Hydrology and Hydraulics Newsletter

July 2008 **Issue: 1**

AASHTO
Technical Committee on Hydrology and Hydraulics

Message from the Technical Committee on Hydrology & Hydraulics Chair

Mike Fazio, UTDOT

Welcome to our newsletter. With hopes of reaching other practitioners, enlarging our group, getting input from professionals across the country, and improving our services, the AASHTO Technical Committee on Hydrology and Hydraulics has decided to publish a biannual newsletter. It will be circulated electronically and written by volunteers from our committee. The newsletter will include AASHTO updates, related conference and meeting announcements, national and state research efforts, a technology corner, and training opportunities.

The AASHTO Technical Committee on Hydrology and Hydraulics was formed in 1970 as a task force to help the Subcommittee on Design in preparing drainage guides. The task force was very productive, publishing several guides for transportation drainage. Since then, the guides have been compiled into the volume: Highway Drainage Guidelines. This volume has been updated and republished, most recently, in 2007. The task force then published the first edition of the Model Drainage Manual in 1992 (recently updated with dual units in 2003).

Today, twenty-four professionals serve on the technical committee (changed from a task force in 2004). We come from state, federal and international governments. We meet semiannually to work on manual updates, discuss new research needs and topics of interest. We have a camaraderie that helps us in our professional work, especially in critical times. We depend on the group for information, help and support, in solving problems related to highway hydraulics. We want to expand this forum and improve on what we do. We hope in a way you can be part of our team as well.

In This Issue:

Technical Committee on Hydrology and Hydraulics – Field Trip to the Woodrow Wilson Bridge Project, April 2008

Research Update: FHWA Turner Fairbank Hydraulics Laboratory
Dr. Kornel Kerenyi

The largest percentage of bridge collapse occurs in the US due to flooding and scour. Researchers at the TFHRC Hydraulics Laboratory are working on several studies to improve hydraulic design methodologies for the Nations highway system. One such project started earlier this year is a study on "Fish Passage in Large Culverts with Low Flows". This study funded through the Transportation Pooled Fund Program with support from AK, MD, VT, MI, MN and GA is gathering information on the hydraulics of low flows in large culverts and to determine the extent of the variation of local velocities within the cross-sectional area of the culvert under such conditions. Advanced technologies such as Particle Image Velocimetry and High Performance Computational Fluid Dynamics modeling will be utilized on this study. The experimental testing apparatus is currently being constructed for this fish passage culvert study where all tests will be conducted (Figure1).

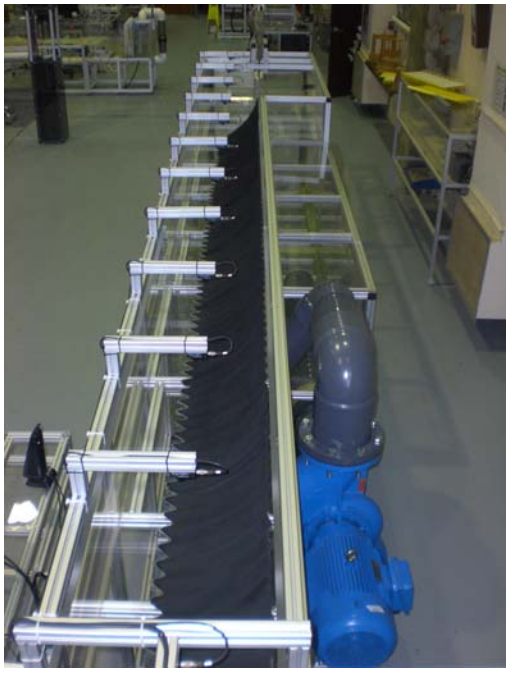

Figure1: Fish Passage Culvert Flume

Another study "scour in cohesive soils" was initiated last fall to investigate the incipient motion of cohesive soils and the influence of turbulence on the erodibility of soils. Success of this effort could significantly enhance scour prediction methodologies. This study also includes development of an Ex-situ Scour Testing Device (ESTD) which could be used in the future for estimating bridge scour in cohesive soils. The ESTD technology can determine erosion rate of soil samples, which are used to transfer the soil test results to the bridge pier scour computations. The ESTD technology is capable of simulating pressure fluctuations that are associated with the extreme turbulence that occurs around a bridge pier. (Photo)

