHH (See Appendix E). The conference's theme has been defined as "Partnering for Progress in a Changing Environment." It will be held at the Holiday Inn at the Bay in Portland, Maine from August 26-29, 2008. Registration fee is being discussed (\$150 or \$300 per participant) – it would allow for continental breakfast and lunch. Chairman Henderson commented that if the registration fee exceeds \$150 it will require approval at a different level.
11. The NHEC steering committee would like to know if the TCHH would like to meet in coordination with the conference. The TCHH provided input on research that would be completed by August 2008: Fish passage manual (Mike Fazio); Hydrology (Amy Ronnfeldt); contact fish and wildlife (Brooks Booher); Florida's complex pier scour equations and major sediment and erosion control project (Rick Renna); rainfall (Paul Wirfs); South Dakota's cohesive soils research – following Texas procedures (Richard Phillips), but research results may not be on time for a presentation at the conference; cohesive soils – existing contract with Texas A&M intended to make changes to the EFA apparatus (Kornel Kerenyi).
12. A discussion took place with regards to the logistics of meeting during the same week of the NHEC such as extra charge for a conference room – it was highlighted that when hotels have meetings like the 2008 NHEC, they would provide additional rooms for other meetings, but there is a possibility that the TCHH would have to pay for its own meeting room. It was discussed that since the NHEC does not start until Tuesday, that the TCHH could meet on Monday and Friday; however, this would require weekend travel. Other possibility would be to meet during Wednesday, which is the day of the field trip during the NHEC. It was mentioned that the TCHH tried to meet during a similar conference in Austin about 10 years ago and it resulted in a not so good meeting. The members of the TCHH were reminded that they decided to try to meet with a NHEC every 24 months and that it is an opportunity that we should not let it pass, but that the NHEC should not interfere with the TCHH meeting and its productivity. If we meet during the NHEC week, it would give us an opportunity to meet with other hydraulics engineers and see if we are meeting their needs – it would be an excellent opportunity for networking – we may need to make some adjustments and make sacrifices to make this work.
13. The TCHH recommended that the NHEC look at the alternative of reducing the conference from 3.5 days to 3 days and in this way the TCHH would have 2 days of committee meeting. Also, the TCHH recommended that if the NHEC steering committee would like a report from the TCHH that this should be handled with a presentation early on in the conference's program.

Action Item No. 1 -- TCHH should e-mail any further ideas on the NHEC to Andrea Hendrickson.

D) AASHTO:

14. Kelley Rehm, AASHTO liaison to the TCHH, gave an update of AASHTO activities. She reported that the AASHTO Standing Committee on Highways (SCOH) meets this week – interested in how the TCHH can do some cross-cutting activities with them. They will be brainstorming on how the TCHH can do more things together with the SCOH. She mentioned that there are several opportunities to work with other AASHTO groups. She indicated that there are a lot of talks about Bridge Preservation – she participated in a meeting with this group and one of the items discussed was on bridge scour. Jim Sorenson, of FHWA, is leading an effort on transportation system preservation roadmap workshop this May to discuss needed research on bridge preservation.

Action Item No. 2 -- TCHH needs to provide comments to present at this workshop.

15. Kelley Rehm recommended that the TCHH to work closely with AASHTO's bridge technical committees and to use them as resources. She also mentioned that AASHTO's bylaws require its Committees to submit a report on their finances. This is an AASHTO requirement that has never been enforced.

Action Item No. 3 -- TCHH needs to submit a report on its finances to AASHTO that shows how much money comes in and how much money is being used.

16. It was mentioned that the Subcommittee on Bridges has about \$120K in their account. Members of the TCHH asked if there are guidelines for AASHTO's Technical Committees (TC's) on carry over balances for operation. The TCHH was advised that the carry over balance should not exceed \$50K. The TCHH was advised that funds cannot be in an interest bearing account.

17. Kelley Rehm indicated that AASHTO really wants the TCHH to meet at the same time as the Subcommittee on Design meets – this also means to meet at the same location; however, it does not mean that the TCHH has to meet at the same hotel – but they would like the TCHH to participate in their activities and that we try to go to some of their meetings.

18. Other TC's assigned to the Subcommittee on Design (SCOD) with similar concerns are Value Engineering, Pavements, and Environmental Design. SCOH wishes to have TC's focus on highway issues and not have TC's working on similar or competing issues. This seems to be why they would like the TCHH to have a chair from the SCOD.

19. It was mentioned that Merrill Dougherty has been nominated to be a member of the SCOD.

20. The TCHH members discussed the tenure of the TCHH chairmanship. This is an item that TCHH members need to follow-up as it will require changes in the TCHH's bylaws if chairmanship tenure is changed – the 2-year term for a chairman is a decision made by the TCHH. The TCHH members could decide if they want the chair assigned for a longer period – 4 or 5 years.

Action Item No. 4 -- TCHH members need to discuss further the tenure of TCHH chairman.

21. Chairman Henderson has copies of the TCHH work plan, which he will be sharing with the members of the TCHH.

Action Item No. 5 -- TCHH needs to submit AASHTO a revised work plan prior to its fall '07 meeting.

22. Chairman Henderson led another discussion regarding chairmanship of the TCHH. He indicated that he and Mike Fazio participated on a recent conference call with AASHTO staff (Jim McDonnell, Ken

Kobetsky and Kelley Rehm). Comments made during this conference call reflected AASHTO's support for the chair of the TCHH to come from the SCOD. Also, they discussed that a TC chair needs to be one that could help build consensus, communicates TC needs to the SCOD, and provides the SCOD's big picture to a TC.

23. Chairman Henderson led a discussion on key points that he made in his June 12, 2006, letter to the Chairman of the SCOD, Mr. Allen Biehler. The key points were that the TCHH Chair could be seated as an ex-officio member of the Subcommittee on Design and report to their committee during their summer meetings, and that the TCHH Chair would not be a voting member on the SCOD. This letter was delivered in person to Chairman Biehler by NCDOT's voting member of the SCOD. Chairman Henderson indicated that so far there has been no response to the letter. He further said that the SCOD appears to have no interest of chairing a TC where they do not have expertise and that this idea (of having the chair of a TC from the SCOD) seems to be coming from parties that are external of the SCOD.
24. Chairman Henderson indicated that AASHTO staff communicated the need for TC chairs to present an annual report to the SCOD during their summer '07 meeting in Vermont. He pointed out that this is something new from AASHTO. Chairman Henderson indicated that each TC chair would have a 10 minute window to present a report and that he and Vice-chair Fazio will be attending the meeting. Chairman Henderson plans to present the TCHH report to the SCOD and will offer TCHH concerns about chairmanship coming from the SCOD, and that TCHH members do not favor a chair from the SCOD, and that it unanimously support that TCHH chairmanship continues to be selected from within the TCHH membership.
25. Kelley Rehm shared a package containing: Technical chair e-mail list (Appendix F); NCHRP project selection for FY '08 (Appendix G), and proposed research problem statement 20-7 on "Evaluation of Pipe Materials Selection Practices and Research, and recommendations for Pipe Material Selection Criteria" (Appendix H).

E) NCHRP:

26. The new NCHRP liaison for the AASHTO TCHH is David Reynaud. He made a presentation of the NCHRP projects on hydrology and hydraulics (See Appendix I).
27. Chairman Henderson expressed how delighted the TCHH is by having David Reynaud joining the committee as the NCHRP Liaison.
28. With regards to NCHRP problem statements, Chairman Henderson stated that it would be excellent if we can have volunteers to identify past request needs or new ones.
29. Chairman Henderson indicated that we have to have our NCHRP problem statement priorities by September 15, 2007, deadline – he pointed out that Tim Hess would allow us to submit our priorities by November.

Action Item No. 6 – TCHH need to check with David Reynaud, of NCHRP, on whether or not we would be able to submit our problem statement priorities in November. If we cannot, then we will have to vote by e-mail in order to meet the September 15, 2007, deadline. Chairman Henderson encouraged all committee members to vote on the balloting process for the problem statements.

30. There were two problem statements on hydraulics funded for the NCHRP 2008 research program: Development of Design Methods for In-Stream Flow Control Structures (NCHRP 24-33, \$600K), and Culvert rehabilitation to Maximize Service Life While Minimizing Direct Costs and Traffic Disruption (NCHRP 14-19, \$750K). Funding continuation request was declined for NCHRP 24-32, "Scour at Wide Piers and Long Skewed Piers."

31. The TCHH members discussed the scope of NCHRP 14-19 and Chairman Henderson requested any members with interest in participating on this research to send him an e-mail.
32. The TCHH committee reviewed its problem statements:
 - a. Development of Design Guidance to Mitigate Hydroplaning Effects – person developing this problem statement: Glenn DeCou; estimated funding level is \$500K and research period is 30 months.
 - i. Mike Fazio indicated that one of the issues that needs to be investigated under this problem statement is how much of a contribution is the texture of pavement on hydroplaning. He also said that we should be looking at not just hydroplaning but also into the big picture of pavement drainage.
 - ii. Te Ngo will call Glenn DeCou and work with him, Hani Farghaly and Rae Van Hoven in revisiting this problem statement – may change it or resubmit it the way it is.
 - b. Impact from Riprap Protected Channel Banks on Fish Habitat – person developing this problem statement: Dave Henderson; estimated funding level is \$400K and research period is 24 months.
 - i. No comments
 - c. Development of Design Methods for In-Stream Flow Control Structures – person developing this problem statement: Mark Miles (original author), Mike Fazio, Utah DOT and Clint Adler, Alaska; problem statement funded at \$600K and research period is 36 months.
 - d. Design Hydrology for Stream Restoration and Channel Stability at Stream Crossings – estimated funding level and research period to be determined.
 - i. Te Ngo will be coordinating with the TRB AFB60 Committee on this problem statement.
 - e. Evaluation and Assessment of Environmentally Sensitive Stream Bank Protection Measures – estimated funding level is \$500K and the research period is 36 months.
 - i. TCHH voted to keep this problem statement
 - ii. It was mentioned that the TCHH needs to get more involved on environmental issues – our approach has to be more interdisciplinary.
 - f. Evaluation of Long Term Performance of Stormwater Controls – person developing this problem statement: John Salsalone; estimated funding level is \$550K and the research period is 36 months.
 - i. The TCHH members voiced that this project could have difficulty in getting funded because it is not focused – we should look at this problem statement again in cooperation with the TRB AFB60 committee to re-focus it.

Action Item No. 7 -- Rick Renna, Karuna Pujara and Paul Wirfs will work on refocusing this problem statement.

- g. Combined Effects of Hurricane Storm Surge and Waves on Bridge Scour – person developing this problem statement: Rick Renna; estimated funding level is \$450K and the research period is 36 months.
 - i. This project is on the contingency list for FY '08 funding.
- h. Development of Bench Test Methods for Determining Manning's Roughness for Culverts – person developing this problem statement is Phil Thompson (original author), Joseph Krolak; estimated funding level is \$250K and the research period is 24 months.
 - i. The TCHH debated on whether or not we should expand the scope of this problem statement since it calls to bench test and not to establish a criteria.
 - ii. Members of the TCHH questioned if there is an ASTM procedure for estimating “n” values – not sure if this exist.
 - iii. It was suggested that if independent labs provide a decent data report and analysis then we may not have a problem; however, if what is done is not consistent, then one would have trouble in accepting results.

- iv. A comment was made with regards to manufacturer's recommended "n" values – we should be discussing what values should be used and not accepting low range "n" values from manufactures right away. It was mentioned that there should be a discussion on this topic on the culvert chapter.

Action Item No. 8 -- Since Joe is the new contact person on this problem statement, the TCHH recommends that he and Kornel Kerenyi should revisit this problem statement.

- i. Time Rate of Scour at Wide and Skewed Bridge Piers – person developing this problem statement is David Henderson; estimated funding level is \$300K and the research period is 36 months.
 - i. This project is currently funded under 24-32 "Scour at Wide Piers and Long Skewed Piers."
 - ii. Funding continuation request was declined.
- j. Determination of Design Hurricane Rainfall – person developing this problem statement is Rick Renna; estimated funding level is \$500K and the research period is 36 months.
 - i. The TCHH decided to keep this problem statement.
- k. Dependability of NEXRAD Reflectivity for Highway Design – person developing this problem statement is Rick Renna; estimated funding level is \$100K and the research period is 1 year.
 - i. This problem statement is a snap shot of where technology was on rainfall hydrology.
 - ii. Committee needs to determine if this problem statement to a 20-07 project (synthesis).
 - iii. Larry Arneson pointed out that there is a lot of data being generated and ia available online (DEMs, photogrametry, bathometric surveys, precipitation, etc.) – a study is needed to make recommendations on how this data could be pulled together so that it can be used by us.
 - iv. Paul Wirfs pointed out that by the time that any effort on this subject is published it would be outdated. Also, the system developed for managing all this data would have to be user's friendly.
 - v. Mike Fazio pointed out that this effort is best fitted for a synthesis study. Also, this sort of things should be documented in the data collection chapter in the future.
 - vi. The synthesis should get into how we should use (manage) this data using new technology in the future.

Action Item No. 9 – Larry Arneson and Mike Fazio will write a problem statement on this topic. The TCHH members will evaluate the problem statement before deciding whether or not it should be a 20-07 or at another level.

