



Association of State Dam Safety Officials

Request for Proposal/Qualifications

The Association of State Dam Safety Officials (ASDSO) is soliciting statements of qualifications and proposals from engineering consulting firms, research groups, academics, and others who are qualified to develop and conduct technical training seminars on dam safety issues for state dam safety personnel and other interested ASDSO members.

Project Overview

ASDSO's Technical Training Committee has identified a topic to be developed into Core Classroom Courses in the coming year. Once developed, this course will be added to the regular biennial rotation of courses (there are currently 12 courses offered) and will also become available as 'on-the-shelf' classroom courses as requested by State Dam Safety Programs or as needed. For courses that become part of the biennial rotation, instructors will be given at least 12 months' notice for planning purposes. For courses that are requested by States or as needed, instructors will be given at least 3 months' notice for planning purposes.

Instructors chosen to develop the course will be the primary training team on this topic for ASDSO. Each course should be structured so that additional qualified (ASDSO-approved) instructors could be tapped to instruct the course should there be a time and date that the primary training team is not available. The primary training team may be compensated separate from this project to assist with training additional trainers (to be negotiated and determined as needed).

Course: Spillway Erodibility Investigation and Analysis – 2.5- Day Course

A suggested content outline is attached. The outline should be used as a basis for the course agenda. Once a proposal is selected, the ASDSO Technical Training Committee will work with the contractor to plan, develop, and conduct a seminar on the proposed topic.

Project Cost:

The contractor's cost proposal should identify estimated expenses including, but not limited to the following items:

- Pre-seminar critique with ASDSO Training Committee
- Time/labor expenses separately identified for course development and presentation.
- Speaker travel and accommodation
- Development of materials.
- Post -seminar critique with ASDSO Training Committee

Development and delivery guidelines below represent ASDSO estimated costs based on similar trainings.

Per Course - Development: \$28,000

| <u>TIME/LABOR @ \$140 per hour</u> | HOURS |
|---|-------|
| Research and Data Gathering | 40 |
| Creating PowerPoint or other presentation content | 75 |
| Developing student manual, handouts, files for digital download | 45 |
| Review and editing | 40 |
| | <hr/> |
| | 200 |

Per Course – Delivery: Labor - \$7,700 Per Instructor. Travel – Not-to-Exceed: \$1,750 Per Instructor

| <u>TIME/LABOR- Per Instructor</u> | HOURS | RATE | SUBTOTAL | TOTAL |
|---|-------|----------|------------|------------|
| Content review, rehearsal and other prep* | 12 | \$175.00 | \$2,100.00 | |
| Travel Days | 12 | \$175.00 | \$2,100.00 | |
| Teaching Days | 20 | \$175.00 | \$3,500.00 | \$7,700.00 |

Timeline

Proposals must be submitted to ASDSO by September 30, 2021

Proposals will be evaluated by the Technical Training Committee, and selections will be announced no later than the end of October 2021.

Course developers will have approximately 6 months to develop course content and accompanying materials. The pilot course will be offered in the fall/winter of 2022 with subsequent courses offered starting in 2023.

Scope of Work

A. The contractor will be responsible for the following items and their expenses. All tasks and procedures will be under the supervision and subject to the approval of ASDSO:

- Develop the Full Seminar Agenda - contractor will submit a full agenda complete with subject headings, speakers, and time schedules to the Training Committee for review and comment.
- Develop the Course Materials - contractor will develop the course materials, including printed handouts and reference documents. The contractor will submit a draft copy of the course materials to the training committee for review and comment.
- Secure All Speakers - contractor will be responsible for securing all seminar lecturers and making travel arrangements for speakers
- Conduct Seminar - contractor will conduct the seminar based on the agenda submitted to and approved by ASDSO. The content should be developed so that it can be delivered in a live classroom setting or a virtual environment.
- Review - Each presentation of the seminar will be subject to review by the Training Committee, which will provide suggestions for modification and improvement. Evaluation forms completed by the seminar participants will be reviewed as part of the post seminar critique. The review is often conducted via conference call but will be scheduled in a format that is agreeable to all parties.

B. ASDSO will be responsible for the following items and associated expenses:

- ASDSO will arrange the meeting site and guestroom block.
- ASDSO will coordinate all virtual classroom needs if the seminar is conducted virtually.
- ASDSO will be responsible for conducting seminar registration and all advertising of the seminar.

Audience

ASDSO Technical Seminars are attended by a wide cross section of the dam and levee safety community including state dam safety engineers and inspectors as well as federal regulators, private sector engineers, and others with an interest in dam safety. Technical Seminar attendees also represent a mix of experience levels from those just starting out in their career to experienced engineers looking to further their expertise.