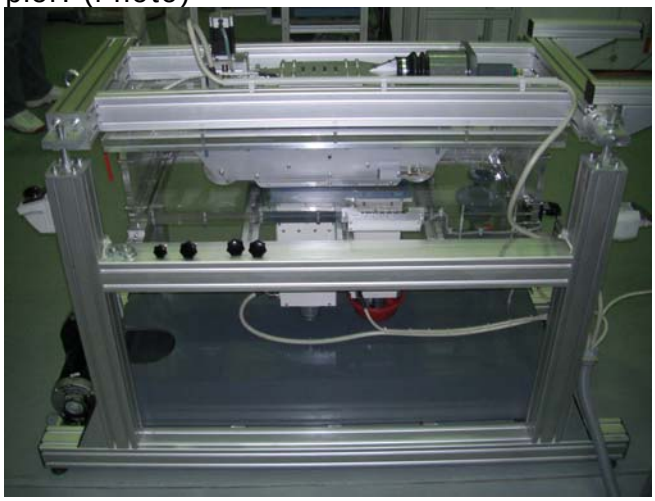

Figure 2: Ex-Situ Scour Testing Device

The AASHTO Hydraulics & Hydrology Technical Committee and the FHWA National Hydraulics Team work closely together to develop RD&T needs and problem statements. At the last Hydraulics & Hydrology Technical Committee meeting in Baltimore, the AASHTO and the FHWA worked together on a long term strategic research plan.

In the near future the TFHRC Hydraulics Laboratory proposes to conduct two new research studies where FHWA will solicit partners through the Transportation Pooled Fund Program. One of the studies will address the need to develop new design guidance to mitigate hydroplaning effects. The other will study bridge superstructure response to wave loadings. Where the information obtained will be most useful in the development of bridge retrofits and to test and improve wave load predictive methodologies and equations.

For more information on these or any bridge hydraulic issues, or to collaborate on the pooled fund effort please contact Dr. Kornel Kerenyi at (202) 493- 3142 or email at kornel.kerenyi@fhwa.dot.gov.

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FHWA Releases Update Version of HY-8 Culvert Hydraulics Program

The Federal Highway Administration (FHWA) has recently released Version 7.1 of its popular culvert analysis and design software. This newest version represents the second phase of FHWA's multi-phase upgrade of its culvert hydraulics software approaches and protocols. New features of version 7.1 include:

- Energy dissipater module (Including 4 new energy dissipators not included in the DOS version of HY-8),
- Hydraulic analysis of embedded culverts,
- Use of modified outlet loss coefficients,
- Dynamic culvert shape database with new materials, and
- Various improvements, technical updates, and bug fixes.

The primary references used for the technical methods applied in HY-8 are based on the FHWA publications "Hydraulic Design Series5: Hydraulic Design of Highway Culverts" (HDS 5), May 2005 and "Hydraulic Engineering Circular 14: Hydraulic Design of Energy Dissipaters for Culverts and Channels" (HEC 14), Third Edition, July 2006.

The conversion of the earlier DOS version of the HY-8 program to a Windows platform maintains the same basic philosophy and simplicity of model input and operation; however, the new version adopts a "project file" approach that allows the user the ability to analyze multiple culverts in a project and multiple alternatives at a specific location within the project.

A single input screen presents all of the input necessary to analyze a single crossing (Figure 1). The user has the option of "copying" a culvert and associated crossing information. The user can make changes and then easily toggle back and forth between alternative crossing designs. In addition a new mapping feature helps the user to create a map identifying each crossing that can be included in their report. Unlike the DOS version of HY-8, the new version allows any file name format and length allowed by Windows.

