

Hydrologic Engineering Center

Training Course

on

**HYDROLOGIC ENGINEER ROLE IN PROJECT FORMULATION THROUGH DESIGN**

22-26 June 1992  
Davis, California

**Course Objectives**

This course provides hydrologic engineers an introduction to Corps multiobjective planning procedures required to meet water resources planning investigation needs. Specific course objectives are to familiarize attendees with (a) planning terminology; (b) the general planning process; and (c) the analytical hydrologic/hydraulic interface with other planning disciplines. Its focus is on policy and procedures for performing reconnaissance and feasibility phase investigations and hydrologic engineering and flood damage analyses methods for plan formulation and evaluation.

Nominees for the course would benefit most if they have a minimum of two year's experience with hydrologic-hydraulic investigations associated with water resource planning studies. Supervisory personnel are encouraged to attend.

Course Coordinator: Donna Lydon, HEC

**HEC Instructors**

Michael Burnham  
Bob Carl  
Darryl Davis

Harry Dotson  
Donna Lydon

**Corps Guest Lecturers**

Don Banashek, Washington Level Review Center  
Bo Smith, Jacksonville District  
Ken Cooper, Omaha District  
Pat Davis, South Atlantic Division  
Joe Dixon, Los Angeles District  
Earl Eiker, HQUSACE  
Tom Johnson, Omaha District  
Doug Kamien, HQUSACE

**Non-Corps Guest Lecturer**

Jack Cassidy, Bechtel Corporation

Monday, 22 June 1992

**Overview of Corps Planning Process**

| <u>Time</u>      | <u>Description</u>   |
|------------------|--|
| 8:00- 9:00 a.m.  | <b>Welcome and Introduction</b><br>(Davis and Lydon)   |
| 9:00- 9:15 a.m.  | Break  |
| 9:15- 9:40 a.m.  | Videotape: <b>Awesome Power</b>  |
| 9:40-10:30 a.m.  | 1.1 Lecture <b>Planning In the Corps of Engineers</b><br><br>An overview of the planning process will be presented. The Corps' role in flood control planning and the authorization, review, and certification process of different types of studies from planning through construction will be presented. (Davis)   |
| 10:40-11:30 a.m. | 1.2 Lecture <b>Feasibility Studies</b><br><br>An overview of requirements and procedures for performing flood damage reduction feasibility studies from the District perspective will be presented. Funding, technical studies, level-of-detail, reviews and interaction with cost-share partners will be discussed for both reconnaissance-phase and feasibility-phase studies. (Burnham)                 |
| 11:30-12:30 p.m. | <b>Lunch</b>   |
| 12:30- 1:30 p.m. | 1.3 Lecture <b>Overview of Design Studies</b><br><br>This presentation is a discussion of the hydrologic engineer's role in Preconstruction Engineering and Design (PED) studies, and Engineering and Design. It will provide an overview of the plan design after the feasibility study recommends a plan and prior to construction. (Doug Kamien, Chief of General Engineering Branch, CECW-EP, HQUSACE) |
| 1:30- 1:45 p.m.  | Break  |
| 1:45- 2:30 p.m.  | 1.4 Lecture <b>Initial Project Management Plans (IPMP)</b><br><br>This presentation will be an overview of the purpose and importance of developing and using IPMP's by hydrologic engineers. An open discussion will follow the presentation. (Earl Eiker, Chief of Hydraulics and Hydrology Branch, Engineering Division, CECW-EH-Y, HQUSACE)  |
| 2:30- 5:00 p.m.  | 1.5 Workshop <b>Reconnaissance Studies</b><br><br>The workshop requires the participants to perform a preliminary level of investigation using available information from previous studies and simplified analysis methods. (Dotson and Lydon)   |
| 6:00- 8:00 p.m.  | <b>Ice Breaker Dinner</b>  |

Tuesday, 23 June 1992

**Overview of Analysis Procedures for Planning Studies**

| <u>Time</u>      | <u>Description</u>  |
|------------------|---|
| 8:00- 8:40 a.m.  | <b>Review (Dotson)</b>  |
| 8:45- 9:45 a.m.  | <b>2.1 Lecture      Benefit-Cost and Expected Annual Damage Analysis</b><br><br>Definition of benefits and costs for flood damage reduction studies will be presented. Principles of computation of expected annual damage for with and without existing and future conditions also will be described. (Carl)   |
| 9:45-10:00 a.m.  | Break   |
| 10:00-11:00 a.m. | <b>2.2 Lecture      Environmental and Wetland Issues</b><br><br>The presentation will overview and discuss environmental issues pertinent to the Corps mission. The need for communication between Planning and Hydrology and Hydraulics personnel will be stressed. Technical studies dealing with flood damage reduction will be described. (Bo Smith, Chief of Environmental Branch, Jacksonville District)  |
| 11:10-12:00 noon | <b>2.3 Lecture      Performance of Flood Damage Reduction Measures</b><br><br>Information requirements and characteristics of selected structural and nonstructural flood loss reduction measures will be presented. The effects of the measures on hydrologic and flood damage relationships will be described. (Burnham)  |
| 12:00- 1:00 p.m. | Class Photograph and Lunch  |
| 1:00- 2:00 p.m.  | <b>2.4 Lecture      Consideration of the Local Sponsors Views In Hydrologic Studies</b><br><br>The problems and solutions to issues concerning hydrologic analysis in cost-shared feasibility studies will be discussed. Case studies in the Denver metropolitan area will be presented to emphasize some of the issues arising from the local sponsors' perspective of hydrologic analysis. (Tom Johnson, Civil Engineer/Study Manager, Planning Division, Omaha District) |
| 2:00- 2:15 p.m.  | Break   |
| 2:15- 5:00 p.m.  | <b>2.5 Workshop      Flood Damage Computations</b><br><br>This workshop will require participants to compute flood damage for conditions with and without projects then compute the project benefits for each alternative project. (Carl and Lydon)   |