Format of Technical Proposal

Required Elements: Please include the following in the proposal:

- Detailed course outline, a list and description of course materials, and a list of proposed speakers.
- Qualifications for teaching the subject matter.
- Examples of previous similar courses developed and taught.
- A general range of available dates for presenting the seminar in 2022 (July-September) and Calendar 2023.

Suggestions:

- More than one speaker is preferable.
- Course preparation should include a survey of attendees prior to the seminar to determine the needs and experience levels of the participants.
- The course should be flexible enough so that it can be tailored to meet students' needs (beginning or advanced levels) or geographical variations that affect the topic.
- The course should include many practical examples/applications.
- The course should include information on references and tools available on the topic.

Please Note: Any proposals marketing the specific services or products of private companies will be disqualified. No individual or company marketing will be accepted as part of the seminar training.

Proposal Evaluation Process

The Training Committee will evaluate proposals based on the following numerically weighted factors (total of 100 points):

- The experience the contractor has had in developing and presenting training courses like the one that is proposed. References must be cited. (Factor weight of 20)
- The experience the contractor has with producing technical educational materials or similar documents. Please provide examples. (Factor weight of 15).
- The administrative and technical expertise of the seminar developers and instructors, their names and their credentials including references, and the number of hours to be allocated toward development and presentation of the seminar itself, and preparation of the seminar materials. (Factor weight of 30)
- The number of speakers available to make presentations. (Factor weight of 10)
- The flexibility and ability of contractor to conduct the proposed seminar at various dates and locations based on the needs of the ASDSO, and the ability of the contractor to develop a seminar curriculum that accomplishes the goal of the course. (Factor weight of 10)
- The proposed organization and development of the course agenda. The course outline provided by ASDSO sets the minimum as to what should be covered. The Contractor shall develop a full course agenda and present in detail. (Factor weight of 15)

ASDSO reserves the right to reject any or all proposals.

Questions may be addressed to Jennifer Burns, ASDSO Training Director, jburns@damsafety.org or 859-550-2788.

Association of State Dam Safety Official Technical Seminar

Spillway Erodibility Investigation and Analysis Outline

Prerequisite: None

Background: The recent failure event at the Oroville Dam has increased attention and awareness of the risks and failure modes associated with erosion and headcutting of both lined and unlined spillways. ASDSO plans to provide a series of workshops to provide Dam Safety professionals with an opportunity to learn more about these risks and develop and improve skill sets that can be used during the erodibility analysis and evaluation of these spillways. The first of these workshops will focus on the erodibility of unlined spillways and the analytical tools available and skills required when evaluating spillway stability. Guidance will be provided for both new projects and rehabilitation projects, but the emphasis will be on rehabilitation projects since those types of projects are a major focus for most of the Dam Safety industry.

Course Purpose: Provide an overview of the basic considerations, field investigation techniques, and analytical techniques related to erosion and headcutting of unlined spillways. The course is intended to benefit those that perform or would like to perform this type of analysis but will also benefit professionals involved in the review and approval of analysis and design submittals for unlined spillways.

Target Audience: Government Staff, Consultants, and Regulatory Technical Staff that possess a basic understanding of Hydrology, Hydraulics, Geomechanics, and Dam Safety Best Practices.

Introduction and Course Overview

Learning Objectives:

The Contractor shall develop a Seminar with the following Learning Objectives:

- Understand basic hydrologic principles affecting spillway analysis.
- Understand and evaluate basic open channel flow computations.
- Understand the basic mechanisms that result in scour and erosion of cohesive material.
- Understand the mechanics and evaluate incipient motion of grass lined and non-cohesive materials.
- Understand and evaluate hydraulic index parameters used in various analytic approaches.
- Understand geomechanical factors affecting erodibility of earthen material.
- Determine erodibility parameters based on field reconnaissance and testing.
- Have awareness and understanding of major factors affecting spillway erosion case histories.
- Understand basic inputs, outputs, analysis procedures, statistical capabilities, and uncertainties within WinDAM C and SITES.
- Present similarities and differences between WinDAM C and SITES and discuss the advantages and disadvantages associated with each platform.
- Understand and develop awareness of other methods of evaluating spillway erosion.

Topics Covered: The following is a suggested list of agenda topics to address the spillway erodibility needs in the Dam Safety industry, as identified by ASDSO. The Contractor shall develop a proposed agenda with sufficient detail to address the course objective based on their own understanding of the industry needs. Note that the italicized items for each item provide clarification/commentary for the Contractor's consideration.