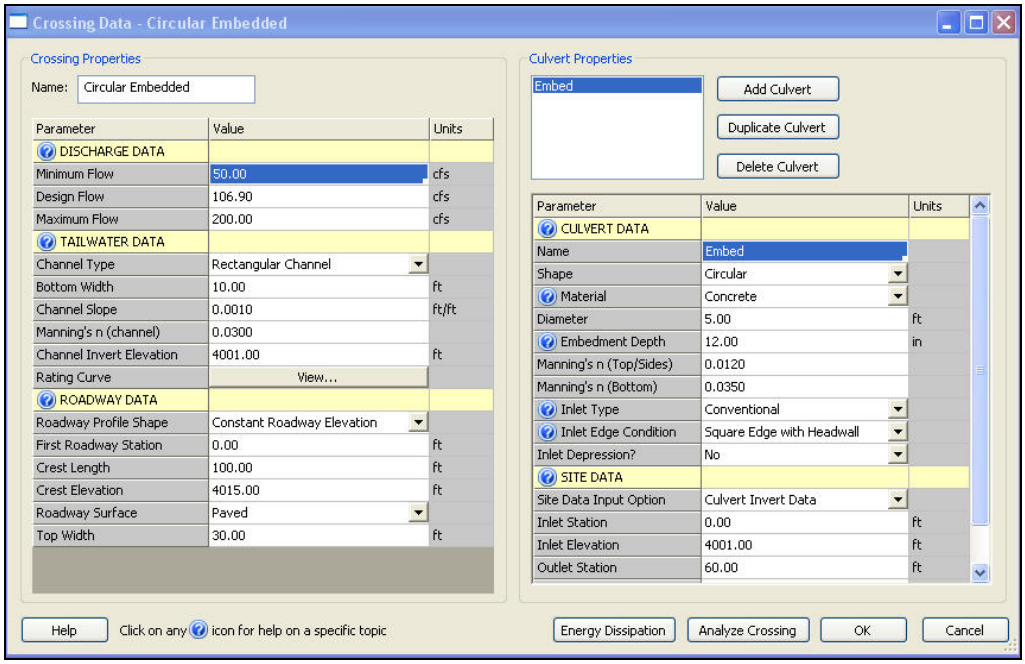

Figure 1: HY-8 Culvert Data Input Dialog

Among the many enhancements to HY-8 Version 7.1 is an enhanced ability to plot culvert characteristics such as the water surface profile through the culvert (Figure 2) and custom user report generation.

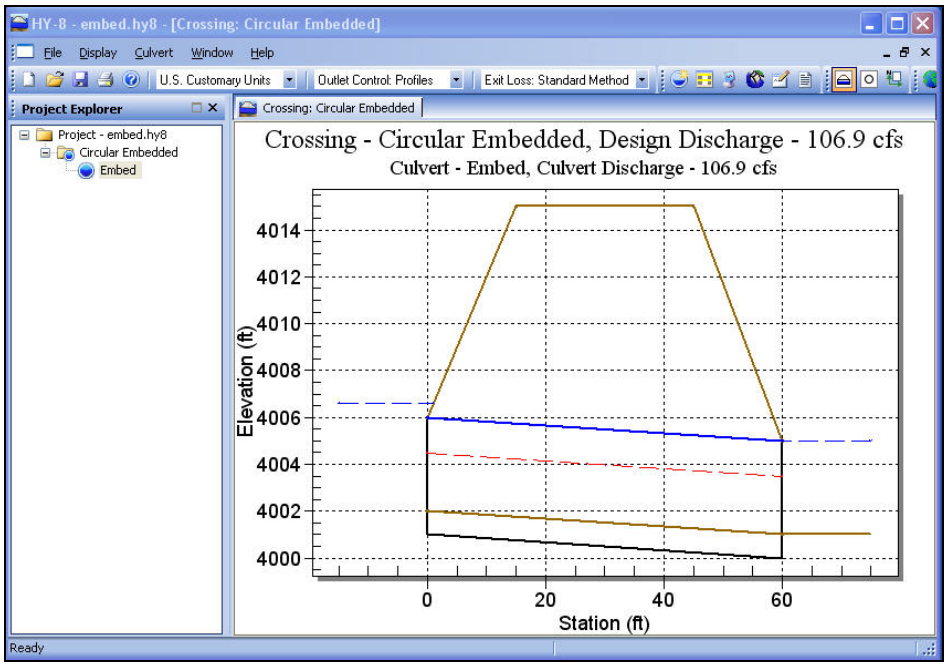

Figure 2: Water Surface Profile

The HY-8 Version 7.1 Culvert Hydraulic Analysis Program as well as a “Quick Start” document that contains installation instructions are available free of charge from the Federal Highway Administration at:

http://www.fhwa.dot.gov/engineering/hydraulics/software/hy8/

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Name the Newsletter Contest!!!

Since "Hydrology and Hydraulics Newsletter" is obviously not a particularly memorable name, we were hoping to come up with an alternative title for this newsletter. I hereby issue a challenge to all readers to come up with a new creative, relevant newsletter title. The winner will be awarded Kudos in a future issue of this premier newsletter. (I would not want to compromise anyone's integrity by offering monetary or material prizes) Submissions will be judged and a winner selected by the editorial board (Te Ngo, Mike Fazio, Kelley Rehm and Andrea Hendrickson). Please send your submittal by October 31, 2008 to andrea.hendrickson@dot.state.mn.us

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HIGHLIGHTS: Concerns of the States

Issue: Vandal Resistant Inlet Grate Designs Needed.
"It seems that we're experiencing an increased incidence of theft of our drainage inlet grates. Besides the maintenance headache and cost to continually replace the grates, there's the obvious safety issue of what could happen if either a vehicle or bicycle might encounter an uncovered inlet. We were wondering if any of you have generated or adopted any type of vandal-resistant grate/frame systems. In some cases, our maintenance guys are resorting to tack welding the grates in place - which I consider a problem waiting to happen as soon as they need access, or otherwise need to remove the grate for clean-out. If any of you have such details, please send them."

