

3 Day HEC-RAS Modeling Seminar

This three-day seminar will prepare participants to set up and run HEC-RAS steady flow applications with a combination of lectures and hands-on workshops taught by renowned instructor Vernon Bonner, P.E. Participants will learn the concepts of basic HEC-RAS modeling, which includes modeling bridges, culverts and floodways.

When: April 3-5 2017
DuPage County
421 N County Farm Road
Wheaton, IL 60563

Registration fee: \$500 - Government Employees
\$600 - Non-government Employees
(includes breakfast & lunch for 3 days)
Register online: <https://www.123signup.com/event?id=ppyj>

Deadline: March 24, 2017

Instructors: Vernon Bonner, P.E.

CEC's: 12 CECs

Description: Day one, you will develop a river model, run simulations and review program output. An overview of the computational methods and data requirements will be provided. Day two, you will learn how to add roadway crossings with bridges or culverts to your model. The last day will overview: importing HEC-2 data, using DTM data with Mapper, plus floodway procedures. You will compute a FEMA floodway. All workshops include a review, with an emphasis on output analysis.

No prior HEC-RAS experience is required; however, participants should have a technical background. Each participant will need to bring a laptop with HEC-RAS 5.0 installed

For more details on the course please see the attached agenda. Should you have any questions to regarding this course (agenda, hotel options, meals, etc.), please contact Shauna Urlacher at (630) 729-6160 or via e-mail at surlacher@v3co.com.

River and Floodplain Modeling with HEC-RAS

3 – 5 April 2017

DuPage County
421 N County Farm Road
Wheaton, IL

Sponsored By:

Illinois Association for Floodplain and Stormwater Management: IAFSM

Objectives. This course will enable participants to compute water-surface-profiles using computer program HEC-RAS in a sound and effective manner. Version 5.0 will be presented in lectures and workshops. Day one, you will develop a river model, run simulations and review program output. An overview of the computational methods and data requirements will be provided. Day two, you will learn how to add roadway crossings with bridges or culverts to your model. The last day will overview: importing HEC-2 data, using DTM data with Mapper, plus floodway procedures. You will compute a FEMA floodway. All workshops include a review, with an emphasis on output analysis. No prior program experience is required; however, a technical background is required.

INSTRUCTOR. **Vernon Bonner, P.E. Consulting Civil Engineer, Carlsbad, CA,** VernBonner@yahoo.com Served 20 years as Chief, Training Division, Hydrologic Engineering Center; (*retired 1 July 2000*). Over 35 years of water resource engineering experience in water resource planning, reservoir-system analysis, river hydraulics, floodplain management, and program administration. Managed and participated in the development of software (HEC-2, HEC-RAS, HEC-5, HEC-ResSim) and the conduct of technical studies for the national floodplain management program, the national hydropower assessment, and several basin-wide reservoir systems.

Presented seminars and workshops in hydrology (HEC-1, HEC-HMS) and river hydraulics (HEC-2, HEC-RAS, UNET), and reservoir system analysis (HEC-5, HEC-ResSim) for:

Government: HEC, USACE District and Division offices, TVA, FEMA, Mekong River Commission, Vientiane, Laos; Panama Canal Authority, Ministry of Natural Resources Toronto, State water resource agencies in: Alabama, California, Florida, Georgia, Illinois, Indiana, Kentucky, Michigan, Minnesota, North and South Carolina, North Dakota, Wisconsin; and the Oneida Nation, Green Bay, WI.

Universities: Arizona State at Tempe, California at Davis, Colorado at Denver, Colorado State, Michigan State, Minnesota at St. Paul, Penn State, Rutgers, Texas at Austin, Wisconsin at Madison.

Companies: Alabama Power, Birmingham, AL; Halff Assoc., Fort Worth, Dallas & Austin, TX; Jeremy Benn Assoc., Skipton, England; HDR Engineering, Folsom, CA; Houston Engineering, Fargo, ND; Kimley-Horn, Phoenix, AZ; and Manitoba Power, Winnipeg.