F) OPEN DISCUSSION:

33. Chairman Henderson urged each member of the TCHH to discuss direction, progress, concerns and any ideas as we moved to the chapter working sessions in order to have these discussed and resolved by each group.
34. Amy Ronnfeldt needed to have Mark Miles' work on the environmental chapter. Secretary Pagán gave her electronic copies of chapter.
35. Chapter 17 will be chaired by Alvin Shoblom.
36. Chairman Henderson voiced that we all have stumbled on how to handle the chapters as far as the "Why's" and the "How's." Lotwick Reese said that he believes the TCHH finally hammered down the "Why's" and "How's" thanks to the outline developed at the Fall meeting in New Mexico – at least the outline made it easier for him to work on his chapter.
37. The committee discussed that other issues on the horizon include the environment and fish passage, and especially on the oversizing of culverts.

38. The committee was reminded that chapters should include basic procedures and detailed procedures would be the references (e.g., HEC's or HDS's). We could repeat the basics within a reasonable amount, but remember to let the reference go into the details. If any chapter chair has a question about this, he/she should bounce recommendations for structuring the "How" chapter and if there are any issues, we can open the issue(s) up to a few members of the committee or among the whole committee – let's try to avoid spinning the wheels and not getting anywhere. We should rely on your review team, but don't hesitate to bring any issue up to the full committee. We should remember that one manual would be on policy – that is the one on the "Why's" (e.g., why certain things have to be done) and a follow up document on the "How", which is the procedures manual. These manuals won't be \$450 each. The committee was reminded that the AASHTO MDM was one which one could tweak to fit needs – that was the purpose of the double parenthesis to signal the practitioner that he/she had flexibility of changing guidance.
39. As the committee continued its open discussion on the manuals there were quite a bit of suggestions for the process of completing the chapters such as: need for a structure on the process of completing the chapters from the TCHH officers -- need benchmarks between each meeting to show how intermediate steps are accomplished; need to reiterate action items; need to approach working on the chapters with a better discipline; and need to state action items right up front and not let 6 months go out without reviewing progress. Also, it was commented that there is a need to send reminders on action items on a regular basis. It was suggested to benchmark a schedule and bring it back to the TCHH members.

Action Item No. 10 -- A team was put together (Dave Henderson, Mike Fazio and Rick Renna) to look over recommendations to structure a process for completing the chapters and to layout a plan.

40. The TCHH members continue discussion on other topics such as one raised by Brooks Booher on his Channel Chapter – he indicated that a third of his chapter is on geomorphology and that it concerns him whether or not this material is actually needed in his chapter. It was commented that if a channel is relocated, one has to have knowledge on geomorphology.
41. Karuna indicated that the Bank Protection chapter may be the house for the geomorphologic material presented in the Channel Chapter. Richard Phillips reminder the TCHH members that when this chapter was originally developed, the TCHH did not want anything on natural protection for banks. He also indicated that we need to get to a certain point where basic concepts are coordinated between chapters (e.g., a chapter indicates that "x" topic will be covered in chapter "y" and then chapter "y" indicates to go to chapter "z" for more information on the same subject.
42. Rae Van Hoven said that in her opinion, we do not need to expand on geomorphology because it is a broad topic. She further said that now State DOTs are only dealing with their own right-of-way and do not have to expand studies way outside their limits. It was discussed that there is guidance needed on geomorphology and the decision to be made was how much of it is needed for discussion on the Channel Chapter.
43. Brooks Booher indicated that he would be taking most of the geomorphology material out of his chapter and will retain just about a paragraph on this subject.

Motion No. 1 -- Combine geomorphology material with the channel bank protection and natural streams. The motion was introduced by Te Ngo and seconded by Lotwick Reese and voted unanimously to combine geomorphology with channel bank protection and natural streams. The committee will consider a new chapter name for this material.

44. Lotwick Reese voiced his concern about addressing issues regarding fish passage as he is not sure where one can find guidance on this subject and especially since this is an area that could control

design. Chairman Henderson ask the TCHH members if we should have a new chapter on fish passage or if we should wait until design guidance is further flushed out. Bart Bergendahl suggested that we consider table developing a new chapter for the time being. He indicated that FHWA believes there is need for a more engineering-based procedure rather than a design that is based on geomorphic parameters. Procedures should be more systematic. He further said that FHWA does not want to advocate for a procedure until FHWA is convinced that the approach is more engineering-based and that the next phase of the FHWA's effort towards developing guidance on fish passage design would describe when a geomorphic approach may be applicable and when an engineering-based approach is applicable. Chairman Henderson said that, based on Bart's input, the TCHH may want to consider table developing a chapter on fish passage. Richard Phillips suggested that as a minimum, the culvert chapter would need to refer to fish passage to a small degree. Also, it was mentioned that this topic is an area of concern in various chapters (e.g., environment, culverts, and channel bank protection). Larry Arneson said that there should be a way to make people aware of best management practices available on fish passage. Bart suggested that we refer to the synthesis in the time being.

Motion No. 2 -- Table the concept of developing a new chapter on fish passage. The motion was introduced, seconded and unanimously passed with the understanding that chapters 9, 15 and 17 (Culverts, Environment and Channel Protection) will mention fish passage with a reference to the FHWA synthesis for best management practices on fish passage.

Action Item No. 11 -- FHWA need to provide the TCHH with a reference title and publication number for the fish passage synthesis.

45. Joe Krolak talked briefly about the FHWA memorandum on pipe selection material final rule dated November 30, 2006 (<http://www.fhwa.dot.gov/engineering/hydraulics/policymemo/113006.cfm>). He mentioned that FHWA Administrator Rick Capka discussed this final rule at the AASHTO Board of Directors. Joe indicated that it is up to the State DOT to come up with an analysis to select the type of material to be used. FHWA recognizes that it may be difficult to implement the new rule. While FHWA does not have any guidance or materials beyond those already published, FHWA may need to provide some assistance on how to implement this new rule making. Joe advised State DOTs make their own pipe material selection decision based on engineering and economics and application of the pipe material to local conditions.

G) WORK SESSIONS:

46. Chairman Henderson divided the TCHH into two subcommittees and charged them with the duty of discussing chapters as follow: Group 1 (Chapters 8, 9, 17 and 19): Karuna Pujara, Bart Bergendahl, Hani Farghaly, Brooks Booher, Te Ngo, Matt O'Connor, Larry Arneson and Richard Phillips; Group 2 (Chapters 7, 12, 21 and 16): Dave Henderson, Andrea Hendrickson, Merril Dougherty, Rae Van Hoven, Mike Fazio and Amy Ronnfeldt. Tables showing chapter chairs and team members are presented in Appendix J.
47. It was decided that the Appendixes should be treated as the "How's" for each chapter.
48. The Appendixes should be referenced as A1, A2, A3 and so on for each chapter.
49. A discussion took place on how to name the document and it was decided to name it "AASHTO Drainage Manual."
50. The issue of whether to use single units (English) or retain dual units was discussed among the TCHH members. It was suggested to keep dual units since the TCHH has gone through the effort of have dual units. While State DOTs have changed back to English units, there are other potential users (Canada, Europe and South America) that would benefit of having the manual in dual units. It was

mentioned that there are state DOTs that while they are going back to English units they are keeping all their documents in dual units. There was no objection for going dual units among the TCHH members and therefore, the TCHH decided to move forward in dual units.

51. Kelley Rehm suggested that since we are meeting in November '07, the TCHH should send all draft chapters to the AASHTO publication section shortly after our fall meeting. The draft chapters should include all charts and figures. The AASHTO publication section will do a quality review and should have all editorial comments to us by our spring '08 meeting. She also indicated that AASHTO would like to have our final draft by December '08 and then we should have everything ready for printing by March '09 – we are talking about everything on Levels I and II.
52. The TCHH members worked energetically on reviewing chapter material for approximately 1.5 days.
53. Andrea Hendrickson and Amy Ronnfeldt led a discussion about the possibility of sending chapters out to the whole committee given that each committee chair can highlight areas where they would like the committee to press more attention to a specific section – they believe that this approach would help get more members to comment on a specific section. Another idea discussed was to have interims available on the web. While AASHTO may not like this approach, we can still do it. As long as the basic concept is there, we can have the interim posted and update them as needed. The general consensus towards these ideas was that while we would like to have input from everybody, we have to remember that not everybody would have interest or time to revise a chapter.
54. Joe Krolak reminded the TCHH that FHWA developed a secured web site where chapter chairs can put their chapters – this will prevent having to send out large files, which can clog up one's inbox very quick.
55. With regards to updating our current work on chapters, we should expect to do updates on a 2 to 3 year cycle at least for the first few years.
56. With regards to the data collection chapter, a comment was made that this chapter contains a lot of information; however, there are only a few items to review. It was recommended that each chapter should have a short section with more details about data collection. This may have to be discussed further.
57. The TCHH reconvened as a group on Thursday morning. Mike Fazio led the morning by presenting an “Intermediate Work Plan for Prosecution of Chapter revisions” (See Appendix K).
58. Rick Renna suggested sharing (by e-mail) the work plan with the TCHH members and to allow them to provide input on the schedule.
59. Chairman Henderson pointed expectations for the fall '07 meeting such as having discussions of big picture items pending to be resolved and the fact that we may have to go back into groups again. He highlighted that the work plan presented during this meeting is for a Level I manual and that we have to start working on a Level II work plan. Also, he pointed out that there is no way for policing what the TCHH members are doing on their respective chapters and encouraged everyone to move forward and meet our milestones presented in the work plan for the Level I document. The TCHH members can explore using teleconferences and web conferences through AASHTO for free.
60. Chairman Henderson pointed out that chapter chairs not present during this meeting would need some tutorial on how to catch up with proceeding with progress on their respective chapters. These chapter chairs would have to go to a team member that participated in this meeting for guidance. The TCHH chair and vice-chair will also be glad to provide guidance.

H. BUSINESS SESSION:

61. The next meeting location will be in Moab, Utah. Mike Fazio will be the host. Moab is near the Colorado River and several national and state parks. Other places that he considered were St. George and Park City. The hotel selected is the Red Cliff Lodge, which is about 20 minutes from Moab. The room rate will be \$65 per night, which is the state per diem rate. The hotel will provide breakfast, lunch and dinner for \$7, \$9, and \$15, respectively. As for airlines, he indicated that U.S. Airways has

two flights a day to Moab from Salt Lake City. As an option, one can drive from Salt Lake City to Moab, which would take about 4 hours. The hotel provides internet access. Cellular phones may not work in this area as the mountain cliffs may limit receptions.

62. The airfare cost is approximately \$142 roundtrip from Salt Lake City to Moab. One flight departs at 9:40 AM (arriving at 10:45 AM) and the other at 5:20 PM (arriving at 6:25 PM).
63. Mike distributed brochures about the hotel. Also, he gave us a virtual tour of some of the hotel facilities, including the conference rooms, which is large and would facilitate breaking out in groups for discussions.
64. The dates for our fall '07 meeting will be November 6-8, 2007. Please remember that we will meet for 3 full days.
65. November 5 and 9 should be travel days.
66. Possible locations for our next two meetings are: Baltimore, MD or Washington, D.C. (spring '08), and Portland, Maine (summer '08) – in conjunction with the 2008 National Hydraulics Engineers Conference.
67. A decision on the spring '08 meeting was tabled until Karuna and Jorge get back to the TCHH with information on hotels. Also, Karuna will check on the days when the MDSHA will be sponsoring the meeting of the Technical Committee on Environment. She reported later on that the days are likely to be April 8-10, 2008. Chairman Henderson pointed out that it would be a good opportunity to also meet with this committee.
68. The TCHH will try to make arrangements to meet during the 2008 National Hydraulics Engineers Conference (NHEC), which will be held in Portland, Maine from August 26-29, 2008. Chairman Henderson and Vice-Chair Fazio will coordinate regarding to a meeting room for our committee meeting (either prior to, during, or after the NHEC).
69. A group picture of TCHH members and friends of the TC is presented in Appendix L (courtesy of Te Ngo).

I. COMMITTEE WORKING PLAN:

70. The TCHH needs to update its 5-year working plan (see Appendix M). Our current efforts toward developing the manual will have to be finished by December '08 if we want it to be printed by spring '09. Chairman Henderson pointed out that we would have to go back and take a look at the HDG once we finish with the MDM and may have to shift the work plan for updates – this would have to be addressed in the 2008 Work Plan. Also, he pointed out that we currently have a very aggressive schedule through 2008.

J. CONCERNS OF THE STATES:

71. MDSHA – Karuna Pujara voiced concerns with regards to Sections 404 and 401 – there is so much conflict between these regulations and divergence on how Section 404 and 401 requirements are actually applied. There is a big disconnect with these requirements. She said that the hydraulics community would benefit from having an environmental group looking into these regulations and try to resolve the issues – she doubts that we would get any positive resolution even if we put together a problem statement on this subject – this may take congressional action. She also pointed out that MDSHA is getting ready to be shot down on a project due to issues with the effectiveness of sediment control devices, which were designed according to plans. The environmental agencies said that the MDSHA devices were the best ones that they have ever seen; however, there is still turbidity in the water and they are required to virtually have clear water discharge.
 - a. Members of the committee questioned whether or not we would like to get involved more on this area since it is totally a different discipline. Also, it was discussed that the expectation regarding water quality is that there shall be no increase in turbidity.

