

# ***Streambank Stabilization for Restoration And Flood Control Projects***

## **Purpose and Background**

---

The course will focus on streambank stabilization techniques for both restoration and traditional flood control projects. Traditional hard structural-type channel bank stabilization techniques will be discussed (using rock riprap, gabions, articulated concrete blocks) as well as redirective techniques (including bendway weirs, rock vanes, and spur dikes). In addition, the use of bioengineering solutions will be presented. In this course, you will learn the applicability and limitations of the various techniques, and recognize the importance of adequate toe protection. Workshops accompanying the lectures provide practical application experience in streambank stabilization design.

## **Seminar Instructors**

---

**KENNETH D. PUHN, P.E., CFM, M.ASCE** is a project manager and senior hydraulic engineer with over 16 years of experience in water resources and hydraulic engineering. Mr. Puhn has conducted hydrologic, hydraulic, sedimentation, and geomorphic studies throughout the United States. His project experience includes bridge hydraulic and scour analyses, revetment design, steady and unsteady river hydraulic modeling, hydrologic modeling, flood hazard analysis, sediment transport modeling, geomorphic analysis, bank erosion assessment, and reservoir sedimentation studies. Mr. Puhn earned his B.S. in Geology from Northern Arizona University and his M.S. in Water Resource Engineering from Oregon State University.

**BRENT TRAVIS, PH.D., P.E., D.WRE, M.ASCE** has more than 20 years of experience in hydraulics, hydrology, bank stability analysis, groundwater modeling, tailings dam water balance studies, and risk analysis. He is a Senior Hydraulic Engineer and the Director of Mining Support Services at WEST Consultants in Tempe, Arizona. Dr. Travis has helped both the United States Army Corps of Engineers and the United States Geological Survey develop streambank stability models for a number of projects throughout the United States, including the Colorado River in the Grand Canyon. His work has appeared in numerous peer reviewed and conference papers. He is currently serving as Chair of the ASCE Arizona Chapter of the EWRI. Dr. Travis earned his B.S. in Engineering and Applied Science from the California Institute of Technology and his Ph.D. from Arizona State University.

- To register your group, contact John Wyrick ([JWyrick@asce.org](mailto:JWyrick@asce.org)) or Stephanie Tomlinson ([STomlinson@asce.org](mailto:STomlinson@asce.org))

## Summary Outline

### DAY 1

#### **Introduction**

- Stream Instability
- Streambank Stabilization Approaches

#### **Assessment Fundamentals**

- Fluvial Geomorphology Fundamentals
- Channel Form and Processes
- Channel Stability Assessment

#### **Streambank Stabilization Methods**

- Biotechnical Techniques
- Redirective Techniques
- Resistive Techniques

### DAY 2

#### **Hydraulics**

- Design Discharge
- Tractive Force and Permissible Velocity
- Channel Stability
- Top Elevation of Protection

#### **Streambank Protection Design Criteria**

- Biotechnical Techniques
- Resistive Techniques - Bendway Weirs, Spur Dikes, etc.
- Traditional Resistive Techniques

#### **Workshop - Streambank Protection Design**

### DAY 3

#### **Toe Protection Techniques**

#### **Toe Scour Evaluation**

- Long-term Degradation
- General Scour
- Local Scour
- Other Scour Components

#### **Workshop - Predicting Total Scour**

#### **Streambank Stabilization and Grade Control**

#### **Introduction to Design Computer Programs**

## Who Should Attend?

Individuals involved in the planning, design, construction, and maintenance of channel restoration and flood control projects who need state-of-the-practice information on streambank stabilization techniques such as how to select appropriate streambank protection methods, obtain design guidelines and criteria, and evaluate toe scour.

## Seminar Benefits

- Gain insight on the causes of streambank failure and erosion
- Understand concepts of channel stability and its assessment
- Review the fundamentals of stream systems and channel processes
- Understand when streambank stabilization may be required
- Obtain guidance on biotechnical and redirective techniques for streambank stabilization
- Learn primary means used for streambank stabilization and how to select a streambank protection method
- Receive guidance on establishing limits of streambank protection
- Review design approaches to streambank stabilization for restoration and flood control
- Gain insight into stream channel design
- Learn how to predict total scour for toe scour protection

## Learning Outcomes

Upon completion of this seminar, you will be able to:

- Identify the two main techniques for streambank stabilization
- Understand the fundamentals of fluvial geomorphology
- Identify the design data requirements for streambank stabilization project
- Understand the basic principles and techniques on estimating the total scour for streambank protection measure

**CEUs/PDHs:** ASCE has been approved as an Authorized Provider by the International Association for Continuing Education and Training (IACET), 1760 Old Meadow Road, Suite 500, McLean, VA 22102. In addition, ASCE follows NCEES guidelines on continuing professional competency. Since continuing education requirements for P.E. license renewal vary from state to state, ASCE strongly recommends that individuals regularly check with their state registration board(s) on their specific continuing education requirements that affect P.E. licensure and the ability to renew licensure. For details on your state's requirements, please go to: [http://www.ncees.org/licensure/licensing\\_boards/](http://www.ncees.org/licensure/licensing_boards/).

**ASCE seminars are available for On-Site Training. For details regarding On-Site Training and/or needs-based training opportunities, please contact:**

John Wyrick, Director  
On-Site Training Worldwide  
ASCE Continuing Education  
Tel.: 703-295-6184  
Email: [jwyrick@asce.org](mailto:jwyrick@asce.org)