Glenn DeCou, CALTRANS (glenn_s_decou@dot.ca.gov)

Responses:
In places in South Carolina where the problem is severe (which seem to be increasing), we use tack welding just as you do. I have heard that some of our grates have been used as part of barbecues. I would also appreciate any help that anyone might have to offer. *South Carolina DOT*

We've not had an issue with stolen grates, but we've had issue with stolen trash cans. (Go figure...) We use some specialty bolts to hold the cans down, in some locations. I would suggest looking into such specialty bolts to hold the drainage grates down. Some manufacturers make tamper resistant/proof bolts for use in vandalism prone environments. The bolts require a special tool for bolt removal or installation. I'm sure they could contact any large bolt/fastener supplier and see what's available. --- *New Mexico DOT*

We had the same problem. The maintenance people anchored the grate using a chain connected to the inside of the basin or manhole. --- *Utah DOT*

We usually chain our grates down to the structure. --- *FL DOT*

Potential Topic for Next Issue: Should we consider impacts of climate change on hydraulic infrastructure design? If you have an anecdote, opinion or concern on this topic, or if you would like to submit a different "concern of the states" topic, please email andrea.hendrickson@dot.state.mn.us

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AASHTO Update – New Vision for the Subcommittee on Design

Kelley Rehm P.E.

The Subcommittee on Design, at its meeting in June 2007, passed a resolution resolving to develop a vision, mission, and goals – i.e., a strategic plan – to guide the work of the Subcommittee and its technical committees. A Task Force was formed to help develop this plan. The Task force members are**:**

SCOD Vision Task Force Members

- Chair, Rick Land, California
- Rob Cary, Virginia
- Dan D'Angelo, New York
- Mark Gaydos, North Dakota
- Mike Kennerly, Iowa
- Kirk McClelland, Maryland
- Jim McDonnell, AASHTO
- Jim McMinimee, Utah
- Gary Mroczka, Indiana
- David O'Hagan, Florida
- Kathleen Penney, District of Columbia

A second charge of the task force was to review the Subcommittee's Operating Procedures with the goals of:

- providing feedback to the technical committees;
- reviewing procedures for assigning chairpersons and members to the technical committees; and
- providing guidance to the technical committees regarding work plans and meeting schedules to enhance communications.

During the past year, the task force has developed a new strategic vision, mission and plan that will be balloted at the 2008 meeting of the Subcommittee in July. The following are excerpts from the new plan.

Draft Vision Statement:

It is the vision of the AASHTO Subcommittee on Design to be the national voice and the leading source of innovation and technical guidance for the design programs of the transportation agencies.

Draft Mission Statement:

It is the mission of the AASHTO Subcommittee on Design to be leaders in transportation design and project delivery by sharing knowledge, advancing innovation, promoting quality and safety, ensuring proficiency, pursuing research opportunities, and collaborating with other organizations and disciplines to improve our ability to provide safe and efficient solutions to meet the transportation and mobility needs of our customers.

Draft Goals and Strategies:

The Subcommittee on Design will accomplish its mission by focusing on the following goals:

1. **Accelerate the delivery of projects**

a. Identify and share best practices for project delivery methodologies from across the country and around the world.

b. Develop policy statements and proposals for streamlining project delivery processes and procedures.

c. Identify and share best practices related to project management.

2. Develop design solutions that meet the purpose and need of a project, address its context, and protect the natural and human environment

a. Promote flexibility in design practices.

b. Research and share techniques and processes for involving communities and other stakeholders in the development of transportation facilities.

c. Promote better integration of project delivery efforts from planning and environment, through design, to construction, maintenance, and operations.

d. Provide guidance to ensure that environmental commitments are carried through design to construction.

e. Play an active role in providing guidance on climate change and energy efficiency efforts in the design of projects.

3. Improve the cost effectiveness of projects

a. Provide guidance on constructability best practices for designers.

b. Develop research and share techniques for delivering projects that minimize the operational and maintenance resources needed to sustain system effectiveness and functionality.