72. Canada – Hani Farghaly voiced the need to have research on Manning’s “n” values. Mike Fazio pointed out that there is an active NCHRP project on this subject being conducted in Utah. The TCHH discussed whether or not one should use a high or low Manning’s “n” value when designing a new pipe. Paul Wirfs said that he never goes below 0.013 for concrete pipes (typically goes with 0.015 – 0.016) based on engineering judgment to allow for deterioration. Hani Farghaly will take the lead on a problem statement on this subject and Mike Fazio and Andrea Hendrickson will assist him. Hani reported that they have completed a manual on Factors for Designing Service Life for Projects and Materials Service Life. He indicated that preparing all the documentation and contract material is proving to be a challenge after completing this document, which is ready to be launched and planned to be implemented in July ’07. The new process will identify suitable pipes for use by contractors. They have developed this manual with the cooperation of manufactures. He pointed out that their IDF curves are out of date and they are looking at means to update this information. Also, Hani reported that they are developing a culvert inventory and requested anyone with a culvert management system or information about it to share this with him.
73. TXDOT – Amy Ronnfeldt expressed concerns on how much money they have for their projects. Also, she expressed concerns with the lack of communication between other agencies and the TX DOT about projects.
74. MNDOT – Andrea Hendrickson voiced concerns they are having with pipe culvert joints separation – pipe culverts are not making their 75 year service life. Life span of pipe is often related to joint problems rather than pipe material deterioration. The state could use more information on pipe repair techniques. Also, they are having discussions on appropriate Manning's "n" for in place conditions rather than numbers provided by lab studies of flow during optimal conditions. For instance HDS-5 has the Manning’s “n” for smooth concrete pipe as 0.010-0.011 and the state DOT typically uses 0.012-0.013 for design. When looking for HDPE test specifications we found that tests provided in ASTM and AASHTO specs are for the resin, not for the extruded pipe. Pipe material characteristics can change during the pipe manufacturing process, and the state DOT has no test for manufactured pipe. FL has done some work on this and there was a research project to address this issue, but the final report was never issued.
75. FLDOT – Rick Renna pointed out that he encourages all state DOTs to adopt the results from NCHRP 4-26. The state has been testing HDPE for the last 4-years and has implemented a manufacturing quality assurance test. HDPE is allowed for 50 years service life, but not for 100-years. Also, he pointed out that if the installation of HDPE cannot be controlled, then one should not consider using it. The state DOT is also updating the complex pier scour equation and recently completed tests on embedded footers or partially embedded footers. They found that the HEC-18 equations on these scenarios were extremely conservative. They just completed an erosion control manual.
76. OKDOT – No report.
77. ILDOT – Matt O’Connor reported problems with using bridge sharks technology (from Debris Free). They have used them at over 10 locations and have observed several kinds of failure modes over a brief period of use. Failures include bridge sharks clogged with trees/corn stalks, crushed by large debris or dislodged from the pier face mounting. Other TCHH members have used them: Mike Fazio reported that they have worked well in Utah; Andrea Hendrickson reported that MN has used them in a district and expressed concerns with their installation; Merrill Dougherty reported that they are not robust enough; Richard Phillips reported that South Dakota is concerned with their performance under icy conditions. Matt expressed concerns with FEMA asking for letters of map revisions for new alignments on unregulated streams. He asked the group if any of their states’ central bridge offices had an organizational structure that did not include a stand alone bridge hydraulics unit. He explained that their replies would help him with ongoing discussions of an IDOT plan that intends to fold the hydraulics staff into a unit guided by a structural engineer. A survey on this subject was initiated by Arizona DOT (Ken Akoh-Arrey is the contact person). The Ngo will see if the results of

this survey can be summarized. Also, Matt pointed out (by e-mail) that a complete and prompt set of minutes makes the meeting more valuable to the State DOT's in that they have a clearer idea of the proceedings and a much more reliable source of information at their disposal. Also, he pointed out that information from the minutes gets disseminated to a good deal of engineers -- he generally uses the minutes to brief IDOT in-house staff on FHWA activities, the committee's activities, scour/research developments, etc.

Action Item No. 12 – Te Ngo will find out if survey could be summarized to show how hydraulics units in State DOTs are structured.

78. ARDOT – Brooks Booher reported that Arkansas DOT drainage manual has not been completed.
79. Oregon DOT – Paul Wirfs is facilitating a discussion between the bridge engineering community and environmental agencies – to have a programmatic approach for streamlining permits. There is a need for training environmental staff on why engineers are coming with certain design so that they can understand bridge hydraulics. The state DOT is working three chapters: water quality, fish passage and temporary water management – these chapters should be available in fall '07. The chapter on fish passage won't be published unless they reach an agreement with regulatory agencies – they are having some concerns with low flows. The chapter on temporary water management will focus on managing water during construction – they are starting to be required by environmental agencies to have plans on this before permits are issued – they have to show how they will manage water during construction. Paul also reported that they recently lost a court case dealing with an utility company – the state DOT is not allowed to review their installations in the ROW – and cannot enforce environmental loss of others – essentially, they cannot enforce (require) water quality on utility company projects. Paul also reported that they will be starting a research project on “Construction on Fish Passage” and that they will be updating ER curves throughout the state.
80. NCDOT – Chairman Henderson reported that they are having difficulty in recruitment/retention of professional staff, particularly with engineering technicians – colleges are not graduating technicians. If they get technicians on board, they usually retain them, but with engineers, once they get their P.E., they go on to other jobs.
81. NYDOT – Norm Schips reported that retention of engineers is also an issue in NY. They are also experiencing issues with fish passage now-a-days with the nationwide permits.
82. IDDOT – Lotwick Reese reported issues keeping engineers. For the last 10-years, legislation promoted to contract out, but now they want projects to be done in house – consultants are costing too much; however, in-house engineers are gone. Once engineers get their P.E.'s they get 5 offers. The State DOT has lost about 15 of their top engineers. He also reported that Ayres Associates is doing POAs in 10 bridges that they have identified on their top priority list. They are trying to figure out what to do with their remaining scour critical bridges. Also they are having floodplain issues.
83. NMDOT – Rae Van Hoven reported similar problems with retaining engineers. They are conducting several days of training to all functional areas so that they would know what everybody is doing. They are experiencing problems with riprap and sediment transport due to the erosive materials in the state. Rae reported that they decided to write down problems they have been experiencing and their solutions to help out incoming engineers because most of the senior engineers are starting to leave. Also, she reported that they are revising their drainage manuals to include case studies that would be helpful to incoming engineers.
84. CALTRANS – Glenn DeCou reported (by e-mail) that they are completing the final edits to their Fish Passage Guide, based on comments from resource agency staff. He indicated that this will be a very comprehensive document with detailed instructions on design of various types of fish passage improvements. Final document to be posted on their Division website by June 1. Gen reported on the passage of Proposition 1B last November, which will lead to nearly \$20B in bonds dedicated to

transportation. He pointed out that their current budget for the coming fiscal year calls for all of the engineering work that will be generated by the bond measure to go to consultants with no increase in state staffing. He also reported that they have just received the final draft of a research document which evaluated several hydrology methods commonly used in desert regions to come up with new recommendations. Final report should be published in about a month.

85. UTDOT – Mike Fazio reported (by e-mail) that culvert repair is a big issue in Utah. Many culverts are failing or have failed causing some damage. He indicated that they don't have a mandate to have a regular program to inspect culverts regularly as we do for bridges. This is a safety issue.
86. VADOT – Roy Mills reported (by e-mail) that they are concerned with losing (and not replacing some) people, but not work (do more with less). If replacement personnel allowed, hard to find willing/qualified candidates for the salary being offered. He also reported that some additional money has been approved for transportation, but most associated work likely to go to consultants. Also, he reported that State Stormwater Management Regulations are being revamped. It will be much harder for linear (roadway) projects to comply within typical confines. They have MS-4 issues abound. VADOT is also concerned with recent changes to Section 112 of Title 23 U.S. Code requiring the allowance of alternative materials in all drainage systems unless the DOT can provide engineering and economic justification for not doing so.

K) FINANCIAL REPORT (As of May 31, 2007)

- Funds Available prior to Meeting: \$2,565.75
- Registration Fees from Spring 2007 (\$95): \$2,185.00
- + Subtotal \$4,750.75
- Expenses (Room/breaks): \$1,590.00
- Total Balance \$3,160.75

L) TCHH FUTURE MEETING LOCATIONS:

- 2007 Fall Moab, Utah
- 2008 Spring Baltimore, MD or Washington, D.C. (to be decided)
- 2008 Fall Portland, Maine (in conjunction with the 2008 National Hydraulics Engineers Conference)

Appendix A

AASHTO TECHNICAL COMMITTEE ON HYDOLOGY AND HYDRAULICS		
MEMBERS/MEMBER'S REPRESENTATIVES		
MEMBER	ADDRESS	TELEPHONE
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Mr. Brooks Booher Staff Hydraulic Engineer	AR State Highway & Transportation Dept. 10324 I-30, Little Rock, AR, 72209 PO Box 2261, Little Rock, 72203-2261	(501) 569-2589 (o) (501) 569-2057 (fax) brooks.booher@arkansashighways.com
Mr. Glenn DeCou Headquarters Hydraulic Engineer State Highway Drainage Design	CALTRANS, 1120 N Street, Room 2208, Sacramento, CA 95814, P.O. Box 942874 Sacramento, CA 94274-0001	(916) 653-1302 (o) (916) 653-1446 (f) Glenn_S_DeCou@dot.ca.gov
Mr. Merrill E. Dougherty Hydraulics Engineer Supervisor	Indiana Department of Transportation 100 North Senate Avenue, Rm N642 Indianapolis, IN 46204-2228	(317) 232-6776 (o) (317) 233-4929 (f) mdougherty@indot.state.in.us
Dr. Hani Farghaly Senior Hydrotechnical Engineer Design and Contract Standards Office	Ontario Ministry of Transportation 301 St. Paul St, 2nd Floor North St. Catherines, Ontario L2R 7R4	(905) 704-2244 (o) (905) 704-2051 (f) hani.farghaly@mto.gov.on.ca
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Mr. Preston Helms Hydraulic Design Engineer	SC Department of Transportation P.O. Box 191, Columbia, SC 29202 955 Park Street, Columbia, SC 29201	(803) 737-1723 (o) (803) 737-9868 (f) helmspw@dot.state.sc.us
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Mr. Te Anh Ngo Roadway Drainage Engineer Roadway Design Division	Oklahoma Dept. of Transportation 200 N.E. 21 st Street Oklahoma City, Oklahoma 73105	(405) 521-6772 (o) (405) 522-4519 (f) tngo@odot.org
Mr. Matt O'Connor Hydraulics Engineer	Illinois Department of Transportation 2300 S. Dirksen Parkway Springfield, Illinois 62764	(217) 785-2917 (o) (217) 782-7960 (f) matthew.oconnor@illinois.gov

AASHTO TECHNICAL COMMITTEE ON HYDOLOGY AND HYDRAULICS

MEMBERS/MEMBER'S REPRESENTATIVES

MEMBER	ADDRESS	TELEPHONE
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Ms. Karuna Pujara Chief, Highway Hydraulics Division	Maryland State Highway Admin. 707 N. Calvert St., MS C-201 Highway Hydraulics Div. Baltimore, MD 21202	(410) 545-8390 (o) (410) 209-5031 (f) kpujara@sha.state.md.us
Mr. Lotwick I. Reese Hydraulics Engineer	Idaho Transportation Department P.O. Box 7129, Boise, Idaho 83703 3311 West State Street Boise, Idaho 83707-1129	(208) 334-8491 (o) (208) 334-8040 (f) lotwick.reese@itd.idaho.gov
Mr. Rick Renna State Hydraulics Engineer	Florida Department of Transportation 605 Suwannee Street M.S. 32 Tallahassee, Florida 32399-0450	(850) 414-4351 (o) (850) 559-2780 (m) (850) 414-5261 (f) rick.renna@dot.state.fl.us
Mr. James R. Richardson Road Design Leader	Kansas Department of Transportation Bureau of Design, Road Section 700 SW Harrison Street Topeka, Kansas 66603-3754	(785) 368-8292 (o) (785) 296-6946 (f) jimr@ksdot.org
Ms. Amy Ronnfeldt Hydraulics Engineer	TXDOT 200 E. Riverside Dr. Austin, Texas 78704	(512) 416-2328 (o) (512) 416-3098 (f) aronnfel@dot.state.tx.us
Mr. Norman P. Schips Civil Engineer 3	New York State Department of Transportation Design Quality Assurance Bureau 50 Wolf Road - POD 23 Albany, NY 12232	(518) 485-8611 (o) (518) 457-6477 (f) nschips@gw.dot.state.ny.us
Mr. Alvin Shoblom Senior Hydraulics Engineer	Oregon Department of Transportation 355 Capital Street NE Room 308A Salem, Oregon 97301	(503) 986-3365 (o) alvin.shoblom@odot.state.or.us
Mr. Amir Soltani	Nevada Department of Transportation	(775) 888-7619 (o) (775) 986-3407 (f) amir.soltani@sbcglobal.net

AASHTO TECHNICAL COMMITTEE ON HYDOLOGY AND HYDRAULICS

MEMBERS/MEMBER'S REPRESENTATIVES

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Ms. Rae Van Hoven State Drainage Engineer	NM DOT 1120 Cerrillos Rd. Santa Fe, New Mexico 87505-1842	(505) 827-5323 (o) (505) 827-5345 (f) rae.vanhoven@state.nm.us
AASHTO HIGHWAY SUBCOMMITTEE ON DESIGN OFFICERS		
Dr. Kam K. Movassaghi (Chair) Secretary, LA DOT & Development	P.O. Box 94245 1201 Capitol Access Road Baton Rouge, LA 70804-9245	(225) 379-1200 (o) (225) 379-1851 (f) kammovassaghi@dotd.state.la.us
Mr. Dwight Horne (Secretary) Director, Office of Program Administration	FHWA, (HIPA-1) 400 7th Street, SW., Room 3134 Washington, D.C. 20590	(202) 366-5530 (o) (202) 366-7298 (f) dwight.horne@fhwa.dot.gov
Ms. Kelley C. Rehm, P.E. AASHTO Staff Project Engineer - Technical Committee on Hydrology and Hydraulics	AASHTO 520 Suffolk Court Old Hickory, Tennessee 37138	(859) 433-9623 (o) (866) 301-1322 (f) krehm@ashto.org

