

Canadian Water Resources Association

presents

General and Advanced HEC-RAS Workshops

February 23-24 and 25th, 2009

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**Black Creek Pioneer Village
Toronto and Region Conservation Authority**

These training courses are designed for hydraulic engineers who wish to learn how to use HEC-RAS to perform river hydraulic modelling. A general knowledge of HEC-2 and HEC-RAS is required.

HEC-RAS incorporates a number of changes over that of HEC-2. HEC-RAS models will be provided, along with each model's individual strengths and weaknesses. For example, HEC-RAS provides a more complete and accurate analysis of bridge and culvert discharge.

The primary focus of these training courses are to provide a "hands-on" experience to the modeller. Participants will learn by doing, while using state-of-the-art HEC-RAS for Windows software. The lectures and workshops will concentrate on demonstrating how to use the software in "real world" engineering applications.



Instructor

The courses are instructed by Chris E. Maeder, M.S., Senior Technical Engineer at BOSS International. Chris is in charge of product development at BOSS and has been involved in numerous training courses on various hydrology and hydraulic models, including DAMBRK, HEC-1, HEC-2, HEC-RAS, RMS, RiverCAD, SMS, WMS and WSPRO.

Fee Schedule

The registration fees for the 2 day and the additional 3rd day courses are detailed below and includes lunches, refreshments and a HEC RAS course manual. Payment may be by credit card or cheque (payable to CWRA – Ontario Branch).

2 Day:	CWRA Members: \$ 700.00 (\$666.67 + \$33.33 G.S.T)
	Non-Members: \$ 800.00 (\$761.90 + \$38.10 G.S.T)
3 rd Day:	All: \$ 200.00 (\$190.48 + \$9.52 G.S.T)

NOTE: G.S.T Registration #R10077-3779-RT0001

Please register ASAP. Registration will be confirmed upon receipt of payment. Please register early as space is limited.

Participants are required to bring their laptop computer to the workshop.



Contact: Ed Gazendam (CWRA Secretary-Treasurer)
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E-mail: egazendam@watersedge-est.ca

Canadian Water Resources Association

presents the following:

HEC-RAS Workshop

February 23 & 24, 2009

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**Black Creek Pioneer Village
Toronto and Region Conservation Authority**

HEC-RAS RIVER HYDRAULICS MODELLING

Course Description

This training course is designed for hydraulic engineers who wish to learn how to use HEC-RAS to perform river hydraulic modelling. A general knowledge of HEC-2 and HEC-RAS is required.

HEC-RAS is a relatively new hydraulic model, meant to eventually replace HEC-2. HEC-RAS incorporates a number of changes over that of HEC-2. HEC-RAS models will be provided, along with each model's individual strengths and weaknesses. For example, HEC-RAS provides a more complete and accurate analysis of bridge and culvert discharge.

The primary focus of this training course is to provide a "hands-on" experience to the modeller. Participants will learn by doing, while using state-of-the-art HEC-RAS for Windows software. The lectures and workshops will concentrate on demonstrating how to use the software in "real world" engineering applications.

Participants are required to bring their own laptop computer to the workshop.

Course Objectives

- Benefit from "hands-on" instruction throughout the course.
- Learn practical applications in river hydraulics.
- Understand water surface profile modelling with HEC-RAS.
- Develop confidence in application of HEC-RAS to a variety of modelling problems.
- Learn how to troubleshoot models.
- Learn how to review analysis results.
- Learn advanced modelling techniques.
- Learn to recognize potential problems in a modelling situation.

Course Subjects

- Perform bridge and culvert design and analysis.
- Model multiple bridge and culvert opening roadway crossings.
- Model both sub-critical and supercritical flow.
- Compute split flows.
- Model gated spillways and weirs.
- Unsteady flow analysis and complete hydrograph simulation.
- GIS and HEC-RAS integration.



COURSE BREAKDOWN

Day 1 – Morning 8:00 a.m. to 12:00 p.m.

- Welcome and introduction
- Overview of HEC-RAS
- Setting up a complete HEC-RAS model
- Lab session #1
- Review of analysis results
- Subcritical and supercritical profile modelling
- Question and answer session

Day 1 – Afternoon 1:00 p.m. to 6:00 p.m.

