Introduction to HEC-RAS Modeling

Agenda

Presented by Gregory H. Nail, PhD, PE

Introductions and Exploring Open Channel Hydraulics
- Introduction and overview
- Exploring open channel hydraulics

Steady One-Dimensional Open Channel Hydraulics Background and Theory
- Conservation of momentum: steady one-dimensional
- Conservation of energy: steady one-dimensional
- Bernoulli’s Equation

HEC-RAS and Water Surface Profiling
- Required data and boundary conditions
- Backwater and forewater calculations

History and Development of HEC-RAS

Demonstration 1 – Building a HEC-RAS Model without GIS
- HEC-RAS user interface
- Building a hydraulic model with geo-referenced data
- Trapezoidal channel example

Demonstration 2 - GIS Basics
- Introduction and overview
- Geographic versus projected coordinate systems
- Raster versus Vector Files
- ArcMap versus ArcCatalog
- ArcMap interface basics
- Digital elevation model

Demonstration 3 – Building a HEC-RAS Model with GIS
- RASMapper interface and the projection file
- Digital elevation models and geometry creation
- Steady flow computational simulation

Demonstration 4 – Typical HEC-RAS River Reach and Mixed Flow
- Subcritical flow
- Mixed flow

Demonstration 5 – Typical HEC-RAS Bridge Model
- Cross section locations
- Implementing the bridge

Demonstration 6 – Typical HEC-RAS Culvert Model
- Cross section locations
- Steady flow simulation

Demonstration 7 – Introduction to 2D-Unsteady Flow Modeling
- 2D-unsteady flow versus 1D-steady flow
- Geometry and computational mesh

Learning Objectives

You’ll be able to:

Discuss the principles of open channel hydraulics, including conservation of momentum, conservation of energy and Bernoulli’s Equation.

Discuss the history and development of HEC-RAS and get tips on building models with and without GIS.

Learn about modeling bridges in HEC-RAS, using expansion and contraction coefficients and steady flow simulation.

Create a typical HEC-RAS culvert model using steady flow simulation.

Compare 2D unsteady flow to 1D steady flow, and get an introduction to 2D modeling.

In coordination with:

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Introduction to HEC-RAS Modeling

Lafayette, LA - Thursday, May 14, 2020

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Review GIS basics

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Learn about typical HEC-RAS bridge and culvert models

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Gregory H. Nail, PhD, PE  Associate Professor, University of Tennessee at Martin
Dr. Nail is an associate professor in the Engineering Department at the University of Tennessee at Martin where he teaches a variety of courses including fluid mechanics, hydraulics and hydrology, and hydraulic and hydrologic modeling. He holds a professional engineer’s license based on having passed both the Civil and Mechanical discipline-specific exams. Prior to coming to UT-Martin in 2002 he worked as a research hydraulic engineer for the United States Army Corp of Engineers for 11 years. He is a former member of the Executive Committee of the Tennessee American Water Resources Association, and he has lectured on various HEC-RAS modeling topics at the Annual Tennessee Water Resources Symposium and at other venues. Dr. Nail earned his B.S.E. degree from Auburn University and his M.S. and Ph.D. degrees from Texas A&M University.

Here’s what past attendees had to say about the program and presenter Gregory Nail:

“Good seminar.” — Architect

“Very knowledgeable speaker.” — Landscape Architect

“Great presenter.” — Civil Engineer

In Coordination With the ASCE - Acadia Branch: Founded in 1852, ASCE is the oldest national engineering society in the United States. Our mission is “to provide essential value to our members, their careers, our partners and the public by developing leadership, advancing technology, advocating lifelong learning, and promoting the profession.”

Seminar Information
Courtyard by Marriott Lafayette South
200 Fresh Boustany Drive
Lafayette, LA 70508
(337) 345-4450

Registration:
8:00 - 8:30 am
Morning Session
8:30 am - 12:00 pm
Lunch (On your own)
12:00 - 1:00 pm
Afternoon Session
1:00 - 5:00 pm

Tuition:
$299 for individual registration
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