



100 - RESERVOIR SEDIMENTATION AND SUSTAINABLE DEVELOPMENT	100 - ALLUVIONNEMENT DES RESERVOIRS ET DÉVELOPPEMENT DURABLE
<p>1. Best practice of storage design including sediment release structures, reservoir operation and sedimentation management techniques including dredging, sediment removal and debris removal.</p> <p>2. Sediment replenishment techniques downstream of dams for river regime and morphology restoration.</p> <p>3. Experiences with turbidity current discharge by bottom outlets and the performance of sediment by-pass tunnels.</p> <p>4. Effect of climate change on reservoir sedimentation and consequences on sustainable storage use.</p>	<p>1. Meilleures pratiques de conception des retenues incluant des ouvrages de transit de sédiments, exploitation des réservoirs et techniques de gestion des sédiments y compris le dragage et l'extraction de sédiments et de débris.</p> <p>2. Techniques de restitution de sédiments à l'aval des barrages pour restaurer le régime et la morphologie des rivières.</p> <p>3. Expériences de l'évacuation des courants de turbidité par des vidanges de fond et performances des galeries de dérivation des sédiments.</p> <p>4. Effets du changement climatique sur l'alluvionnement des retenues et conséquences pour leur exploitation durable.</p>
101 - SAFETY AND RISK ANALYSIS	101 - SECURITE ET ANALYSE DE RISQUE
<p>1. Seismic Risk. Lessons from past earthquakes. Cost efficiency of relevant design improvements for dams.</p> <p>2. Risk from floods on embankment dams, including climate change Data of accidents. Risk analysis. Efficiency and cost of solutions.</p> <p>3. Various risks for concrete and masonry dams including climate change. Data on accidents. Risk analysis. Specific remedies.</p> <p>4. Non-structural drivers that increase or reduce risk Management. Alert Systems. Public Safety. Data on Accidents.</p>	<p>1. Risque sismique. Enseignements des séismes passés. Efficacité et coût des améliorations correspondantes des projets de barrages.</p> <p>2. Risque hydrologique sur les barrages en remblai, y compris risque associé au changement climatique. Leçons issues des accidents. Analyse de risque. Efficacité et coût des solutions.</p> <p>3. Risques pour les barrages en béton ou maçonnerie. Données d'accidents. Analyse de risques. Remèdes spécifiques.</p> <p>4. Causes non structurelles augmentant ou réduisant les risques Management de la construction, Exploitation et Gestion des situations d'urgence. Système d'alerte. Sécurité publique. Données sur les accidents.</p>



<b>102 - GEOLOGY AND DAMS</b>	<b>102 - GÉOLOGIE ET BARRAGES</b>
<p>1. Geology of foundation (investigation, interpretation and characterization) in relation to dam type selection and dam design.</p> <p>2. Foundation treatment: - Sealing the foundation (e.g. grouting, jet-grouting, cut-off walls, deep cut-off, etc.).  - Strengthening the foundation (e.g. consolidation grouting, anchoring, concreted galleries, etc.).</p> <p>3. Instrumentation and monitoring, behavior of foundations including long term performance.</p> <p>4. Problems and solutions related to soft rocks foundation and foundation on deep overburden.</p> <p>5. Reservoirs and landslides.</p>	<p>1. Géologie des fondations (reconnaitances, interprétation et caractérisation) en relation avec le choix du type de barrage et sa conception.</p> <p>2. Traitement des fondations : - Étanchement des fondations (injections, jet-grouting, paroi étanche de divers types, coupure profonde, etc.). - Renforcement des fondations : injection de consolidation, ancrage, galeries bétonnées, etc.).</p> <p>3. Instrumentation, surveillance et comportement des fondations y compris les performances à long terme.</p> <p>4. Problèmes et solutions liées aux fondations sur des roches tendres et aux fondations sur remplissage meuble profond.</p> <p>5. Retenues et glissement de terrain.</p>
<b>103 - SMALL DAMS AND LEVEES</b>	<b>103 - PETITS BARRAGES ET DIGUES</b>
<p>1. Failure modes of levees: lessons learned, risk analysis, safety levels.</p> <p>2. Design, construction and reinforcement of levees, problems with the original design.</p> <p>3. Governance, inspection and monitoring of levees.</p> <p>4. Specific problems experienced and solutions for operating maintaining and rehabilitation of thousands of "Large Dams" lower than 15m.</p> <p>5. Specific problems experienced and solutions for operating, maintaining and rehabilitation of millions of Small Dams lower than 15m and storing less than 1 million m<sup>3</sup>.</p>	<p>1. Mode de rupture des digues : leçons tirées, analyse de risques, niveaux de sécurité.</p> <p>2. Étude, construction et renforcement des digues, problèmes liés à leur conception initiale.</p> <p>3. Gestion, inspection et auscultation des digues.</p> <p>4. Problème spécifiques rencontrés et solutions pour exploiter, maintenir et réhabiliter des milliers de «Grands Barrages» de moins de 15m.</p> <p>5. Problèmes spécifiques rencontrés et solutions pour exploiter, maintenir et réhabiliter des millions de Petits Barrages de moins de 15m et stockant moins de 1 millions de m<sup>3</sup>.</p>



## **About ICOLD**

The International Commission on Large Dams (ICOLD) was founded in 1928 to provide a forum for discussion and for the exchange of knowledge and experience in dam engineering for engineers and others concerned with the development of water resources. Its objectives are to encourage improvements in dam engineering in all its aspects, and in all phases of the planning, design, construction and operation of dams and associated works.

With a present total of 100 member countries, ICOLD leads the profession in ensuring that dams are built and operated safely, efficiently, economically, and with a minimum environmental impact. For more than 30 years, ICOLD has been particularly concerned to enhance the profession's awareness of the social and environmental aspects of dams and reservoirs, and to broadening its perspective in such a way that these aspects receive the same attention and conscientious treatment as the technical aspects.

To reflect the growing concern for the environment, a Committee on the Environment was formed in 1972 and has been renewed four times since. In June 1980, ICOLD published a comprehensive matrix in Bulletin No. 35 as a guideline for the identification and evaluation of all conceivable effects of individual dams on the specific parts of their environment. In 1999, ICOLD published a position paper on Dams and Environment, which is available on its website (<http://www.icold-cigb.org>).

ICOLD maintain and intensifies activities to harmonize the development of water resources with the conservation of the environment and with regard for the people affected by a project. It increases our understanding of environmental interactions and progress in the methods available to control them by the collection, analysis, evaluation and publication of actual experience, including the elaboration of guidelines based on such experience. It encourages the application of environment conscious criteria and objectives, as well as the establishment of an adequate legal and institutional framework tailored to every country's specific conditions and needs. It provides its members with up-to-date information on the current norms of environmental care and the state-of-the-art in dealing with environmental issues.

ICOLD has published in 2012 a World Declaration on Water Storage for Sustainable Development, jointly signed by ICID and IWRA.



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DES GRANDS BARRAGES  
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ON LARGE DAMS