4. Improve the safety of the traveling public and the workforce

a. Develop and promote research into safer highway and transportation facility designs.

b. Identify and share improvements on design-related work zone safety issues.

c. Support enhanced efforts for involvement of construction personnel in the design phase of project delivery.

5. Promote new technologies and processes to advance the state of the practice

a. Develop and promote research proposals on new technologies.

b. Engage other AASHTO committees in the development and use of new technologies and processes throughout project delivery.

c. Coordinate and set priorities for the inclusion of new technologies and processes into design guidance.

d. Increase coordination with and feedback mechanisms to/from academia, consultants, and contractors.

6. Ensure quality in all design products

a. Support performance management objectives within the design phase of project delivery, including the identification and recommendation of appropriate performance measures for design activities.

b. Identify the need for and deliver technical and policy publications and other timely information on design-related topics.

7. **Foster collaboration with other organizations and disciplines**
    a. Coordinate and collaborate with other AASHTO committees in the development of project delivery guidance, processes, and procedures
    b. Coordinate with other organizations on design issues, such as the Federal Highway Administration (FHWA), American Public Works Association (APWA), the National Association of County Engineers (NACE), and the American Council on Engineering Companies (ACEC)

The Subcommittee on Design will be discussing this plan at their annual meeting. The Technical Committee on Hydrology and Hydraulics Chair, Mike Fazio of Utah, is also a member of the Subcommittee and will represent the group at the annual meeting in Albuquerque, NM where these discussions are to be held. Overall, the Subcommittee is striving to make improvements that will help all the Technical Committees to run smoothly and efficiently.

Any questions can be directed to Kelley Rehm, the AASHTO Staff Liaison, at krehm@aashto.org

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Continuing Education

The National Highway Institute (NHI) is a part of the Office of Professional and Corporate Development (OPCD) within the Federal Highway Administration (FHWA). NHI's goals are to:

- Train the current and future transportation workforce
- Transfer knowledge quickly and effectively to and among transportation professionals
- Provide training that addresses the full life cycle of the highway transportation system

Established by Congress in 1970, NHI is the training and education arm of FHWA. We are proud of our 38 + years of service to the transportation community. In serving the national transportation community, NHI continues to partner with many organizations. We provide training resources to customers, partners, and learners in every State. Local governments and private organizations have also benefited from our training resources.

As part of the Office of Professional and Corporate Development (OPCD), NHI also works with the Affiliate Programs, the University and Grants Programs (UG&P), and OPCD Workforce Development Initiatives. Together, these programs and activities support the training and educational needs of the transportation workforce.

The following course descriptions were taken from the National Highway Institute (NHI) website. http://www.nhi.fhwa.dot.gov/training/train.aspx

Course Number: FHWA-NHI-135010
Course Title: River Engineering for Highway Encroachments
The course provides training in the theory and application of alluvial channel flow, fluvial geomorphology, sediment transport, and river mechanics to the planning, location, design, construction, maintenance, and operation of highways. Material for this course comes from "Hydraulic Design Series 6 (HDS-6): River Engineering for Highway Encroachments - Highways in the River Environment." The course includes detailed coverage on how to estimate rates of sediment transport by selecting appropriate equations for use in the computations. Additional topics include sediment properties and sediment measurement techniques. Case histories provide practical examples of problems that occur at highway crossings and encroachments of streams and rivers. A computer generated 360-degree virtual tour site visit is used for a comprehensive workshop. Example problems in sediment transport will be worked by the course participants.

Course Number: FHWA-NHI-135027
Course Title: Urban Drainage Design (3-Day)
Course Number: FHWA-NHI-135027A
Course Title: Urban Drainage Design (4-Day)
This course provides a detailed introduction to urban roadway drainage design. Design guidance for solving basic problems encountered in urban roadway drainage design is provided. The topics are hydrology including rational equation, soil conservation method, regression equations, and synthetic hydrographs; and highway drainage including gutter flow, roadway inlet interception, storm drain systems, energy and hydraulic grade lines, detention ponds, and stormwater management. The 4-day course includes the basic 3-day course, plus presentation of the 1-day course FHWA-NHI-135028 Stormwater Pump Station Design.

Course Number: FHWA-NHI-135028
Course Title: Stormwater Pump Station Design
This course provides an overview of the location and type selection of stormwater pump stations. A major portion of the course is devoted to recommended hydraulic design procedures for sizing and optimizing stormwater pump stations. This course is also offered as a 1-day add-on to FHWA-NHI-135027 Urban Drainage Design. Topics to be discussed include, site considerations, hydrology, storage, pump configuration, mass curve routing, pump selection, sump dimensions, and mechanical and electrical considerations.

