HEC-RAS

Version 2.3

Training Manual/Self Study Guide

Preface

The HEC-RAS computer program was developed by the U.S. Army Corps of Engineers at their Hydrologic Engineering Center (HEC), 609 Second Street, Davis, California 95616. The software was designed by Mr. Gary W. Brunner, leader of the HEC-RAS development team.

This training manual was written by Clyde B. Giaquinto, who is a civil engineer with the United States Department of Agriculture - Natural Resources Conservation Service, Syracuse, New York. The preparation of this manual used many portions of CPD-68, HEC-RAS River Analysis System, User's Manual. Some of the text in this manual was taken verbatim from the HEC-RAS River Analysis System, User's Manual as is available from the Hydraulic Engineering Center's home page at http:\www.hec.usace.army.mil.

The purpose of developing this manual is two fold. First, it is intended to provide a choice as to the method of learning the HEC-RAS program from the various choices and sources available and secondly, to provide a cost efficient means whereby a person may become knowledgeable of the program's capabilities. It is estimated that if a person carefully follows the instructions in this manual, approximately two days would be required to complete the training.

This manual is intended for use as a self teaching aid whereby the user could sit at the keyboard and follow the instructions in this manual and thereby learn the essentials of the computer program. Throughout the chapters in this manual, many of the tasks are repeated so as to provide the user with the experience necessary to accomplish a practical application. This manual can also be used in a class room setting with an instructor as a facilitator and the users performing essentially the same routine as in a self teaching mode. To enhance the class room setting it is suggested that separate exercises be used as additional learning tools.

The models developed as a result of following the pages in this manual do not depict any actual or real project. Its development is merely a result of the development of this training manual.

This manual is not intended to cover 100 percent of the capabilities of the HEC-RAS program. For additional modeling capabilities and alternatives, the user should consult the Hydraulic Reference Manual, Applications Guide and Users Manual that were prepared by the U.S. Army Corps of Engineers, Hydrologic Engineering Center.

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Chapter 1 - Introduction

The current version of this program will perform steady flow analysis using a variety of flow regimes and geometric models. Input and output data is provided in graphical as well as tabular formats.

General Philosophy of the Modeling System

The HEC-RAS computer program uses a graphical user interface (GUI). The program incorporates separate hydraulic analysis components, data storage and management capabilities, graphics and reporting facilities.

Overview of Program Capabilities

HEC-RAS is designed to perform one-dimensional hydraulic calculations for a full network of natural and constructed channels and provide input and output information in tabular and graphical formats.

User Interface

The graphical user interface provides the following functions:

- File management

- Data entry and editing

- Hydraulic analysis

- Tabulation of graphical displays of input and output data

- Reporting facilities

- On-line help

Hydraulic Analysis Components

Calculates water surface profiles for steady gradually varied flow through a network of channels, dendritic systems or a single river reach. The computer program will model subcritical, supercritical and mixed-flow regime water surface profiles. The geometric model can include combinations of bridges and culverts.

Data Storage and Management

User input files are stored in separate categories of project plan, geometry, steady flow and sediment data. Output data is stored predominately in separate binary files.

Graphics and Reporting

Graphics include plots of the river system schematic, cross sections, profiles, rating curves, hydrographs and other hydraulic variables. Tabular output is available using preselected tables or user defined tables. All tabular and graphical data can be displayed or printed or pasted to the windows clipboard and then accessed by other software