Appendix B

<u>VISITORS</u>		
AASHTO TECHNICAL COMMITTEE ON HYDROLOGY AND HYDRAULICS SPRING 2007 MEETING FERNANDINA BEACH, FLORIDA MAY 1-3, 2007		
Name	Address	Telephone/Fax/E-Mail
David Reynaud NCHRP	500 5 th Street, NW. Washington, D.C. 20001	(202) 334-1695 (Office) (202) 334-2006 (Fax) dreynaud@nas.edu
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Kornel Kerényi FHWA/TFHRC	6300 Georgetown Pike McLean, VA 22101	(202) 493-3142 (Office) kornel.kerényi@dot.gov
Paul Wirfs Oregon DOT	355 Capitol Street, NE. Suite 301 Salem, Oregon 97301	(503) 986-3526 (Office) paul.r.wirfs@odot.state.or.us

Appendix C

 <h3>FHWA Perspective</h3> <p>Presented for: AASHTO Technical Committee on Hydrology and Hydraulics Fernandina Beach, Florida May 1, 2007</p> <p>By: Jorge E. Pagán-Ortiz Principal Bridge Engineer - Hydraulics Leader, Hydraulics and Geotechnical Team (e-mail: jorge.pagan@dot.gov) Federal Highway Administration Office of Bridge Technology Washington, D.C.</p> 	 <h3>FHWA National Hydraulics Team</h3> <p>Headquarters: Jorge E. Pagán-Ortiz, Joe Krolak, Kornel Kerenyi and Louisa Ward</p> <p>Resource Center: Dr. Larry Arneson, Cynthia Nurmi, Dan Ghere, Dr. Eric Brown and Veronica Ghelardi</p> <p>Federal Lands Highway Program: Bart Bergendahl, Brian Beucler, Abbi Ginsberg, Dave Dajc, Scott Hogan, Dr. Thien Nguyen, Dr. Mark Browning, Sven León, (1 Vacant in Central Federal Lands)</p> <p>Division Office: Steve Taillon, Kansas</p>
 <h3>Hydraulics Engineering Website</h3> <ul style="list-style-type: none"> ■ WWW.FHWA.DOT.GOV/ENGINEERING/HYDRAULICS ■ Structured by the "Functional Areas" <ul style="list-style-type: none"> ■ Scour Technology ■ Bridge Hydraulics ■ Culvert Hydraulics ■ Highway Drainage ■ Hydrology ■ Environmental Hydraulics ■ Identifies FHWA contacts and activities 	 <h3>Functional Areas Activities</h3> <ul style="list-style-type: none"> ■ Limited activities due to lack of funding for FY '07 <ul style="list-style-type: none"> ■ SAFETEA-LU did not provide discretionary funds <ul style="list-style-type: none"> • Currently using \$156K carryover for FY '07 program activities ■ Funding level for FYs '08 and beyond is unknown <ul style="list-style-type: none"> ■ Does not look promising (from a program office perspective) ■ May have to rely totally on NHI funding availability for updating HEC/HDS publications and for software development
 <h3>Scour Technology</h3> <ul style="list-style-type: none"> ■ HECs 18 & 20 Updates <ul style="list-style-type: none"> ■ Status: Planned for FY '08 ■ To be updated with research at the FHWA's J. Sterling Jones Hydraulics Lab on pressure flow and K_d factor (armoring), and with results from NCHRP projects. ■ Jorge E. Pagán-Ortiz, Principal Bridge Engineer - Hydraulics, FHWA Office of Bridge Technology, is leading this Task. 	 <h3>Scour Technology (Continuation)</h3> <ul style="list-style-type: none"> ■ HEC 23 Update <ul style="list-style-type: none"> ■ Status: Ongoing ■ Task awarded to Ayres Associates ■ To be updated with: <ul style="list-style-type: none"> • New material from POA module, results from NCHRP projects, and new and updated design guidelines. ■ Jorge E. Pagán-Ortiz, Principal Bridge Engineer - Hydraulics, FHWA Office of Bridge Technology, is leading this Task.

 <h3>Scour Technology (Continuation)</h3> <ul style="list-style-type: none"> ■ Revisions to the FHWA's Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges (Coding Guide) <ul style="list-style-type: none"> ■ Status: Ongoing ■ Proposed to be rename to "Specifications Guide" ■ Reviewing all Items pertaining to bridge hydraulics and scour: <ul style="list-style-type: none"> • Items 60, 61, 62, 71, and 113 ■ Proposing additional Items to capture other issues such as: <ul style="list-style-type: none"> • Plan of Action for a scour critical bridge (Item 114) • Stream instability upstream/downstream of a bridge (Item 115) • Scour countermeasure type and condition (Items 116 and 117) • Stream stability countermeasure type and condition (Items 118 and 119) 	 <h3>Scour Technology (Continuation)</h3> <ul style="list-style-type: none"> ■ Module on Plan of Action for Scour Critical Bridges <ul style="list-style-type: none"> ■ Status: Ongoing ■ Contactor is Ayres Associates ■ Second draft delivered to FHWA ■ Expanded guidance for developing POAs ■ Presents POA Standard Template <ul style="list-style-type: none"> • Posted on FHWA hydraulics website @ http://www.fhwa.dot.gov/engineering/hydraulics/index.cfm ■ Will include case studies for riverine, monitoring and tidal on a CD ■ Completion expected in Summer '07 <ul style="list-style-type: none"> • Module will be available at the FHWA Hydraulics web site. ■ Cynthia Nurmi, Hydraulics Engineer, FHWA Resource Center, is leading this Task.
 <h3>Scour Technology (Continuation)</h3> <ul style="list-style-type: none"> ■ POA Training Module (micromedia breeze presenter) <ul style="list-style-type: none"> ■ Status: Completed! ■ Content: <ul style="list-style-type: none"> • Guidance and Regulations • Details of POA Standard template • Case Studies on Riverine and Monitoring ■ Memo will distribute CDs with POA training module in about 2 weeks ■ Available for free downloading at the NHI web site in May 2007 <ul style="list-style-type: none"> • link to the NHI web site from the FHWA hydraulics web page ■ Cynthia Nurmi, Hydraulics Engineer, FHWA Resource Center is leading this Task. 	 <h3>Scour Technology (Continuation)</h3> <ul style="list-style-type: none"> ■ Scour and Protection of Bottomless Culverts: Phases I and II <ul style="list-style-type: none"> ■ Status: Research Completed! <ul style="list-style-type: none"> • Conducted for MDSHA at the FHWA's J. Sterling Jones Hydraulics Lab ■ Research outcome: <ul style="list-style-type: none"> • Equations for estimating scour at bottomless culverts • Countermeasure (end treatment) for reducing culvert outlet scour ■ Final report completed - report number HRT-07-026 (available at the FHWA Hydraulics website) <ul style="list-style-type: none"> • http://www.fhwa.dot.gov/engineering/hydraulics/index.cfm ■ Procedure to reside in HEC-18 ■ Dr. Kornel Kerenyi, Senior Research Hydraulics Engineer, FHWA TFHRC, led this Task
 <h3>Scour Technology (Continuation)</h3> <ul style="list-style-type: none"> ■ Second Edition of HEC-25 <ul style="list-style-type: none"> ■ Status: Ongoing ■ Contractor is University of South Alabama (Dr. Scott Douglas) ■ NHI Course is being developed parallel to second edition of HEC-25 ■ Draft Second Edition under review by FHWA ■ Joe Krolak, Senior Hydraulics Engineer, FHWA Office of Bridge Technology, is leading this Task 	 <h3>Scour Technology (Continuation)</h3> <ul style="list-style-type: none"> ■ Bridge Failure Forensic Investigation Report <ul style="list-style-type: none"> ■ Currently, there is no system in place for collecting available information on bridge failures ■ A forensic report could be the process for reporting bridge failures (hydraulic, overload, fire, earthquake, etc.) <ul style="list-style-type: none"> • Standard template for capturing forensic information for a bridge/culvert failure ■ National database for future reference that could lead to enhance ability to identify inadequacies on material specifications, design procedures, construction techniques and maintenance operations ■ Dan Ghere, Hydraulics Engineer, FHWA Resource Center is leading this Task

 <h3>Scour Technology (Continuation)</h3> <ul style="list-style-type: none"> ■ Wave Load Synthesis Study (FY '06) <ul style="list-style-type: none"> ■ Status: Completed ■ Study conducted at the University of South Alabama (Scott Douglas) and Texas A&M (Billy Edge) ■ Report delivered to FHWA ■ Joe Krolak, Senior Hydraulics Engineer, FHWA Office of Bridge Technology, led this Task 	 <h3>Bridge Hydraulics</h3> <ul style="list-style-type: none"> ■ AASHTO/FHWA Task Force on Wave Forces <ul style="list-style-type: none"> ■ Status: Ongoing ■ Chairman: Mr. Greg Perfetti, NC DOT State Bridge Engineer ■ FHWA Members (Hydraulics): Joe Krolak and Kornel Kerenyi ■ Task Force currently working on two documents: <ul style="list-style-type: none"> ● Design and Retrofit Handbook ● Guide Specifications ● Target date for final report is November '08 and published by March '08.
 <h3>Bridge Hydraulics (Continuation)</h3> <ul style="list-style-type: none"> ■ Unknown Foundation Synthesis <ul style="list-style-type: none"> ■ Status: Ongoing (delayed) ■ Contractor - Scott Sabol, Associate Professor, Vermont Tech ■ Completion expected in Spring '07 - draft due in May '07 ■ Cynthia Nurmi, Hydraulics Engineer, FHWA Resource Center is leading this task 	 <h3>Culvert Hydraulics</h3> <ul style="list-style-type: none"> ■ Develop HY8 Graphical User Interface for Windows <ul style="list-style-type: none"> ■ Status: Phase I Completed! ■ Contract was EMS-I ■ Phase II - awarded to EMS-I <ul style="list-style-type: none"> ● To include module on energy dissipators, hydraulic jumps in the culvert barrel and broken-back culverts ■ Joe Krolak, Senior Hydraulics Engineer, FHWA Office of Bridge Technology, is leading this Task
 <h3>Culvert Hydraulics (Continuation)</h3> <ul style="list-style-type: none"> ■ HDS-5 Update <ul style="list-style-type: none"> ■ Status: Delayed until FY '08 ■ To be updated with new guidance from NCHRP project 15-24 (hydraulic loss coefficients and composite roughness calculations) ■ Joe Krolak, Senior Hydraulics Engineer, FHWA Office of Bridge Technology, will be leading this Task 	 <h3>Culvert Hydraulics (Continuation)</h3> <ul style="list-style-type: none"> ■ Culvert Asset Management Strategic Planning <ul style="list-style-type: none"> ■ Status: FHWA National Hydraulics Team proposed forums to be funded under the "Convening and Scanning" options of the Exploratory Advanced Research Program provided by SAFETEA-LU ■ Objective: <ul style="list-style-type: none"> ● Convene subject experts during FYs '07 and '08 to address the Nation's aging culvert infrastructure ● Identify state-of-the-art culvert asset management technologies ● Identify future research technology development and deployment and training needs ● Establish working groups to steer future national research and technology development initiatives ■ Dr. Eric Brown, Hydraulics Engineer, FHWA Resource Center, is leading this Task

 <h2 style="text-align: center;">Highway Drainage</h2> <ul style="list-style-type: none"> ■ HEC-22 Revision <ul style="list-style-type: none"> • Status: Completed! • Implements new methodology for estimating junction losses in assess holes • New technology already implemented in NHI Course 135027 • Dan Ghere, Senior Hydraulics Engineer, FHWA Resource Center, is leading this Task • Another revision to include new storm drain software is planned for FY '08 	 <h2 style="text-align: center;">Highway Drainage (Continuation)</h2> <ul style="list-style-type: none"> ■ Develop new FHWA Storm Drain Software (FY '07) <ul style="list-style-type: none"> • Joe Krolak, Senior Hydraulics Engineer, FHWA Office of Bridge Technology, will be leading this Task
 <h2 style="text-align: center;">Hydrology</h2> <ul style="list-style-type: none"> ■ Pooled-Fund studies to upgrade rainfall maps <ul style="list-style-type: none"> • Status: Some states have committed funds for this effort <ul style="list-style-type: none"> • Could be a regional pooled-fund or national pooled-fund depending on number of states participating (Dr. Kerenyi will give us an update on this task) • Dr. Kornel Kerenyi, Senior Hydraulics Engineer, FHWA TFHRC, is leading this Task 	 <h2 style="text-align: center;">Environmental Hydraulics</h2> <ul style="list-style-type: none"> ■ Design of Fish Passage at Bridges and Culverts <ul style="list-style-type: none"> • Status: Synthesis almost completed! - target completion is May '07 • Contractor is Dr. Rollin Hotchkiss (now with BYU) • Draft synthesis reviewed by Technical Advisory Committee and members of the FHWA National Hydraulics team - provides a comprehensive approach for fish passage design based on geomorphic parameters and not an engineering-based design • Bart Bergendahl, Senior Hydraulics Engineer, FHWA Central Federal Lands, is leading this Task • Phase II being considered (developing an HEC-level publication)
 <h2 style="text-align: center;">NHI Training Courses in Hydraulics Engineering</h2> <ul style="list-style-type: none"> ■ Second Most Popular Category of NHI Training Courses ■ 13 Active Courses ■ Considering to Develop a Few Other Courses 	 <h2 style="text-align: center;">NHI Courses to be Updated</h2> <ul style="list-style-type: none"> ■ NHI 135047 - Stream Stability and Scour for Bridge Inspectors <ul style="list-style-type: none"> • Status: Ongoing • Update to include: <ul style="list-style-type: none"> • Prerequisite modules on basic stream stability and scour concepts and definitions • POA material • Animations on stream stability, scour and countermeasures • Field Inspector's Handbook • New interactive inspection and coding workshop • Contractor is Aynes Associates • Target date for completion is September '07 • FHWA is exploring the feasibility of making this course available in web-based training modules • Jorge E. Pagan-Ortiz, Principal Bridge Engineer - Hydraulics, FHWA Office of Bridge Technology, is leading this Task