Wednesday, 24 June 1992

**Policy and Technical Analysis Considerations for Flood Damage Reduction Measures**

| <u>Time</u>      | <u>Description</u>  |
|------------------|---|
| 8:00- 8:50 a.m.  | <b>Review</b> (Carl)  |
| 9:00- 9:50 a.m.  | <b>3.1 Lecture      Levees and Interior Areas</b><br><br>This lecture will address the key issues of levee alignment, sizing, and overtopping considerations and will present policy and analytical aspects of formulating and evaluating measures of reducing damage for interior areas. (Dotson)  |
| 9:50-10:05 a.m.  | Break   |
| 10:05-11:00 a.m. | <b>3.2 Lecture      Nonstructural Measures</b><br><br>An overview of nonstructural measures including Corps regulations and policies, technical study requirements, and responsibilities of other Federal agencies, will be given. (Burnham)  |
| 11:05-12:00 p.m. | <b>3.3 Lecture      Case Study: Metropolitan Phoenix Area</b><br><br>This lecture will describe the development of channel alternatives with emphasis on different conveyance, environmental and urban needs. (Joe Dixon, Chief of Planning, Phoenix Area Office, Los Angeles District)   |
| 12:00- 1:00 p.m. | Lunch   |
| 1:00- 1:45 p.m.  | <b>3.4 Lecture      Case Study: Flood Control Project</b><br><br>An overview of the key issues associated with formulating and evaluating a flood damage reduction project for the American River will be presented. (Burnham)  |
| 1:45- 2:00 p.m.  | Break   |
| 2:00- 4:15 p.m.  | <b>3.5 Workshop    Formulation and Evaluation of Flood Damage Reduction Measures</b><br><br>Participants will be divided into groups representing different perspectives of an urban flood damage reduction study. Selected groups will make a presentation from their viewpoint as to the appropriate project type and size. A review and discussion period will follow. (Lydon and Burnham) |
|                  | <b>2:00- 2:15 p.m. Introduction</b><br><b>2:15- 3:10 p.m. Group Discussions</b><br><b>3:15- 4:15 p.m. Group Presentations</b>   |
| 4:15- 5:00 p.m.  | <b>Review</b> (Burnham)   |

Thursday, 25 June 1992

### **Planning and Risk-Based Analysis**

| <u>Time</u>      |                   | <u>Description</u>   |
|------------------|-------------------|--|
| 8:00- 8:55 a.m.  | 4.1 Lecture       | <b>Planning in the Cost-Shared Environment - Planning Perspective</b><br><br>The presentation will discuss the Corps' planning in a cost-shared environment from a district planning perspective. (Ken Cooper, Chief of Planning, Omaha District)  |
| 9:05-10:00 a.m.  | 4.2 Lecture       | <b>Planning in the Cost-Shared Environment - Hydrology and Hydraulics Perspective</b><br><br>The presentation will discuss the Corps' planning in a cost-shared environment from a division hydraulics and hydrology perspective. (Pat Davis, Chief of Hydraulics and Hydrology, South Atlantic Division)  |
| 10:00-10:15 a.m. | Break             |  |
| 10:15-10:30 a.m. | 4.3 Lecture       | <b>Risk and Uncertainty -- Policy Issues</b><br><br>This presentation will overview the Corps policy on using risk and uncertainty in sizing and evaluating flood damage reduction measures. There will also be a discussion of the draft EC "Risk Analysis Framework for Flood Damage Reduction Studies." (Eiker)   |
| 10:30-11:15 a.m. | 4.4 Lecture       | <b>Risk Based Concepts for Flood Control Projects</b><br><br>The lecture will overview the technical concepts and strategy for implementing a risk-analysis framework in the plan formulation process. A discussion of uncertainty associated with estimating discharge-frequency, elevation-discharge, and elevation-damage relationships will be made. (Davis) |
| 11:20-12:00 p.m. | <b>Discussion</b> |  |
| 12:00-1:00 p.m.  | Lunch             |  |
| 1:00- 2:00 p.m.  | 4.5 Lecture       | <b>Levee Sizing and Analysis Using Monte Carlo Simulation</b><br><br>An example of the risk-based analysis approach will be presented for Chester Creek, Pennsylvania. (Davis)   |
| 2:00- 2:15 p.m.  | Break             |  |
| 2:15- 4:00 p.m.  | 4.6 Workshop      | <b>Project Sizing Using Risk-Based Analysis Framework</b><br>(Davis and Dotson)  |
| 4:00- 5:00 p.m.  | <b>Review</b>     | (Davis)  |

Friday, 26 June 1992

**Planning Issues**

| <u>Time</u>      | <u>Description</u>   |
|------------------|--|
| 8:00- 9:15 a.m.  | 5.1 Lecture <b>Review of Planning Studies</b><br><br>This presentation will describe the responsibilities of and the procedures used by the Washington Level Review Center for feasibility studies and the lessons learned from review of these studies in the cost-shared environment. (Don Banashek, Director of the Washington Level Review Center CEWRC-WLR)   |
| 9:15- 9:30 a.m.  | Break  |
| 9:30-10:45 a.m.  | 5.2 Lecture <b>Hydrologic Engineering as a Profession</b><br><br>An overview of hydrologic engineering as a profession will be presented from an academic, government, and private industry perspective. Topics covered will include a history of hydrologic engineering and projections on where the profession is going and what the needs will be. (Jack Cassidy, Manager, Hydraulics and Hydrology Group, Geotechnical Engineering Services, Bechtel Corporation, San Francisco) |
| 10:45-11:30 a.m. | <b>Critique and Closing</b>  |