Course Number: FHWA-NHI-135041
Course Title: HEC-RAS, River Analysis System (3-Day)
Course Number: FHWA-NHI-135041A
Course Title: HEC-RAS, River Analysis System (3.5-Day)
HEC-RAS is a computer program designed as the successor to the U.S. Army Corps of Engineers' Hydraulic Engineering Circular HEC-2, Water Surface Profiles program (WSPRO). The program incorporates the Standard Step Method for Water Surface Profile computations, bridge hydraulics, including the method presented in WSPRO, culvert hydraulics, flood encroachments, design of open channel flow, analyzing split flow options and sub- and supercritical flow computations. The program can be

used to compute bridge pier and abutment scour following the HEC-18 guidelines. The program is Windows-based and uses a graphical user interface for file management, data entry and editing, program execution and output display. It provides easy conversion from English to metric units and vice versa. Both courses provide an overview and hands-on experience with the computer program, including modeling of bridges, but the 3.5-day version adds coverage of culvert modeling or multiple-opening bridges. A representative from the host agency is encouraged to contact the instructor when setting up the course to determine which length course would best suit the needs of the course participants and if the 3.5-day version is requested whether coverage of culverts or multiple opening bridges is preferred. Each participant will receive a notebook containing the course notes, and a CD containing user documentation, HEC-RAS software, and example computer workshops.

Course Number: FHWA-NHI-135046
Course Title: Stream Stability and Scour at Highway Bridges
This course provides comprehensive training in the prevention of hydraulic-related failures of highway bridges. The effects of stream instability, scour, erosion, and stream aggradation and degradation are covered. Material for the 3-day course comes primarily from two Hydraulic Engineering Circulars (HEC), "Evaluating Scour at Bridges" (HEC-18), and "Stream Stability at Highway Structures" (HEC-20). The course provides training in conducting a stream stability classification and qualitative analysis of stream response. Quantitative techniques are provided for estimating long-term degradation, and calculating the magnitude of general and local scour at bridge piers and abutments for simple and complex substructures. A comprehensive workshop integrates qualitative analysis and analytical techniques to determine the need for a plan of action for correcting stream instability and scour problems. FHWA-NHI-135048 Countermeasure Design for Bridge Scour and Stream Instability is a recommended subsequent course that provides training in the selection and design of countermeasures for stream instability and scour problems, including development of a plan of action and an introduction to fixed and portable instrumentation for scour monitoring. See the listing for FHWA-NHI-135047 Stream Stability and Scour at Highway Bridges for Bridge Inspectors for a description of the 1-day course for bridge inspectors.

Course Number: FHWA-NHI-135047
Course Title: Stream Stability and Scour at Highway Bridges for Bridge Inspectors
This course is an abbreviated presentation of FHWA-NHI-135046 Stream Stability and Scour at Highway Bridges. The course provides an understanding of and assistance in detecting hydraulic-related problems at highway bridges. The effects of steam instability, scour, erosion, and stream aggradation and degradation are covered. Countermeasures to these problems are discussed. This course concentrates on visual keys to detecting scour and stream instability problems and provides an introduction to portable scour monitoring instrumentation. The course emphasizes inspection guidelines to complete the hydraulic and scour-related coding requirements of the National Bridge Inspection Standards (NBIS). This

course can be offered as a 1-day module in conjunction with the 3-day FHWA-NHI-135046 or as a stand-alone presentation.

Course Number: FHWA-NHI-135048
Course Title: Countermeasure Design for Bridge Scour and Stream Instability (2.5-Day)
This course provides an overview of countermeasures to highway related failures from the effects of stream instability, scour, erosion, and stream aggradation and degradation problems. Material for the 2.5-day course comes primarily from Hydraulic Engineering Circular (HEC) "Bridge Scour and Stream Instability Countermeasures - Experience, Selection, and Design Guidance" (HEC-23). Given a stream instability and scour problem, participants will select appropriate countermeasures to correct the problem. The course provides training in recommended strategies for developing a plan that includes appropriate countermeasures, including alternatives to conventional riprap and filter design. Participants will apply hydraulics analysis techniques to countermeasure design for seven design guideline workshops.
The course provides an introduction to fixed and portable instrumentation for scour monitoring using slides and video demonstrations. Participants will receive training in designing a monitoring program to reduce the risk from scour. NHI Course 135046 provides training in identifying and analyzing stream instability and scour problems at highway bridges and is recommended as a prerequisite for this course.