 <h3 style="text-align: center;">NHI Courses to be Updated (Continuation)</h3> <ul style="list-style-type: none"> ■ NHI 135048 - Countermeasure Design for Bridge Scour and Stream Instability <ul style="list-style-type: none"> ■ Status: Ongoing ■ Update to include: <ul style="list-style-type: none"> • New POA material • Prerequisite modules on basic stream stability and scour concepts and definitions • Animations on stream stability, scour and countermeasures • New technology and guidance from NCHRP projects on countermeasures and environmentally sensitive channel and bank protection • New and updated design guidelines • Target date for completion is Summer 2008 ■ Jorge E. Pagán-Ortiz, Principal Bridge Engineer - Hydraulics, FHWA Office of Bridge Technology, is leading this Task. 	 <h3 style="text-align: center;">NHI Courses to be Updated (Continuation)</h3> <ul style="list-style-type: none"> ■ NHI 135065 - Introduction to Highway Hydraulics <ul style="list-style-type: none"> ■ Status: Awarded to Ayres Associates ■ Update with new HECs 14 and 15; and other minor corrections ■ Cynthia Nurmi, Hydraulics Engineer, FHWA Resource Center, will be leading this Task
 <h3 style="text-align: center;">NHI Courses to be Updated (Continuation)</h3> <ul style="list-style-type: none"> ■ NHI 135081 - Introduction to Highway Hydraulics Software <ul style="list-style-type: none"> ■ Status: Update with new HY-8 planned for FY '07; and with storm drain software for FY '08 ■ Joe Krolak, Senior Hydraulics Engineer, FHWA Office of Bridge Technology, will be leading this Task 	 <h3 style="text-align: center;">NHI Courses to be Updated (Continuation)</h3> <ul style="list-style-type: none"> ■ NHI 135027 - Urban Drainage <ul style="list-style-type: none"> ■ Status: Planned for FY '08 ■ Update with new storm drain software ■ Dan Ghene, Senior Hydraulics Engineer, FHWA Resource Center will be leading this Task ■ NHI 135046 - Stream Stability and Scour at Highway Bridges <ul style="list-style-type: none"> ■ Status: Planned for FY '08 ■ Update with new POA material, new research on pressure flow, K4 factor and outlet scour countermeasure, and results from NCHRP projects ■ Jorge E. Pagán-Ortiz, Principal Bridge Engineer - Hydraulics, FHWA Office of Bridge Technology, is leading this Task
 <h3 style="text-align: center;">NHI Courses to be Updated (Continuation)</h3> <ul style="list-style-type: none"> ■ NHI 135056 - Culvert Design <ul style="list-style-type: none"> ■ Status: Planned for FY '07 ■ Update with new HY-8 software, and HEC-14 ■ Dr. Eric Brown, Hydraulics Engineer, FHWA Resource Center-Baltimore, MD, will be leading this Task 	 <h3 style="text-align: center;">NHI Course Under Development</h3> <ul style="list-style-type: none"> ■ 135082, Tidal Hydrology, Hydraulics and Scour at Bridges <ul style="list-style-type: none"> ■ Status: Ongoing ■ Contractor: Kilgore Consultant Management ■ Target date for completion is Summer '07 ■ Joe Krolak, Senior Hydraulics Engineer, FHWA Office of Bridge Technology is leading this Task ■ Online Pre-requisite Modules <ul style="list-style-type: none"> ■ Hydrology (already developed) ■ Basic hydraulics concepts and definitions (already developed) ■ Basic concepts and definitions on scour (already developed - final draft) ■ Basic concepts and definitions on stream stability (to be developed in CY '07) ■ Dr. Larry Arneson, Principal Bridge Engineer - Hydraulics, FHWA Resource Center, is leading this Task

NHI Courses to be Developed

- Floodplain Policy and Guidance (FY '08 ?)
- Design of Fish Passage at Bridges and Culverts (FY '09?)
- Tidal Hydraulics Modeling (?)
- Sediment Transport (?)
- Advanced HEC-RAS (?)
- Stream Stability and Scour at Highway Bridges for Bridge Inspector
 - Web-based training (hopefully soon!!!)

Innovative Bridge Research and Deployment Program (IBRD)

- Program funds provided under SAFETEA-LU to:
 - Promote, demonstrate, evaluate, and document the application of innovative designs, materials, and construction methods in the construction, repair, rehabilitation of bridges and other highway structures
 - FY '07 funds for the IBRD program estimated at \$5.3 million
- Among the goals of the program are:
 - The development of highway bridges and structures that will withstand natural disasters
 - The development of improved methods to detect bridge scour and economical bridge foundation designs that will withstand bridge scour

IBRD (Continuation)

- Solicitation procedure
 - Posted at <http://www.fhwa.dot.gov/bridge/ibrd/>
 - FY '07 solicitations extended until the second week of May!

Conferences

- 2008 National Hydraulic Engineering Conference
 - Planned for August 26-29, 2008 in Portland, Maine
 - Theme: *Partnering for Progress in a Changing Environment*
 - Cynthia Nurmi and Dr. Eric Brown, Hydraulics Engineers, FHWA Resource Center, are leading this Task
 - Working with AASHTO TCHH Steering Committee
- Regional/National Video Conferences
 - Being considered - may be held on a quarterly or biannual basis
 - Serve as an opportunity to discuss and/or provide updates on issues pertaining to new policies, technologies or other items of concern
 - Veronica Ghelardi is leading this Task

New DOT Headquarters Building

- FHWA HQs Offices will begin to move in on May 2007
 - Office of Bridge Technology will move in on May 14
 - Metro subway service (Green Line-Navy Yard Station) within a block
 - New Address is 1200 New Jersey Avenue, SE: Washington, D.C. 20590
 - Telephone numbers to remain unchanged

Questions???



Appendix D



U.S. Department
of Transportation
Federal Highway
Administration

Subject: **ACTION**: Request for FY 2007 Candidates for
the Innovative Bridge Research and Deployment
Program (**Reply Due: April 30, 2007**)
/s/ Original Signed by

Date: March 28, 2007

From: M. Myint Lwin, P.E., S.E.
Director, Office of Bridge Technology

In Reply Refer To:
HIBT

To: Directors of Field Services
Federal Lands Highway Division Engineers
Resource Center Director
Division Administrators

The purpose of this memorandum is to announce the FY 2007 solicitation for candidate projects from the States for the Innovative Bridge Research and Deployment (IBRD) Program. As in our June 2006 solicitation, the focus of the IBRD Program is to carry out a program to promote, demonstrate, evaluate, and document the application of innovative designs, materials, and construction methods in the construction, repair, and rehabilitation of bridge and other highway structures.

By this notice, the Federal Highway Administration (FHWA) is soliciting applications for the IBRD Program for FY 2007. The FHWA is focusing on projects which, in addition to meeting statutory criteria of the program, provide substantial benefits relating to highway safety or congestion relief. In addition to traditional projects applications, FHWA invites applications of larger-scale projects that provide strategic safety and congestion benefits under the IBRD Program.

As you know highway safety has been an increasing focus and priority for FHWA over the recent past. Targeting discretionary funding such as IBRD funds, in a results-oriented comprehensive approach to safety, is a means of directing limited discretionary funding to those projects that will yield tangible transportation and safety benefits. With respect to safety, applicants should describe the safety benefits associated with the project or activity for which funding is sought, including whether the project, activity, or improvement:

- Will result in a measurable reduction in the loss of property, injury, or life;

- Incorporates innovative safety design or operational techniques, including variable pricing for congestion reduction, electronic tolling, barrier systems, and intersection-related enhancements;
- Incorporates innovative construction work zone strategies to improve safety;
- Is located on a rural road that is in need of priority attention based on analysis of safety experience; and/or
- Is located in an urban area of high injury or fatality, and is an initiative to improve the design, operation or other aspect of the existing facility that will result in a measurable safety improvement.

Increasing mobility by reducing congestion has been a priority for FHWA over the past few years. The application of discretionary funding to improve mobility and reduce congestion will yield tangible transportation and economic benefits that should far exceed the limited amount of discretionary funding provided to the project. These safety and congestion benefits are the types of benefits that the General Accounting Office (GAO) recommended to be assessed in making discretionary grant awards in an earlier report discussing the FHWA discretionary grant process.

In furtherance of measuring the congestion reduction and mobility benefits associated with a project that qualifies for funding under the IBRD Program, within the application, the applicant should describe how the IBRD project, activity or improvement:

- Relieves congestion in an urban area or along a major transportation corridor;
- Employs operational and technological improvements that promote safety and congestion relief; and/or
- Addresses major freight bottlenecks.

For FY 2007, we estimate that approximately 5.3 million is available for the IBRD Program.

In the past, we have funded a large number of projects related to accelerated bridge construction, fiber reinforced polymer, and high strength steel and high strength concrete. We encourage States to send project applications in many other areas of innovation and technologies that will help build new, cost-effective innovative material highway bridge applications and at the same time promote safety and congestion relief.

SAFETEA-LU allows the Federal share to vary, and instructs the Secretary of Transportation to determine the Federal share (percentage) of the cost of a project under this section. For FY 2007, actual percentages will depend on the number of eligible projects submitted, the types of innovative material technologies, and the cost of the candidate projects as well as the amount of funds requested by the States.

We request your assistance in identifying FY 2007 candidate projects for IBRD. The projects shall meet one or more of the goals of the programs including increasing safety and reducing congestion. The Federal Register Notice of Funding Availability was published on March 22 and is available at the following link:

<http://a257.g.akamaitech.net/7/257/2422/01jan20071800/edocket.access.gpo.gov/2007/pdf/E7-5161.pdf>

Also attached is additional information on the IBRD Program, application procedures, and selection criteria for your use and information. Please discuss the program with your State department of transportation (DOT) to determine its interest in the program and to solicit candidate projects. Please assist this office and your State by determining each candidate's eligibility, by assuring the completeness of each application.

We request that candidate project submissions be received in Headquarters (HIBT-1) no later than April 30, 2007, (however, late applications may be considered to the extent practical). To facilitate widespread dissemination, this memorandum will be posted at: <http://www.fhwa.dot.gov/discretionary/currsol.cfm>. Questions concerning this program should be addressed to Chien-Tan Chang, Office of Bridge Technology, at (202) 366-6749.

Attachments

cc:

Steve Rochlis HCC-30

Vince Barone HIPA-10

ATTACHMENT No 1

INNOVATIVE BRIDGE RESEARCH AND DEPLOYMENT PROGRAM

2007 PROGRAM INFORMATION

(March 28, 2007)

BACKGROUND

The IBRC program, the predecessor of the IBRD program, was established by the Congress in the *Transportation Equity Act for the 21st Century* (TEA-21) (Pub. L. 105-178). This program was continued in SAFETEA-LU. However, in section 5202 of SAFETEA-LU, Congress removed two goals of the IBRC program: Goal (E), the development of cost-effective and innovative techniques to separate vehicle and pedestrian traffic from railroad traffic; and Goal (F), the development of new nondestructive bridge evaluation technologies and techniques. In addition, this section added three goals to the IBRD Program: Goal (F), the documentation and wide dissemination of objective evaluations of the performance and benefits of these innovative designs, materials, and construction methods; Goal (G), the effective transfer of resulting information and technology; and Goal (H), the development of improved methods to detect bridge scour and economical bridge foundation designs that will withstand bridge scour. The eight goals of IBRD are listed under ELIGIBILITY of this Attachment.

FUNDING

Funds are provided to the States under the IBRD program to pay the Federal share of the cost of projects that demonstrate innovative accelerated bridge design and construction technology, and the application of innovative material technology in the repair, rehabilitation, replacement, or new construction of bridges and other highway structures. Congress authorized \$13.1 million per year from fiscal years 2005 through 2009 for the IBRD program, \$4.125 million of which is designated for high performance concrete technology research and deployment. The actual amount available can vary in yearly congressional appropriations. Portion of the Funds is available for bridge projects that meet one or more of the eight program goals as listed in Section 5202 (b) of SAFETEA-LU, Public Law 109-59.

FEDERAL SHARE:

In accordance with 23 U.S.C. 503(b) (5), the Secretary shall determine the Federal share of the costs for any project eligible under this program. The FHWA determines the Federal share for each project considering several factors, including the innovation parts of the project, the amount of funds requested for the project, and the available funding for the program. It is the goal to fund as many projects as possible at a 100 percent Federal share; however, because of the above considerations, some projects may be funded at a lower Federal share.

