



Short Term Training Program on CFD and Physical Modelling of Spillways and Energy Dissipators



Overview

The International Centre of Excellence for Dams (ICED), IIT Roorkee, is organising a three-day short term training program on 'CFD and Physical Modelling of Spillways and Energy Dissipators' in association with the International Association for Hydro-Environment Engineering and Research (IAHR). The program shall focus on recent advancements in the hydraulic modelling of spillways and energy dissipators for their best performances.

Spillways and energy dissipators are vital components of hydraulic structures, especially in dam and reservoir systems. Their main role is to safely release excess water during flood events, preventing dam overtopping and structural failure. As water flows through spillways, it gains high kinetic energy that, if unmanaged, can cause severe downstream erosion and ecological damage. With the rising frequency of extreme weather events and increased inflows due to higher probable maximum floods, the need for well-designed spillways has become more critical. Energy dissipators help in dissipating energy, reducing erosion, and ensuring sediment stability downstream. This workshop will highlight recent advancements in CFD and physical modelling for rational design of spillways and energy dissipators, which will be well supported by real-world case studies.

Topics

- An overview of spillways and energy dissipators
- Basics of physical modelling
- Modelling of roughness and sediment
- Scale effects, modelling of cavitation and aerators
- Modelling of energy dissipators and scour downstream of the structure
- Governing equations of water and air-water flows
- CFD modelling using FLOW-3D, Ansys Fluent, REEF3D, etc.
- Global case studies and lessons learned
- Challenges and solutions in hydraulic modelling
- Physical modelling experiments

Target audience

The workshop is designed to attract a diverse group of field engineers, research scholars, dam authorities, regulatory agencies, and stakeholders involved in the design, regulation, and maintenance of spillways and energy dissipators. This diverse audience will benefit from the program by gaining insights into recent advancements, sharing experiences, and discussing collaborative approaches to improve spillway and energy dissipator designs for sustainable dam safety.

Expected Outcomes

Upon completing this course, participants will gain a comprehensive understanding of CFD and physical modelling in the design of spillways and energy dissipators. Through detailed case studies, attendees will explore innovative design solutions and best practices currently being implemented in the field.

The workshop will also foster collaborative discussions, allowing participants to engage with peers and experts on current challenges and future directions in spillway and energy dissipator. The event will be a valuable networking platform, encouraging knowledge exchange and professional connections among hydraulic engineering practitioners, researchers, and stakeholders.

Key Date

Manifestation of interest	March 10, 2026
Acceptance	March 15, 2026
Training Program	April 6-8, 2026

Venue

International Centre of Excellence for Dams, IIT Roorkee, India

Registration



(Find direct registration link provided at the end)

Due to limited seats, participation is subject to confirmation by the organiser.

❖ Course Coordinators

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❖ Organising Team

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Points to be noted

- All the course participants will receive a digital copy of the workshop material (PDF) and a participation certificate.
- The training program shall be conducted in the hybrid mode; however, it is mandatory for Indian participants to join the program in person.
- As such, there is no registration fee for the course; however, participants have to bear their travel, boarding, and lodging at IIT Roorkee.
- Accommodation shall be provided in the guest houses of IIT Roorkee on a payment basis as per the availability of the rooms.
- The number of participants who are joining the course offline is limited to 25. Preference shall be given to the Indian officers of DRIP IAs and State WRD.

List of Lectures

1. An overview of spillways and energy dissipators - **Zulfequar Ahmad**, Professor, Department of Civil Engineering, Joint faculty of ICED, IIT Roorkee, India
2. Basics of physical modelling - **Zulfequar Ahmad**, Professor, Department of Civil Engineering, Joint faculty of ICED, IIT Roorkee, India
3. Physical modelling of energy dissipator of Koushalya dam - **Zulfequar Ahmad**, Department of Civil Engineering, Joint faculty of ICED, IIT Roorkee, India
4. Hydraulic model study for evolution of silt exclusion system for the Kol Dam Project - **Ajay K. Singh**, Former General Manager and Technical Advisor to THDC India Limited, Rishikesh, India
5. Hydraulic model studies for energy dissipation system (Through Swirling Device) for shaft spillways of the Tehri Hydropower Project - **Ajay K. Singh**, Former General Manager and Technical Advisor to THDC India Limited, Rishikesh, India
6. Scale effects, modelling of cavitation and aerators-I - **Valentin Heller**, Associate Professor in Hydraulics, Faculty of Engineering, University of Nottingham, UK
7. Scale effects, modelling of cavitation and aerators-II - **Valentin Heller**, Associate Professor in Hydraulics, Faculty of Engineering, University of Nottingham, UK
8. Global case studies and lessons learned - **Sébastien Erpicum**, Associate Professor at Liège University, Belgium, in charge of the Hydraulic Engineering Laboratory – HECE
9. Challenges and solutions in hydraulic modelling - **Sébastien Erpicum**, Associate Professor at Liège University, Belgium, in charge of the Hydraulic Engineering Laboratory – HECE
10. Governing equations of water and air-water flows - **Fabian A. Bombardelli**, Professor, Department of Civil and Environmental Engineering, University of California, USA
11. CFD modelling using FLOW-3D, Ansys Fluent, REEF3D, etc. - **Fabian A. Bombardelli**, Professor, Department of Civil and Environmental Engineering, University of California, USA
12. CFD modelling of the Nagarjun Sagar Dam for cavitation - **Mohd Hashid**, MANIT, Bhopal & Rahil Ahmad, ICED, IIT Roorkee
13. Field challenges of energy dissipation in large dams - **Rama Raju**, Engineer-in-Chief (Retd), Telangana, India
14. Energy dissipation issues in diversion structures founded on permeable and hard rock foundations - **Rama Raju**, Engineer-in-Chief (Retd), Telangana, India
15. Physical modelling of the lower Subansiri project, India - **Vankayalapati S. Ramarao**, Scientist, CWPRS, Pune, India

List of Experiments

1. Experimentation on the Srisailem Dam for plunge pool scour- Avadhesh C. Pandey, Akash Jaiswal, Faisal Ahmad, & Rahil Ahmad ICED, IIT Roorkee, India
2. Experimentation on the Nagarjun Sagar Dam for cavitation - Avadhesh C. Pandey, Faisal Ahmad, Akash Jaiswal & Rahil Ahmad, ICED, IIT Roorkee, India

Registration link
https://docs.google.com/forms/d/e/1FAIpQLSfx_vFFD_Y0Rm0npGGh93uuxQCrvjNPYp-koOA-cWixTOMmmA/viewform?usp=sharing&ouid=100041509928251277940