Course Number: FHWA-NHI-135056
Course Title: Culvert Design
This course provides participants with the recommended design procedures for the hydraulic design of culverts. Material for the 3-day course comes primarily from "Hydraulic Design of Highway Culverts," Hydraulic Design Series No. 5 (HDS-5), which is provided to participants. "Hydraulic Design of Energy Dissipators for Culverts and Channels" (HEC-14) is discussed, but not provided. Culvert Hydraulic Design/Analysis Computer Program (HY-8) is discussed and demonstrated. However, this is not a "hands-on" computer course. A portable hydraulic flume is set up in the classroom for the participants to observe hydraulic principles and the hydraulic effects of culverts, improved inlets, pipe slope, material roughness, and various end treatments. The participants measure velocity, discharge, and headwater in the flume under various conditions and use the information to make actual design calculations.

Course Number: FHWA-NHI-135065
Course Title: Introduction to Highway Hydraulics
This course is based on Hydraulic Design Series No. 4 (HDS-4), "Introduction to Highway Hydraulics." The objective of the course is to provide a broad overview of basic highway drainage concepts. Fundamental hydraulic concepts are discussed, followed by open-channel flow principles and design applications of open-channel flow in highway drainage, including the design of stable channels, and pavement drainage. Closed-conduit concepts and applications in highway drainage include the application of culvert and storm drainage design. The presentation concludes with an introduction to concepts and design of energy dissipators. Detailed design

criteria are drawn from other Hydraulic Design Series manuals and Hydraulic Engineering Circulars (HECs), providing a broad overview of all components of highway drainage design with an emphasis on practical applications. A portable hydraulic flume is set up in the classroom for the participants to observe numerous hydraulic principles. The participants take velocity and discharge measurements from the flume while in various setups and use the information to make design calculations.

Course Number: FHWA-NHI-135067
Course Title: Practical Highway Hydrology
The course provides engineers and designers with the background and skills necessary for the practical application of hydrologic principles to highway design. Participants will be required to work example problems that stress actual design situations. The course is based on the Hydraulic Design Series (HDS) No. 2, "Highway Hydrology" which is also used in the course as a reference manual. Participants will learn how to select and effectively implement techniques for estimating peak flows and flood hydrographs in gaged and ungaged streams for watersheds of the size typically encountered in highway drainage design. Through a series of optional modules, additional topics including channel routing, wetland hydrology, arid lands hydrology, and snowmelt hydrology are available given host agency preferences. The overall course objectives enhance the understanding of basic hydrologic concepts and principles as they pertain to highways, and enable application of appropriate hydrologic concepts and tools in the design of drainage facilities and hydraulic structures.

Course Number: FHWA-NHI-135071
Course Title: Surface Water Modeling System with Flo2DH and SMS
The host is responsible for providing 15 computers with the following minimum configuration: 850 MHz Intel Pentium III Processor or equivalent with 128 MB RAM, Windows NT 4.0 with Service Pack 6a or 98 Second Edition or 95 (SR-1), 100 MB available disk space, CD-ROM drive, and 1024 x 768 color video display. The course presentation provides a balance of hydraulic theory, background of the finite element method, data requirements necessary to operate the Flo2DH module of the Finite Element Surface Water Modeling System (FESWMS) computer program and to use of Surface-Water Modeling System (SMS) in the development of input data files and the analysis of the data output. The Flo2DH is a depth averaged two-dimensional surface water model for analyzing complex flow patterns in river or tidal situations. The program has been designed for modeling bridges and hydraulic structures commonly found in highway hydraulic applications. The program is capable of modeling bridges, bridges in pressure flow, culverts, weir flow over the roadway, and general and local scour through the reach being analyzed. The model is capable of handling steady and unsteady flow through hydraulic systems. Because of the intensive input data requirements and large amounts of output generated by the Flo2DH computer program, the pre- and post-processing program SMS is used in the course. SMS is capable of interactively building finite element networks, including the input data files necessary to use the Flo2DH computer program. The program is also capable of graphically presenting the output from Flo2DH, using a variety of formats. Participants will receive a notebook that

includes course materials, a Flo2DH user's manual and SMS user's manual, including copies of the software used in the course. Non-State highway agency course participants will receive a demonstration version of the proprietary SMS computer program.