ELIGIBILITY:

- Funds are available for bridge projects that meet one or more of the eight program goals listed in 23 U.S.C. Section 503(b)(2):

Goals—the goals of the program shall include:

- A. The development of new, cost-effective, innovative highway bridge applications;**
 - B. The development of construction techniques to increase safety and reduce construction time and traffic congestion;**
 - C. The development of engineering design criteria for innovative products, materials, and structural systems for use in highway bridges and structures;**
 - D. The reduction of maintenance costs and life-cycle costs of bridges, including costs of new construction, replacement or rehabilitation of deficient bridges;**
 - E. The development of highway bridges and structures that will withstand natural disasters;**
 - F. The documentation and wide dissemination of objective evaluations of the performance and benefits of these innovative designs, materials, and construction methods;**
 - G. The effective transfer of resulting information and technology; and**
 - H. The development of improved methods to detect bridge scour and economical bridge foundation designs that will withstand bridge scour.**
- The project may be on any public roadway, including State and locally funded projects.

- Funds may be used for costs of preliminary engineering, repair, rehabilitation, or construction of bridges or other highway structures, and costs of project performance evaluation and performance monitoring of the structure following construction.

SELECTION CRITERIA:

The FHWA will use the following criteria to evaluate the submitted candidates for selection:

1. Projects that will meet one or more of the goals of the program in 23 U.S.C. Section 503(b) with a particular emphasis on safety and reducing congestion;
2. Projects that will incorporate innovative materials and/or products that are readily available;
3. Projects that have been funded for design and for construction or rehabilitation;
4. Projects with designs, materials, and construction methods that have broad application;
5. Projects that leverage Federal funds with other public or private resources, will be given preference; and
6. Projects that are part of a large right of way improvement project.

In addition, the FHWA may consider:

1. State priorities – For States that submit more than one project application, consideration is also given to the individual State's priorities if specified.
2. Availability of innovative material and/or innovative material product – and projects that apply an innovative material and/or a product made of an innovative material, which is readily available for application in other projects and in other States.
3. Expedient completion of project in a timely manner. For large-scale projects, consideration is given to the State's total funding plan to expedite the completion of the project.
4. Leveraging of private or other public funding – Because the annual requests for funding far exceed the available IBRD discretionary funds, commitment of other funding sources to complement the requested IBRD discretionary funding is also a consideration.

SOLICITATION PROCEDURE:

Each year, a memorandum is sent from the FHWA Headquarters Office of Bridge Technology to the FHWA division offices requesting the submission of candidate projects for a given fiscal year's funding. This solicitation is also published on the IBRD Web at

<http://www.fhwa.dot.gov/bridge/ibrd/> The State DOTs coordinate with local and Federal

agencies, universities and colleges, private sector entities, and nonprofit organizations within their respective States in order to develop viable candidate projects. The State DOTs submit the candidate applications to the FHWA division offices. After review and consultation with the DOT, the division office sends the **acceptable candidate** projects to the Director, Office of Bridge Technology (Attn: HIBT-1). Candidate projects for FY 2007 funding will be due in FHWA Headquarters on April 30, 2007.

The candidate project applications are reviewed and evaluated by a selection panel composed of representatives from the FHWA Office of Bridge Technology and the FHWA Office of Infrastructure R&D, and an allocation plan is prepared for presentation of the candidate projects to the Federal Highway Administrator, for the final selection of projects for funding.

SUBMISSION REQUIREMENTS:

State DOTs submit applications for funding under this program. A prescribed format for a project submission is provided in the format of a project application form, and the following information should be included to properly evaluate the candidate projects. Those applications that do not include this information will be considered incomplete and will be rejected.

- **State** in which the project is located;
- **Ranking** of the project as determined by the State DOT, if more than one project is submitted;
- **County** in which the project is located;
- **Structure Name & Location** – Provide the bridge name (if appropriate) and describe the specific location of the project, including route number/name and mileposts (if applicable), and feature(s) crossed by the bridge;
- **Structure Description** – Provide a description of the structure including type (e.g., continuous prestressed concrete box girder), number of spans, total length, and total width (out to out);
- **Innovation** – Specify the innovation (e.g., SCC, crack free decks, ASR prevention and mitigation, deep foundation techniques, rapid method of QC/QA for foundations and walls, techniques to mitigate stream instability and scour, and /or investigation of bridges with unknown foundations.) that is being used in the project. **Statement for safety and congestion benefits for each project must be included;**
- **Proposed Work** – Describe the specific application of the innovation proposed in this particular request, and whether this is a complete project or part of a larger project;

- **Program Goals** – The State’s submission should show how the application of the innovation would meet one or more of the IBRD program goals with an emphasis on reducing congestion and safety as stated above;
- **Letting Date** – The proposed letting date for the main project should be specified, in which the proposed candidate is a part;
- **Estimated Costs** – Provide the estimated cost of the project as follows: cost of the entire project; cost of the innovative portion of the projects, as well as preliminary engineering costs associated with the innovative portion of the project; and the cost of proposed activities to monitor and document the performance of the innovative application;
- **Amount of Federal IBRD Funds Requested** – Indicate the amount of Federal IBRD funds being requested; and
- **Commitment of Other Funds** – Indicate the amounts and sources of any private or other public funding being provided as part of this project. Only indicate those amounts of funding having documented commitments. The submission must include written confirmation of these commitments from the entity controlling the funds.

APPLICATION GUIDANCE:

- **Priority ranking** – Each State, in cooperation with the FHWA division office, is requested to prioritize their candidate projects.
- **Funding for repeated applications** – The States are encouraged not to submit candidate projects, which essentially duplicate a previous project using the same material in the same type of application if that original project was funded with IBRD/IBRD funds.
- **High cost projects** - Subject to special considerations, high cost projects may be funded at less than 100% of a State’s requested amount. In FY 2007, the threshold amount will depend on the total number of eligible projects submitted as well as on the total amount of funds requested.

DECISION PROCESS FOR FUNDING:

Projects are to be screened for eligibility first by the FHWA division office and then evaluated by the Headquarters IBRD selection panel. Another consideration is:

The State must commit to building the projects for which IBRD funds are awarded. The IBRD funds will be de-obligated if the funds cannot be expended as intended. **(Note: For FY 2005**

(IBRC), the maximum funds provided for each acceptable application were \$400,000. For FY 2006 (IBRD), the amount is \$250,000. Funds for FY2007 have yet to be determined.)

STATE DEPARTMENT OF TRANSPORTATION'S RESPONSIBILITIES:

- **Coordinate with State, local, and Federal agencies, universities and colleges, private sector entities and nonprofit organizations within the State to develop viable candidate projects;**
- Ensure that the applications for candidate projects meet the submission requirements;
- Establish priorities for other candidate projects; and
- Submit completed applications to the local FHWA division office in a timely manner so that the submission deadline can be met.

FHWA DIVISION OFFICE RESPONSIBILITIES:

- Provide the solicitation memorandum and the program information to the State DOTs;
- Request candidate projects be submitted by the State to the FHWA division office in time to meet the submission deadline established in the solicitation;
- Help applicants complete information required in the application form;
- Review and prioritize all candidate applications submitted by the State prior to sending them to the FHWA Headquarters to ensure that they are complete and meet the submission requirements;
- Submit the candidate applications to FHWA Headquarters by the established submission deadline. Submission of these applications will be **by ONLINE** submission only. Late submittals, and insufficient technical and/or cost information will not be considered.
- Record required application data in the IBRD online database via the IBRD home page at <http://www.fhwa.dot.gov/bridge/ibrd/application>

FHWA HEADQUARTERS PROGRAM OFFICE RESPONSIBILITIES:

- Request candidates from the States through the annual solicitation memorandum;
- Review candidate project submissions and compile program and project information for preparation of the allocation plan;

- Submit the allocation plan to the Federal Highway Administrator for approving final project selection; and
- Allocate funds for the selected projects.

FHWA HEADQUARTERS PROGRAM OFFICE CONTACT:

Chien-Tan Chang
Senior Bridge Engineer – Planning and Coordination
Office of Bridge Technology (HIBT-1)
Email: chien-tan.chang@dot.gov
Phone: (202) 366-6749 Fax: (202) 366-3077

ATTACHMENT NO. 2

2007 APPLICATION

For

INNOVATIVE BRIDGE RESEARCH AND DEPLOYMENT PROGRAM

State _____ State's Priority Ranking: # _____ of _____

Project type (new construction, replacement, rehabilitation, or repair) _____

NBI structure number _____ County _____

Structure Name and/or Identifying Description (e.g., Number/Name of Route on the Bridge and Feature Crossed) _____

Structure description (e.g., bridge type, number of spans, length, width, material)

Innovative designs, materials and construction methods (describe the designs, materials, and/or construction methods; and how they are used and how the project meets one or more of the program goals). Each application (proposal) shall include and address the following items:

1. Project Name: _____
2. Project classification/technology: such as, SCC, SCC/HPC, Geotechnology, Hydraulics/Scour etc.
3. Project Summary: _____
4. Project Description:
 - a. Describe designs, materials and construction methods;
 - b. Describe how it is used and how the projects meet one or more of the program goals including a statement on **safety and congestion benefits (also please see the cover memorandum for details)**; and
 - c. Technical merits (technical details, quality of innovation, technically sound, cost effective, likelihood of having a lasting impact on the State, and likelihood of having a national lasting impact.) **Note:** Please limit the narrative (proposal) on this section to 2 pages.

Schedule for start of work (month/year): _____

Cost Estimates:

Total project cost: P
Cost of “innovative material” portion of the construction A
Preliminary engineering cost, if requested B
Cost of innovative material performance evaluation
(e.g., for a 2-year post-construction period) C
PE costs + construction costs + evaluation costs = (A + B + C) T

Total Federal Program Funds Requested _____ \$ _____

State Department of Transportation Contact Person

Name: _____
Title: _____
Agency: _____
Ph: _____
Fax: _____
E-mail: _____

Local Agency Contact Person (if applicable):

Name: _____
Title: _____
Agency: _____
Ph: _____
Fax: _____
E-mail: _____

FHWA Division Office Contact Person:

Name: _____
Title: _____
Agency: _____
Ph: _____
Fax: _____
E-mail: _____

ATTACHMENT NO. 3

INNOVATIVE BRIDGE RESEARCH AND DEPLOYMENT PROGRAM

ELECTRONIC DATA SUBMISSION REQUIREMENTS (DIVISION OFFICE USE ONLY)

The Division Office is requested to input the following basic application data to the IBRD database via the FHWA Web site. Separate instructions will be provided at a later date for submitting the information directly via the Web site. Those applications that do not include these items will be considered incomplete and returned for additional data.

- **State** in which the project is located;
- **Priority Ranking** of the project as determined by the State department of transportation;
- **County** in which the project is located;
- **Congressional District** in which the project is located;
- **Name of Congressional Representative** in whose district the project is located;
- **Structure Name & Location** – Provide the bridge name (if appropriate) and describe the specific location of the project, including route number/name and mileposts, if applicable and feature(s) crossed by the bridge.
- **Structure Description** – Provide a description of the structure including type (e.g., continuous prestressed concrete box girder), number of spans, total length and width (out to out);
- **Innovative designs, materials and construction methods** – Specify what innovative designs, materials, and construction methods are being applied in the project and what structural elements are involved (e.g., girders) and the application (e.g., superstructure).
 1. Project Name: _____
 2. Project classification/technology: such as, SCC, SCC/HPC, Geotechnology, Hydraulics/Scour etc.
 3. Project Summary: _____
 4. Project Description: _____
 - Describe designs, materials and construction methods;
 - Describe how it is used and how the projects meet one or more of the program goals including a statement on safety and congestion reduction benefits (also please see the cover memorandum for details); and

- Technical merits (technical details, quality of innovation, technically sound, cost effective, likelihood of having a lasting impact on the State, and likelihood of having national lasting impact.)

Note: Please limit the narrative (proposal) on this section to 2 pages.

- **Letting Date** – The proposed letting date for the project should be specified; and
- **Estimated Costs** – Provide the estimated cost of the project as follows:
 - Cost of the entire project.
 - Cost of the construction of just the innovative portion of the project.
 - Cost of preliminary engineering associated with the innovative portion of the project.
 - Cost of proposed activities to monitor and document the performance of the innovative material application.

Also include 2007 APPLICATION FOR INNOVATIVE BRIDGE RESEARCH AND DEPLOYMENT PROGRAM in attachment No. 2.

FHWA HEADQUARTERS PROGRAM OFFICE CONTACT:

Chien-Tan Chang, Senior Bridge Engineer
Office of Bridge Technology (HIBT-1)
E-mail: chien-tan.chang@dot.gov
Phone: 202-366-6749 Fax: 202-366-3077

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Appendix E

2008 National Hydraulic Engineering Conference

Tentative Arrangements

1. Theme for Conference: "Partnering for Progress in a Changing Environment"

2. Conference Timetable

- August 26 - 29, 2008
- Monday (8/25) - travel day; icebreaker in the evening
- Tuesday (8/26) - plenary session in morning and breakout in afternoon
- Wednesday (8/27) - begin with one session together in morning on Research and then travel to CRREL for field trip.
 - o Leave mid-morning arrive 1 pm, 3 hour tour, return by 7 PM
 - o Box Lunch and bus provided
- Thursday (8/28) - split sessions whole day
 - o Optional evening activity
- Friday morning (8/29) - wrap up session

3. Sub-themes:

- Conference Theme plenary session
- Fish Passage
- Climate Change and Impacts o~ Transportation
- Highway Hydrology/Rainfall Data
- Water Quality/NPDES
- Bridge Scour
- Human Resources/Capitol Resource Limitations
- Asset Management: Bridges, Culverts or MS4
- Research Partnerships (Wed)
- Consultant Partnerships - Good, Bad, and Ugly
- Innovative Solutions
- Coastal/Tidal Issues/Wetlands
- Culvert Sliplining
- Partnering Case Study: Project process, Highlighting streamlined process
- Cold Region projects/issues

4. Location: Portland, Maine

- Tentative at Holiday Inn at the Bay, <http://www.innbvthebay.com/>
- Rooms about \$90
- Free parking and shuttle from airport

5. Registration Fee

- \$150 to \$300/attendee
- Includes continental breakfast, breaks, lunch and facilities.
- Poster & Exhibit Area
- Sponsor and Exhibitor status for a fee.