- Bridge and culvert modelling with HEC-RAS
- Discussion of the HEC-RAS bridge and culvert methods
- Comparison between HEC-2 and HEC-RAS
- Lab session #2
- Review of analysis results
- Multiple bridge and culvert opening modelling
- Lab session #3
- Review of analysis results

Day 2 – Morning 8:00 a.m. to 12:00 p.m.

- Split flow analysis
- Lab session #4
- Review of analysis results
- Gated spillways and weir modelling
- Lab session #5
- Question and answer session

Day 2 – Afternoon 1:00 p.m. to 4:00 p.m.

- General floodplain modelling – case studies and examples
- Lab session #6
- Review of analysis results
- Closing

Instructor

The course is instructed by Chris E. Maeder, M.S., Senior Technical Engineer at BOSS International. Chris is in charge of product development at BOSS been involved in numerous training courses on various hydrology and hydraulic models, including DAMBRK, HEC-1, HEC-2, HEC-RAS, RMS, RiverCAD, SMS, WMS and WSPRO.

Note: Subject to change as required.

Canadian Water Resources Association

presents the following:

ADVANCED HEC-RAS Workshop

February 25, 2009

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**Black Creek Pioneer Village
Toronto and Region Conservation Authority**

HEC-RAS – UNSTEADY STATE MODELLING

Course Description

The seminar begins with an introduction to using the unsteady flow component of HEC-RAS. Additional lectures present unsteady flow theory, steps for developing an unsteady flow simulation, and procedures for creating a stable and calibrated model. Guidance is given for techniques on modeling bridges and storage areas in the unsteady flow environment.

Participants will build on the knowledge and experience acquired during their first HEC RAS course and/or during practical work experience.

Participants are required to bring their own laptop computer to the workshop.

Course Objectives

The seminar begins with an introduction to using the unsteady flow component of HEC-RAS. Additional lectures present unsteady flow theory, steps for developing an unsteady flow simulation, and procedures for creating a stable and calibrated model. Guidance is given for techniques on modeling bridges and storage areas in the unsteady flow environment. You'll see the inline and lateral weir features that can be added in both steady and unsteady flow models. Workshops accompanying these lectures provide practical application experience in HEC-RAS unsteady flow modeling. New features in the latest release of HEC-RAS are also discussed.

Course Subjects

- Understand why unsteady flow modeling is important
- Understand the differences between steady and unsteady flow theory and modeling techniques
- Become familiar with the modeling capabilities in HEC-RAS including bridges, culverts, storage areas, gates, and inline and lateral structures
- Understand how to develop a stable and calibrated unsteady flow model
- Get acquainted with the full capabilities of features included in the program
- Gain intensive, hands-on experience in model application
- Hear about "real life" applications



COURSE BREAKDOWN

Morning 8:00 a.m. to 12:00 p.m.

- Introduction to Unsteady Flow Modeling with HEC-RAS
- Detailed Output and Results for Unsteady Flow Modeling
- River Mechanics and Unsteady Flow Theory
- Additional Geometric Data for HEC-RAS Unsteady Flow Models
- Boundary and Initial Conditions in the HEC-RAS Unsteady Flow Data Editor
- Computer Workshop
- Question and answer session

Afternoon 1:00 p.m. to 5:00 p.m.

- Modeling Bridges and Culverts using HEC-RAS Unsteady Flow
- Modeling Inline and Lateral Weirs
- Modeling Storage Areas and Hydraulic Connections
- Computer Workshop
- Calibration of Unsteady Flow Models
- Computer Workshop on Calibrating an Unsteady Flow Model
- Model Stability, Accuracy, and Sensitivity
- Question and answer session

Instructor

The course is instructed by Chris E. Maeder, M.S., Senior Technical Engineer at BOSS International. Chris is in charge of product development at BOSS and has been involved in numerous training courses on various hydrology and hydraulic models, including DAMBRK, HEC-1, HEC-2, HEC-RAS, RMS, RiverCAD, SMS, WMS and WSPRO.

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