Course Number: FHWA-NHI-135080
Course Title: Hydrologic Analysis and Modeling with WMS
This course is designed as a hands-on, application-oriented training course using the Watershed Modeling System (WMS) to make hydrologic estimates using a variety of techniques. It will provide attendees with the knowledge and tools necessary to use data derived from geographical information systems (GIS) to develop hydrologic estimates and model runoff from watersheds. The course also teaches how to use digital terrain data for the development of watershed parameters that are required by most commonly used hydrologic analysis programs. The WMS is a comprehensive environment for hydrologic analysis. It is developed by the Environmental Modeling Research Laboratory (EMRL) of Brigham Young University, and has been licensed for use by all State and Federal highway agencies. WMS makes it possible to take advantage of the wealth of digital terrain, land use, soil, and other GIS data readily available from government and private agencies. This data can then be used for preparing input files for several commonly used hydrologic models. Models supported by the interface include HEC-1 (HMS), TR-20, TR-55, and the Rational Method. This course also includes instruction in use of the regional regression equations contained in the National Flood Frequency (NFF) database. This course teaches the techniques and methods necessary to locate and use GIS data so that labor intensive processes such as delineating watershed boundaries and calculating modeling parameters from paper maps can be avoided when computing design flows and developing flow hydrographs at bridges and culverts. Participants will receive a notebook that includes course materials, a WMS User's Manual, and copies of the software, workshops, and tutorials used in the course. Non-State highway agency course participants will receive a demonstration version of the proprietary WMS computer program.

Course Number: FHWA-NHI-135081
Course Title: Introduction to Highway Hydraulics Software
The host agency is responsible for providing computers with the following minimum configuration: 1.6 GHz Intel Pentium III Processor or equivalent with 512 MB RAM, 100 MB available disk space, CD-ROM drive, and Windows XP. One computer is required for every two participants. The course provides engineers and designers with hands-on computer experience in the selection and application of software tools commonly applied for highway hydraulics including estimating peak flows and hydrographs, as well as the
analysis and design of storm drains, culverts, detention basins, and channels. The Watershed Modeling System (WMS) will be the Windows interface used for most applications. Software covered in the course includes:
1. NFF (National Flood Frequency Program)
2. SCS TR-55
3. HEC-1/HEC-HMS
4. FHWA Storm Drain for design of pipes and inlets

5. HY8 (Windows version) for culvert and energy dissipator analysis and design
6. WMS detention basin and channel calculators for detention basin and channel design

Course Number: FHWA-NHI-135082
Course Title: Highways in the Coastal Environment
Over 60,000 miles of roads in the United States are occasionally exposed to coastal surge and waves. Due to these unique design conditions, many highways and bridges suffer damage during coastal storms, including hurricanes and El Nino events. The purpose of this course is to teach important concepts and terminology of coastal science and engineering to highway engineers for use in the planning and design of coastal roads. The course is based on the Hydraulic Engineering Circular (HEC) No. 25, “Highways in the Coastal Environment” (2nd Edition), which is also used in the course as a reference manual. The course includes the use of a portable flume for demonstration of key concepts and for hands-on participant activities. In addition to the presentation of materials and the flume demonstrations, the course incorporates various workshops and exercises to reinforce key concepts. Topics covered in the course include:
1. Introduction to highways in the coastal environment
2. Waves
3. Tide and water levels
4. Revetment design for coastal embankments
5. Wave loads on bridge decks
6. Coastal geology and sediments
7. Shoreline change and stabilization
8. Road overwash
9. Tidal inlets and coastal bridges

New NHI TRAINING
Course Number: FHWA-NHI-135085
Course Title: Plan of Action (POA) for Scour Critical Bridges
This seminar provides guidance on developing a Plan of Action (POA) for scour critical bridges. The seminar highlights the history of the POA requirement and recommends management and inspection strategies for POA development. The seminar introduces the FHWA POA Standard Template and illustrates the use of the POA via a case study of a scour critical bridge in a riverine setting. This seminar is available online or on CD-ROM. Please order a copy through the NHI Store.

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Calendar of Events

Partnering for Progress in a Changing Environment
August 26 – 29, 2008
Portland, Maine
For more information and to register go to:
http://www.maine.gov/mdot-stage/nhec/index.htm

AASHTO TCHH Fall Meeting
In conjunction with the National Hydraulics Engineers Conference – August 2008

AASHTO Subcommittee on Design Annual Meeting
July 13-17, 2008
Albuquerque, NM
http://design.transportation.org/?siteid=59

Other AASHTO Meetings
For Information go to:
http://www.transportation.org/meetings/future.aspx

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