6. Questions for AASHTO H & H TF

- Do you know of any research that is expected to have results by August 2008?
- Input on registration fee,
- Would AASHTO H & H TF want to hold their meeting in coordination with the National Hydraulic Engineering Conference?
- Any recommendations on speakers, presentations or topics that could be considered for the conference?
- Suggestions for Exhibitors or Sponsors.

Appendix F

Technical Chair Email list

- T-1 - Security - George Christian: gchristian@dot.state.ny.us
- T-2 - Bearings and Expansion Devices - Ralph Anderson: Ralph.anderson@illinois.gov
- T-3 - Seismic - Richard Pratt: Richard_pratt@dot.state.ak.us
- T-4 - Construction- Ken Hurst: kenh@ksdot.org
- T-5 - Loadings - Sue Hida: susan_hida@dot.ca.gov
- T-6 - Firber Reinforced Polymer - Paul Liles: paul.liles@dot.state.ga.us
- T-7 - Guardrail and Bridge Rail - William "Fred" Conway: conwayf@dot.state.al.us
- T-8 - Moveable Bridges - Robert "Bob" Healy: rhealy@sha.state.md.us
- T-9 - Corrosion - Bruce Johnson: bruce.v.iohnson@odot.state.or.us
- T-10 - Concrete -David Hohmann: dhohmann@dot.state.tx.us
- T-11 - Research - Thomas Domagalski: Thomas.domagalski@illinois.gov
- T-12 - Luminaires, Signal and Sign Supports - Gregg Fredrick: gregg.fredrick@dot.state.wy.us
- T-13 - Culverts - Dan Dorgan: dan.dorgan@dot.state.mn.us
- T-14 - Steel - Ed Wasserman: ed.wasserman@state.tn.us
- T-15 - Foundations - Jawdat Siddiqi: jawdat.siddiqi@dot.state.oh.us
- T-16 - Timber - James Tukey: james.tukev@:mail.gov
- T-17 - Welding - Alex Bardow: Alexander.bardow@mhd.state.ma.us
- T-18 - Bridge Management, Evaluation, and Rehab - William "Randy" Cox: wrcox@dot.state.tx.us
- T-19 - Computers - Ken Hurst: kenh@ksdot.org
- T-20 - Tunnels - Kevin Thompson: Kevin_thompson@dot.ca.gov

Appendix G

National Cooperative Highway Research Program NCHRP Project Selection – FY 2008

Number	Title	Allocation	Contingent
1	Synthesis of Information Related to Highway Problems	1,200,000	0
2	Evaluation of Load Rating by Load and Resistance Factor Rating	500,000	0
3	Research for the AASHTO Standing Committee on Highways	1,000,000	0
4	Design Layout & Placement Guidance for Cable Barrier Systems	400,000	0
5	Administration of Highway and Transportation Agencies	1,000,000	0
6	Engineering Properties/Field Performance of Warm Mix Asphalt Technologies	1,200,000	0
7	Research for the AASHTO Standing Committee on Planning: Support for Improved Transportation Planning and Project Development	600,000	0
8	Mix Design and Evaluation Procedure for High Reclaimed Asphalt Pavement Content in Hot Mix Asphalt	400,000	0
9	NCHRP-IDEA	1,250,000	0
10	Production of the Year 2010 Highway Capacity Manual	1,000,000	0
11	Quick Response Research for the AASHTO Standing Committee on the Environment	600,000	0
12	Development of the AASHTO Pavement Guide	450,000	0
13	Highway Research and Technology-International Information Sharing	850,000	0
14	Guidelines for Analysis and Construction Engineering of Curved and Skewed Steel Girder Bridges	600,000	0
15	Surface Transportation Security Research	50,000	0
16	Right-Turn Interactions and Channelized Right-Turns	500,000	0
17	Legal Problems Arising Out of Highway Programs	100,000	0
18	Development of Rational Loading, Analysis, and Inspection Criteria for Highmast Lighting Towers	750,000	0
19	Precision Statements for AASHTO Standard Test Methods	300,000	0
20	Evaluation of Pavement Type Selection Processes Including Alternate Design/Alternate Bidding	400,000	0
21	Simple Performance Tester for Superpave Mix Design	300,000	0
22	Setting Effective Performance Targets for Transportation Programs, Plans, and Policy	375,000	0
23	Methodology to Predict the Safety Performance of Urban and Suburban Arterials	100,000	0
24	Long-Term Roadside Crash Data Collection Program	1,000,000	0
25	Guidance for the Design and Application of Shoulder and Centerline Rumble Strips	200,000	0
26	Expansion of the Transportation Research Thesaurus	90,000	0
27	Research for the AASHTO Standing Committee on Public Transportation	250,000	0
28	Reliability Based Design of Concrete Bridge Superstructures Against Sudden Failure	200,000	0
29	Guidelines for the Selection of Snow and Ice Control Materials to Mitigate Environmental Impacts	25,000	0
30	Identifying Transportation Libraries and Information Centers	90,000	0
31	Methodology to Predict the Safety Performance of Rural Multilane Highways	100,000	0
33	Capacity and Quality of Service Interchange Ramp Terminals	200,000	0
34	Traffic Signal System Control for Congested Conditions	600,000	0
35	Human Factors Guidelines for Road Systems – Phase 2	100,000	0
37	Review of Canadian Experience with Large Commercial Motor Vehicles	100,000	0
38	Automated Enforcement for Speeding and Red Light Running	150,000	0
39	Beta Testing and Validation of HMA PRS	500,000	0
40	Update of the AASHTO Transportation Asset Management Guide: Transportation Asset Management Guide, Volume 2 – A Focus on Implementation	175,000	0
41	Measuring and Predicting the Performance of Automobile Traffic on Urban Streets	225,000	0
42	Developing Performance-Based Investment Programs and Data Systems	325,000	0
43	Performance and Quality Control of Corrugated Pipe Manufactured with Recycled Polyethylene Content	150,000	0
45a	Continuation and Increase of Funding for NCHRP Project 20-68, US Domestic Scan Program	500,000	0
46	Guidance for the Provision of Left-turn Lanes	350,000	0
47	Traffic Signal State Transition Logic Using Enhanced Sensor Information	400,000	0
48	Determining Actual Cost of Performing Routing and Preventative Maintenance Operations on Highway Systems	400,000	0

50	Trip-Generation Rates for Infill Land Use Developments in Metropolitan Areas of the U.S.	300,000	0
52	Ramp and Interchange Spacing (Contingent 2006-C-03, 2007-C-22, SCOR directed resubmittal)	500,000	0
53	Development of Design Methods for In-Stream Flow Control Structures	600,000	0
54	Initial Cost Benefits of Quieter Pavements Compared with Other Forms of Noise Mitigation	500,000	0
55	Culvert Rehabilitation to Maximize Service Life While Minimizing Direct Costs and Traffic Disruption	750,000	0
56	Implementing Enterprise Wide Asset Management Decision-Making Tools and Linkage to Other Management Systems	300,000	0
57	An AASHTO Citizen, Stakeholder and Interdisciplinary Guide for CSS in Transportation	400,000	0
58	Liability Aspects of Bikeway Designation Updated	50,000	0
59	Guidelines for Evaluation of Remaining Fatigue Life of Existing Steel Bridges	500,000	0
60	Enhanced Test Method for Specific Gravity and Absorption of Coarse and Fine Aggregate	350,000	0
64	Human Factors Guidelines for Road Systems-Phase III	400,000	0
71	Integrating Individual Transportation System-Level Performance Programs to Determine Network Performance	300,000	0
73	Identification of Results-oriented Public Involvement Strategies Between Transportation Agencies and Native American Tribal Communities	200,000	0
76	Hydraulic Modifications to Existing Drainage Infrastructure in Ultra-Urban Areas to Achieve Watershed Total Maximum Daily Loads	475,000	0
78	Pavement Marking Warranty Specifications	100,000	0
79	Development of Information and Data to Support Improved Safety Management and Communication of Safety Needs	350,000	0
81	Quantification of the Benefits of Utilizing Asset Management for Resource Allocation	150,000	0
83	Development of National Level of Service Criteria for the Interstate Highway System	400,000	0
146	Reauthorization – fact finding	200,000	0
84	Update Roadside Safety Analysis Program (RSAP) Software and Default Data Elements	0	400,000
88	Land Use, Transportation, and other Issues Associated with Major Cargo Hubs in Metropolitan Areas (2007-B-10)	0	300,000
92	Effective Removal of Pavement Markings	0	325,000
95	Research, Identify and Implement How to Reduce Trash on the Roadsides	0	300,000
100	Effect of Solar Loading and Radiational Cooling on Pavement Surface Temperature	0	150,000
108	Bridge Scour due to Combined Effects of Hurricane Storm Surge and Waves	0	450,000
114	Analysis of Nighttime Construction Activities and Impacts to Safety, Quality, and Productivity	0	250,000
127	Developing a Laboratory for Determining the Initial Retroreflectivity Level of Glass Beads in Pavement Markings	0	200,000
	Total	26,880,000	2,375,000

Appendix H

NCHRP 20-7 PROPOSED RESEARCH PROBLEM STATEMENT

Submitted by:

AASHTO Technical Committee on Hydrology and Hydraulics
David Henderson, P.E., NC DOT,

February 2006

TITLE

Evaluation of Pipe Materials Selection Practices and Research, and Recommendations for Pipe Material Selection Criteria.

PROBLEM STATEMENT

In recent years, new pipe materials have been introduced on the market. The pipe industry is placing increasing pressure on DOTs to allow the use of their products for highway applications, claiming their products' competency. In many cases, the performance of these pipe materials has not been verified by credible independent scientific analysis. Some pipe installations are failing prematurely because of pipe material degradation. The cost of repairing or replacing failing pipes can be many times the initial installation costs. Three main hindrances exist nationally for selecting a good pipe material type:

1. Lack of unified, unbiased pipe material selection guidance:

Pipe material selection practices differ widely within the U.S. Some states allow only one material type while others let contractors choose pipe material types. Still other states define material types according to use, allowing only specific pipe types in some areas of the highway.

State officials often have to rely on the manufacturer recommendations for guidance in selecting proper pipe materials. Specifications and service life information provided by manufacturers often are not objective or verifiable, given the resources available to state officials. It can take many years after installation to detect defective and improper pipe materials. Sometimes it is too late to prevent pipe failure. Additionally, changes in pipe manufacturing or materials can introduce uncertainty into observed field experience, causing further reluctance on the part of state officials to accept new pipe materials for high service roadways.

2. Lack of defined engineering approach to pipe selection:

Most times pipe selection is not engineered. The selection is based on anecdotal accounts on the performance of the various material types. For this reason legislatures rather than engineers in some states are dictating the selection of material types for pipes. The selection of a pipe material must be based on criteria such as pipe life, resistance to environmental corrosion, hydraulic qualities and abrasion resistance. For example, because of the exorbitant costs for repairing and replacing an existing pipe, pipe life should equal or exceed the life of the corridor in which the pipe is installed.

A pipe material selection based on independent scientific studies and proper engineering, and that

meets the purpose of the installation will provide for a safer and economical highway.

3. Insufficient tracking of the performance of existing culvert installations

States would greatly benefit from tracking performance of culverts within their own boundaries and making final material selections based on that experience. While efforts at tracking culverts have increased in recent years, many states do not have good data on where culverts are located or how they have been performing. Thus, they are lacking the most important information in the decision making process. Tracking the performance of existing assets is of paramount importance in selecting materials for new culverts or rehabilitation of existing culverts.

OBJECTIVE

The AASHTO Technical Committee on Hydrology and Hydraulics wishes to develop a national standard for selecting pipe materials based on sound, scientific research to meet transportation needs for providing durable, safe and economical products.

SCOPE

The scope of the proposed project includes the following tasks:

1. Perform a literature research of relevant scientific studies on pipes and pipe material performance.
2. Critically review the results of completed national and state –funded and other pertinent research.
3. Review standards and practices for selecting pipe materials in the United States, Europe, and other pertinent sources.
4. Develop recommendations for practice in the selection of pipe materials based on current knowledge as determined in steps 1, 2, and 3 above.
5. Make recommendations for additional research needed to develop national guidance for selecting pipe material types and for evaluating new pipe products for long-term performance.
6. Develop approaches and recommendations for managing/monitoring culvert inventories.

FUNDING REQUESTED

It is estimated that this research will take 18 months and will cost \$100,000.

SUMMARY

The development of a national standard for selecting pipe materials that is based on scientific methods is essential for optimizing state DOTs' investments in durable and safe infrastructure. The national standard would be an independent and objective guide for the selection of a better product that is both safe and economical.