- 1) Introduction to Lined and Unlined Spillways
 - a) New construction
 - b) Rehabilitation projects
 - *Since the bulk of the industry's efforts are for rehabilitation projects, emphasis should be placed on these types of projects.*
- 2) Hydrology
 - a) Inflow Design Floods
 - b) Peak Discharge Estimates
 - c) Inflow Hydrographs
 - *Discuss these items to the level necessary to understand how the inputs can increase attack of the spillway, but this item should not provide an in-depth discussion of hydrology. Focus this discussion on the need to meet regulatory requirements.*
- 3) Basic Scour/Erosion Mechanisms
 - a) Turbulence Production
 - *Discussion items could include boundary eddies, impinging jet, submerged jet, backroller, hydraulic jump, etc.*
 - b) Detachment
 - *Discussion items could include brittle failure, fatigue failure, block removal, etc.*
 - c) Transport and Breakup
 - *Discussion items could include armoring, breakup, transport/deposition considerations, etc.*
- 4) Hydraulic Index Parameters
 - a) Basic open channel flow principles
 - b) Velocity and shear stress
 - c) Stream Power
- 5) Geomechanical Index Parameters
 - a) Factors affecting erodibility of soil
 - *This should include physical and chemical factors, such as water content, particle size gradation, plasticity index, mass strength, vegetative cover, dispersive behavior, etc. Provide a general discussion of how these factors are collected and evaluated in the field and laboratory.*
 - b) Factors affecting erodibility of discontinuous rock mass
 - *This should include physical and geologic factors, such as mass strength, joint condition and spacing, block size and orientation, lithology and stratification, durability, slaking potential, etc. Provide a general discussion of how these factors are collected and evaluated in the field and laboratory.*
 - c) Estimating Erosion Parameters for Soil
 - d) Estimating Erosion Parameters for Discontinuous Rock Mass
 - e) Compare and Contrast Standards/Rule-of-Thumb Approaches with Analytical Methods
- 6) Hydraulic-Geomechanical Correlation Methods
 - *General discussion of the available methods, such as Moore and Temple, Annandale, Kirsten, Pells, etc.*
- 7) Field Evaluation Procedures
 - *General discussion of procedures for index parameters and correlation charts, submerged jet test, erosion functional apparatus, etc.*

- *Discuss how real-world experience and actual site observations can influence adjustment of the analysis and selection of input parameters, as well as interpretation of results.*
- 8) Case Histories
- *Include discussion of notable spillway failures/incidents. Examples include those at Tuttle Creek/Saylorville Dams, Cottonwood Creek, State Creek Reservoir, and Oroville Dam. This should include failures/incidents of both soil and rock materials. Provide photographs and other visuals that clearly demonstrate contributing factors, conditions before and after, the severity of the spillway engagement, etc. These figures should be tailored to promote engagement with the course.*
- 9) Large Scale Physical Modeling
- *Provide a general/brief discussion of how physical modeling can be used as an analysis tool and include a discussion of cases where large scale physical modeling is desirable/beneficial.*
- 10) Analytical Methods
- a) Excess Shear Model used in SITES and WinDAM
- *Also provide a brief discussion of other methods, such as EIM, Pells, George/Block Stability, CSM, etc. but do not provide details or guidance on the use of these other platforms.*
- 11) Inspection Practices
- *Note that future workshops will cover this topic in-depth, and that this item should only be covered in general or high-level terms/concepts.*
- 12) Intervention and Emergency Action Planning
- *Note that future workshops will cover this topic in-depth, and that this item should only be covered in general or high-level terms/concepts.*

Exercises:

ASDSO requests the inclusion of exercises during the seminar to demonstrate the application of the presented concepts, the analysis/calculation of the parameter inputs, and provide attendees with exposure to the use and operation of the SITES and/or WinDAM C platforms. The exercises are intended to tie-together the concepts outlined in the course lectures and apply those concepts to interpretation of analysis results. The exercise or exercises should be performed in segments and structured to provide regular breaks from the traditional lecture format, and to encourage collaboration among participants when appropriate.

For example, the exercise could work through a spillway inspection and erosion evaluation of a failure case history and/or theoretical example. The instructors could provide inputs, work through rough analytical computations (hand calculations), walk through a SITES or WinDAM C evaluation with the same data, and discuss/interpret/compare the results and conclusions from the analysis. The data provided could include items such as design drawings, specifications, construction photos, geologic information; historic performance; inflow design flood hydrograph, data to arrive at parameter ranges for WinDAM analysis, with judgment.