Organizations: ASCE Conferences & Chicago Section, ASFPM Conferences, and the World Meteorological Organization

Day 1:

Modeling River Hydraulics with HEC-RAS

8:00 - 8:15 a.m.	INTRODUCTION
8:15 - 9:15 a.m.	1- Lecture: WATER SURFACE PROFILE CALCULATION Concepts of open-channel-flow hydraulics; energy principles; flow resistance equations; computing profiles; and critical depth.
9:15 - 9:30 a.m.	Break
9:30 -10:30 a.m.	2- Lecture: DATA REQUIREMENTS FOR RIVER MODELS Data requirements for geometric and flow data; program options for data; sources of data.
10:30-10:40 a.m.	Break
10:40-11:45 a.m.	3 - Workshop: DEVELOPING A GEOMETRY MODEL Start a new Project and develop a river model for Beaver Creek.
11:45-12:45 p.m.	LUNCH
12:45- 1:45 p.m.	4 - Lecture: HEC-RAS MODELING - FLOW DATA, COMPUTE PROFILES & VIEW RESULTS Defining steady-flow data and boundary conditions; performing the hydraulic computations, and viewing graphics and tables to evaluate the model.
1:45 - 2:00 p.m.	Break
2:00 - 3:15 p.m.	5 - Workshop: CALCULATING WATER SURFACE PROFILES Continue developing the Beaver Creek model: Enter Flow-file data into HEC-RAS; perform the hydraulic computations; and view results.
3:15 - 4:00 p.m.	Review: WORKSHOP SOLUTION Review input and output for the Beaver Creek workshop
4:00 - 4:15 p.m.	Break
4:15 - 5:00 p.m.	6- Lecture: GEOMETRY OPTIONS Cross-section Options; graphical cross section editor; cross section interpolation.

Day 2:

HEC-RAS Bridge and Culvert Analysis

- 8:00 - 9:00 a.m. 7- Lecture: **BRIDGE HYDRAULICS**
Nature of flow through bridges; components of bridge losses; cross-section locations; defining ineffective flow areas; contraction and expansion losses.
- 9:00 - 9:15 a.m. Break
- 9:15 -10:15 a.m. 8- Lecture: **BRIDGE MODELING with HEC-RAS**
Entering and editing bridge data; defining a bridge modeling approach; bridge modeling options; example bridge application; pertinent bridge output.
- 10:15-11:45 a.m. 9- Workshop: **BRIDGE MODELING**
Enter and edit bridge data; perform bridge hydraulic computations; and review pertinent results.
- 11:45-12:45 p.m. **LUNCH**
- 12:45- 1:45 p.m. Review: Bridge Modeling Workshop
- 1:45 - 2:00 p.m. Break
- 2:00 - 2:45 p.m. 10- Lecture: **CULVERT HYDRAULICS**
Definition of terms; input requirements: cross section locations, ineffective-flow areas, expansion and contraction coefficients; inlet control; outlet control; solution logic.
- 2:45 - 2:55 p.m. Break
- 2:55 - 3:45 p.m. 11- Lecture: **CULVERT MODELING with HEC-RAS**
Cross-section locations, entering culvert data, multiple culvert options, program output.
- 3:45 - 5:00 p.m. 12- Workshop: **CULVERT MODELING**
Entering and editing culvert data; culvert modeling options; example culvert applications.

Day 3: **Mapper, HEC-2 Import, Floodways and Output Analysis**

- 8:00 - 9:00 a.m. Review: Culvert Modeling Workshop
- 9:00 - 9:15 a.m. Break
- 9:15 -10:00 a.m. 13 Lecture: **Using Digital Terrain Data in Mapper**
Geo-RAS to develop geometric data from a DTM; using DTM data with Mapper; displaying results with Mapper.
- 10:00-10:10 a.m. Break
- 10:10 -10:40 a.m. 14 Lecture: **IMPORTING HEC-2 DATA**
Discussions will include how to import HEC-2 data into HEC-RAS; differences between the programs as it pertains to the imported data; major areas where data modifications will be necessary.
- 10:40 -10:50 a.m. Break
- 10:50 -11:45 p.m. 15 Lecture: **FLOODWAY DETERMINATION**
Floodway definitions; FEMA general guidelines; computer procedures; program input requirements for floodway calculations; available output.
- 11:45 -12:45 p.m. **LUNCH**
- 12:45 -2:15 p.m. 16 Workshop: **HEC-2 DATA IMPORT & FLOODWAY DETERMINATION**
Import HEC-2 model data, develop and edit encroachment data and perform a floodway analysis.
- 2:15 - 3:00 p.m. Review Workshop
- 3:00 - 3:15 p.m. Break
- 3:15 - 4:00 p.m. 17 Lecture: **OUTPUT REVIEW & ANALYSIS**
How to interpret HEC-RAS output messages (errors, warning, and notes); diagnose common data input mistakes; and how to use the HEC-RAS “Log File” to understand more about the computations and possible problems.
- 4:00 – 4:15 p.m. Discussion and Closing