ENDORSEMENT

The voting members of the AASHTO Technical Committee on Hydrology and Hydraulics have endorsed this research proposal unanimously.

CONTACT PERSON

David Henderson, P.E.
Chair, Technical Committee on Hydrology and Hydraulics
State Hydraulics Engineer
North Carolina Department of Transportation
NC DOT, 1590 Mail Service Center
Raleigh, North Carolina 27699
1020 Birch Ridge Rd., 27610 (deliveries)

PERSONS PREPARING PROBLEM STATEMENT

Mr. Rick Renna, P.E.
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Florida Department of Transportation
605 Suwannee Street, M.S. 32
Tallahassee, Florida 32399-0450

Mr. Michael Fazio P.E.
Chief Hydraulic Engineer
Utah Department of Transportation
4501 South 2700 West
Salt Lake City, Utah 84119

Ms. Karuna Pujara, P.E.
Maryland State Highway Administration
707 N. Calvert St., MS C-201
Chief, Highway Hydraulics Division
Baltimore, MD 21202

Appendix I

NCHRP Hydrology and Hydraulics Projects

- Spring 2007 Meeting
- AASHTO Technical Committee on Hydrology and Hydraulics
- Amelia Island, FL

□NCHRP Hydrology & Hydraulics Projects

NCHRP 24-07(02)Countermeasures to protect bridge piers from scour

- Objective: The objective of this research is to develop and recommend practical selection criteria for bridge-pier scour countermeasures, guidelines and specifications for design and construction, and guidelines for inspection, maintenance, and performance evaluation. The countermeasures to be considered include riprap, partially grouted riprap, cable-tied blocks, gabions, grout-filled bags and mats, and geotextile sand containers (used as a stand-alone countermeasure or as a filter).

□NCHRP Hydrology & Hydraulics Projects

NCHRP 24-08 Scour at Bridge Foundations: Research Needs

- A strategy was needed to identify and guide bridge-scour-related research. In developing this strategy, it was necessary to (1) assess the validity and applicability of past and present research related to bridge scour and fluvial system instability; (2) define the state of practice; (3) identify gaps, deficiencies, and potential improvements in current scour technology; and (4) make recommendations for future research. Such a strategic research program, covering both fundamental and applied research, would be of value not only to the sponsors of the National Cooperative Highway Research Program (NCHRP), but to other sponsors of bridge-scour-related research.

□NCHRP Hydrology & Hydraulics Projects

NCHRP 24-14 Scour at Contracted Bridge Sites

- Objective: The objectives of this research are as follows: (1) based on field data, describe and quantify the degree of influence of processes affecting scour magnitude in contracted openings, (2) provide field data for use in verification of physical and numerical model studies, and (3) develop quantitative guidelines for applying scour-prediction methodology at contracted bridge sites for a wide range of common field situations. These objectives should be accomplished using real-time and post-flood data collected at sites where floods occurred prior to the initiation of the project and at sites where flood events occur during the project.

□NCHRP Hydrology & Hydraulics Projects

NCHRP 24-15 Complex Pier Scour and Contraction Scour in Cohesive Soils

- Scour at bridges founded in or on cohesive materials is a very complex phenomenon that is not completely understood. Conventional approaches to scour prediction were developed from laboratory experiments in cohesionless materials. No methods for predicting scour depths in cohesive material that account for the material's greater scour resistance are available to practicing engineers. The lack of a predictive method results in inadequate design and analysis of bridge foundations in or on cohesive soils. Research investigating the relationship between properties of cohesive material and the erosive power of flowing water is needed to improve scour prediction for bridge foundations in or on cohesive materials.

□NCHRP Hydrology & Hydraulics Projects

NCHRP 24-15(2) Abutment Scour in Cohesive Soils

- Objective: The objective of this research is to develop a methodology for the prediction of abutment scour in cohesive soils consistent with the methodology developed for pier and contraction scour prediction developed under NCHRP Project 24-15.

□NCHRP Hydrology & Hydraulics Projects

NCHRP 24-18 Countermeasures to Protect Bridge Abutments from Scour

- **Objective:** The objective of this research is to develop and validate selection criteria and guidelines for the design and construction of countermeasures to protect bridge abutments and approach embankments from scour damage. The countermeasures considered shall include but not be limited to: (1) riprap at abutments, including the type and extent of filters that could be used under the protective riprap layer, the size of the riprap, and the extent the riprap should be placed up an abutment slope, into the channel, and on the approach embankment; (2) flow-altering devices such as guide banks, dikes, spurs, bendway weirs and other in-channel devices, including the size, type, placement, and feasibility of using these devices; and (3) nontraditional abutment scour countermeasures such as articulated or tied mats and blocks including the size, type, placement, and feasibility of using these devices.

□NCHRP Hydrology & Hydraulics Projects

NCHRP 24-18A Countermeasures to Protect Bridge Abutments from Scour

- **Objective:** The objective of this research is to develop and validate selection criteria and guidelines for the design and construction of countermeasures to protect bridge abutments and approach embankments from scour damage. The countermeasures considered shall include but not be limited to: (1) riprap at abutments, including the type and extent of filters that could be used under the protective riprap layer, the size of the riprap, and the extent the riprap should be placed up an abutment slope, into the channel, and on the approach embankment; (2) flow-altering devices such as guide banks, dikes, spurs, bendway weirs and other in-channel devices, including the size, type, placement, and feasibility of using these devices; and (3) nontraditional abutment scour countermeasures such as articulated or tied mats and blocks including the size, type, placement, and feasibility of using these devices

□NCHRP Hydrology & Hydraulics Projects

NCHRP 24-20 Prediction of Scour at Bridge Abutments

- **Objective:** The objective of this research is to develop more accurate and comprehensive methodologies for predicting abutment scour in compound channels.

□NCHRP Hydrology & Hydraulics Projects

NCHRP 24-23 Riprap Design Criteria, Specifications, and Quality Control

- The objective of this research is to develop design guidelines, material specifications and test methods, construction specifications, and construction inspection and quality control guidelines for riprap at streams and riverbanks, bridge piers, bridge abutments, guidebanks, and other locations requiring scour countermeasures.

□NCHRP Hydrology & Hydraulics Projects

NCHRP 24-24 Criteria for Selecting Numeric Hydraulic Modeling Software

- The objective of this research is to develop a decision analysis tool and guidelines to assist hydraulic engineers in selecting the most appropriate numeric modeling software for analyzing bridge openings in riverine and tidal systems.

□NCHRP Hydrology & Hydraulics Projects

NCHRP 24-26 Effects of Debris on Bridge-Pier Scour

- The objectives of this research are to develop (a) guidelines for predicting the size and geometry of debris accumulations at bridge piers and (b) methods for quantifying scour at bridge piers resulting from debris accumulations.

□NCHRP Hydrology & Hydraulics Projects

NCHRP 24-27 Evaluation of Bridge-Scour Research

- The objectives of this research are to: (a) critically evaluate bridge-scour research results completed since 1990, (b) make recommendations for adoption of specific research results into AASHTO policies and procedures, (c) recommend research needed to fill gaps where research results are not yet conclusive enough for adoption by AASHTO and wide-scale use by practitioners, and (d) draft the bridge-scour sections of the AASHTO manuals, "*Policy for Design of Highway Drainage Facilities*" and "*Recommended Procedures for Design of Highway Drainage Facilities*."

□NCHRP Hydrology & Hydraulics Projects

NCHRP 24-29 Scour at Bridge Foundations on Rock

- The objectives of this research are to develop: (a) a methodology for estimating the time rate of scour and the design scour depth of a bridge foundation on rock, and (b) design and construction guidelines for application of the methodology

□NCHRP Hydrology & Hydraulics Projects

NCHRP 24-32 Scour at Wide Piers and Long Skewed Piers

- The objective of this research is to develop methods and procedures for predicting time-dependent local scour at wide piers and at long skewed piers, suitable for consideration and adoption by AASHTO. The research shall be limited to non-cohesive soils and steady flow.

□NCHRP Hydrology & Hydraulics Projects

NCHRP 14-19 Culvert Rehabilitation to Maximize Service Life While Minimizing Direct Costs and Traffic Disruption

- Research is needed to investigate techniques of local and continuous culvert repair, and to develop design procedures and specifications for cost effective rehabilitation techniques that extend service life while avoiding disruption to traffic.

□NCHRP Hydrology & Hydraulics Projects

NCHRP 24-33 Development of Design Methods for In-stream Flow Control Structures

- The object of this project is to develop authoritative engineering guidelines and/or criteria for in-stream flow control structures that include quantitative engineering criteria and/or specifications for long-term performance in terms of structure stability, cost effectiveness, fisheries habitat sustainability, erosion protection, channel stability, sediment transport, and scour stability under design flow conditions using recommended installation and maintenance practices.

□NCHRP Hydrology & Hydraulics Projects

Appendix J

ASSIGNMENT OF CHAPTER CHAIRS FOR HDG

Chapter	Title	Chapter Chair
1	Planning	Fazio
2	Hydrology	Van Hoven
3	Erosion	Henderson
4	Culverts	Ngo
5	Legal	Richardson
6	Channels	Booher
7	Bridges	Mills
8	Restoration	Fazio
9	Storm Drains	Bailey
10	Environmental	Ronnfeldt
11	Coastal	Renna
12	Stormwater	Dougherty
13	Training	Phillips
14	Culvert Materials	DeCou
15	Consultants	Pujara
	Glossary	Schips

ASSIGNMENT OF CHAPTER CHAIRS AND TEAM MEMBERS FOR THE POLICY (LEVEL I) AND PROCEDURES (LEVEL II) MANUALS

Policy (Level I)/Procedures (Level II) Manuals

Chapter	Title	Chapter Chair	Team Members		
1	Introduction	Schips	Henderson	Mills	Booher
2	Legal	Richardson	Schips	Soltani	Ghere
3		<i>Intentionally left blank</i>			
4	Documentation	DeCou	Bailey	Fazio	Mills
5	Planning	Fazio	Richardson	Tran	Pagán
6	Data Collection	Reese	Hendrickson	Helms	Pagán
7	Hydrology	Van Hoven	Fazio	Krolak	Bailey
8	Channels	Booher	Arneson	Nurmi	Farghaly
9	Culverts	Ngo	Phillips	O'Connor	Farghaly
10	Bridge	Mills	Arneson	Phillips	O'Connor
11	Energy	Phillips	Ngo	Helms	Ronnfeldt
12	Storage	Dougherty	Bailey	Henderson	Hendrickson
13	Storm Drains	Bailey	Reese	Dougherty	Kerenyi
14	Pump Station	Ghere	DeCou	Reese	Bergendahl
15	Environment	Ronnfeldt	Henderson	Renna	Pujara
16	Erosion and Sediment	Henderson	Dougherty	Van Hoven	Pujara
17	Channel Bank Protection	Shoblom	Bergendahl	Farghaly	Booher
18	Coastal Zone	Renna	Henderson	Shoblom	Krolak
19	Construction	O'Connor	Ngo	Richardson	Ronnfeldt
20	Maintenance	Henderson	Booher	O'Connor	Dougherty
21	Wetlands	Hendrickson	Bailey	Nurmi	Henderson
22	Groundwater	Pujara	Renna	Ronnfeldt	Fazio

Appendix K

Intermediate Work Plan for Prosecution of Chapter Revisions

(Slow and painful execution of Chapter Chairs)

-26 weeks → -14 weeks: Chapter Chair (CC) works on chapter revisions

-16 weeks: Reminder to CC that draft chapter is due to team members in 2 weeks

July 17, 2007

-14 weeks: CC sends revised draft chapters to team members and related other Chapter Chairmen

July 31, 2007

-10 weeks: CC reminds Team Members that comments are due in 2 weeks

August 28, 2007

-8 weeks: Team members submit comments on revised chapter to CC

September 11, 2007

-8 weeks → -4 weeks: Chair resolves comments with Team Members

September 11, 2007

-4 weeks: Reminder to CCs that draft chapter is due to TCHH in 1 week

October 9, 2007

-3 weeks: Chair submits revised chapter to entire TCHH

October 16, 2007

Meeting (Time 0): CC collects and presents revised chapter and additional comments

November 6, 2007

Protocols

- Copy TCHH Chairman / Vice Chairman on all transmittals of draft chapters, comments, etc.
- CCs will notify delinquent team members within 1 week after deadlines
- TCHH Chair / Vice-Chair will notify delinquent CCs within 1 week after deadlines
- CCs check AASHTO website for compliance

Appendix L

Group picture of TCHH members and friends of the TC (courtesy of Te Ngo)



Appendix M

TCHH 5-YEAR WORKING PLAN

- 2006 Spring - Refine direction and scope of MDM revision
- 2006 Fall - Full committee review of first draft reformatted MDM document
- 2007 Spring - Full committee review of second draft reformatted MDM document
- 2007 Fall - Final committee review of reformatted MDM document
- 2008 Spring - Full committee evaluation of HDG update needs
- 2008 Fall - Ballot reformatted MDM document
- 2009 Spring - Publish reformatted MDM document
- 2009 Fall - Full committee review of first draft HDG updates
- 2009 Fall - Full committee review of second draft HDG updates
- 2010 Spring - Final review of HDG updates
- 2010 Fall - Ballot HDG, Policy, and Procedures
- 2010 Fall - Publish new HDG, Policy, and Procedures;
- 2010 Fall - Develop plan for next 5-year update

- Every Spring - Review NCHRP research needs/Assign problem statements/Submit by deadlines
- Every Fall - Prioritize and submit NCHRP research needs problem statements