

# THE DAMS NEWSLETTER



24 PAGES ABOUT ICOLD & THE DAMS' WORLD

EDITION #19 - 2021

**DAMS ARE PART  
OF THE SOLUTIONS  
TO CLIMATE CHANGE**

*(p. 12-13)*

**INCOLD  
Symposium**

*(p. 14-17)*

**Marseille  
2022**

The 27<sup>th</sup> ICOLD Congress &  
90<sup>th</sup> Annual Meeting  
from 27 May to 3 June 2022

*(p. 4-5)*

**Ageing  
Water Storage  
infrastructure**

*(p. 18-21)*

**ICOLD DURING  
THE PANDEMIC**

*(p. 2-3)*

**HYDROPOWER  
EUROPE**

*(p. 6-7)*

**A GENERAL  
ASSEMBLY FOR A  
TIME OF CRISIS**

*(p. 8-9)*

**COLLECTING  
STAKEHOLDERS VIEWS**

*(p. 11)*

## ▶ Editor's letter



▶ Michael Rogers  
President of ICOLD

# “A Letter of New Hope for 2022 from ICOLD President Rogers”

### My Dear Friends and Colleagues:

I start this message with my warmest greetings to our global ICOLD family for the continued health and safety for you and your families. Since my election as your President at the ICOLD Congress in Vienna in 2018, I have endeavored to use my skills and abilities to improve our ICOLD organization and to provide my support wherever possible to continue our global mission of cooperation and collaboration for the safe and reliable design and construction of dams and levees.

As I am beginning my final months as President, I have a new hope to emerge from the last year of tragedy and confinement to a situation for ICOLD that is stronger based on the lessons learned from our hardships. ICOLD was founded on the vision that international cooperation beyond political differences and geographical separation can benefit the global situation of all mankind in the

considered development of critical infrastructure that utilize our planet's God-given natural resources. A large dam such as Hoover or Three Gorges is viewed as an engineering marvel in its stature and a monument to humanity for its services. These stalwart structures stand the test of time for generations, so it falls to each of us in our own generation of learning to pass along hard-earned knowledge and experience.

ICOLD can also be seen to stand the test of time as our organization continues its service from each generation to the next. As ICOLD enters the 93<sup>rd</sup> year since its founding, we are aware that the technology of dams of all sizes is significantly more advanced with common applications to mine tailing structures and levees. With more than 27 technical committees, our volunteer members meet and document the lessons they have learned and the current state of the practice of dam engineering around the world.

## ► Editor's letter (suite)

So, what have we learned in the recent period that can give us hope for 2022 ? We now know that 2022 will be an ICOLD Congress year that always brings additional excitement and expectations as we address select Congress questions to the industry and recognize individuals with Innovation Awards for state of the practice insight in the progression of industry knowledge. This year brings the added emotion as ICOLD returns to the country of its origin – France – with our Congress in Marseille – the country's second largest city and one of the oldest and most beautiful cities in all of Europe!

I would offer that humanity has learned once again that we are resilient in the face of hardship and strong in the face of challenge. Our ICOLD members like the rest of the world has learned that we can continue our important work using modern communication tools such as ZOOM and TEAMS to remain connected and continue our progress. We have also learned that although these tools provide a visual connection to face and voice, we long to return to a physical connection of in-person warmth and compassion. We long to see a smile under a mask with a physical connection to shake hands or embrace our friends that we call our ICOLD family.

We are filled with hope that the vaccine developed by science will once again let us travel to the wonderful places around the world to meet old friends and make new friends in our ICOLD journey. We are comforted to know that the world has learned to make our health the highest priority with innovations in cleaning and sanitization that will undoubtedly save thousands of

lives even beyond the current pandemic. And, we have learned that we continue to have shared values, concerns, and commitments to each other as we hope and pray for each other. We must take these hard-earned lessons forward with us as we emerge from this time of darkness and confinement back to the comfort of social gatherings for work and the joy of just being together, even if only once a year for an ICOLD meeting.

Yes, I am filled with a new hope that our lessons learned from more than nine decades of ICOLD service of betterment through global communication and cooperation will lead us to a new light for our future. I have been inspired by the hard work of our ICOLD Board, Central Office staff, Technical Committees volunteers, and Young Engineers to work together to meet our commitments to the industry and each other through the darkest of times. A wise saying by Confucius says that “the gem cannot be polished without friction nor man without trial.” I am confident that the trials of the last many months will polish each of us. I offer my gratitude to each of you and I encourage you to keep up the good fight working together – even remotely – to emerge this year stronger and brighter in our outlook for the future. Take care and I look forward to seeing you soon.

**Michael F. Rogers**

President, International Commission on Large Dams  
(ICOLD)



Michael Rogers (USA) is the President of the International Commission on Large Dams / Commission Internationale des Grands Barrages (ICOLD/CIGB) since 2018. He lives in Indianapolis, Indiana, USA with his wife Kristin where they are parents to four children and two grandchildren. Mr. Rogers is employed by Stantec Consulting Services, Inc. where he has worked for more than 40 years on dams and hydroelectric projects around the world. He currently serves Stantec as Global Practice Leader for Dams and Project Manager for the Gross Reservoir Expansion Project in Denver, Colorado that will be a 40 meter raise of an existing concrete dam using roller-compacted concrete.





THE VIEW FROM THE CALANQUE (LEFT) AND THE VIEW FROM THE CITY WITH THE BASILICA IN THE BACKGROUND (RIGHT)



# THE 27<sup>th</sup> ICOLD CONGRESS OF MARSEILLE, A GREAT OPPORTUNITY TO MEET AGAIN



Michel Lino  
President of the CFBR

**The Marseille congress, initially planned for June of this year, has just been postponed for a second time. What is your state of mind?**

Of course we regret this situation, especially since the French committee worked hard to prepare a beautiful edition for November. But in view of the global health context, which is still uncertain, the travel restrictions and the restrictions specific to each country, and the responses to a survey we carried out among a number of national committees, it seemed more prudent to postpone this congress. We want to welcome the ICOLD family in serene conditions, so that the long-awaited reunion will be a moment of joy and shared happiness.

**Why did the French Committee on Dams and Reservoirs wish to host the**

## 27<sup>th</sup> Congress and the 90<sup>th</sup> Annual Meeting of ICOLD in Marseille?

ICOLD was born in France, its head office is in Paris and France has not hosted a congress since 1955, so it seemed high time to welcome again the ICOLD family. Indeed, it was in 1925, almost a century ago now, that French engineers had the idea of creating an International forum dedicated to topics specific to large dams, an idea that became reality in 1928, with the creation of ICOLD bringing together 6 founding countries and with the Frenchman G. Mercier as President. The first to join France were the United States, Italy, Romania, Great Britain and Switzerland. And they are still today among the very active members of ICOLD.

France has a long culture of dams, and has some pioneering engineers, such as André Coyne or Pierre Londe. Its know-how and expertise are indisputable and recognized throughout the world. It is thanks to the construction of many dams that France was able to produce the electricity necessary for the country's recovery after World War II.

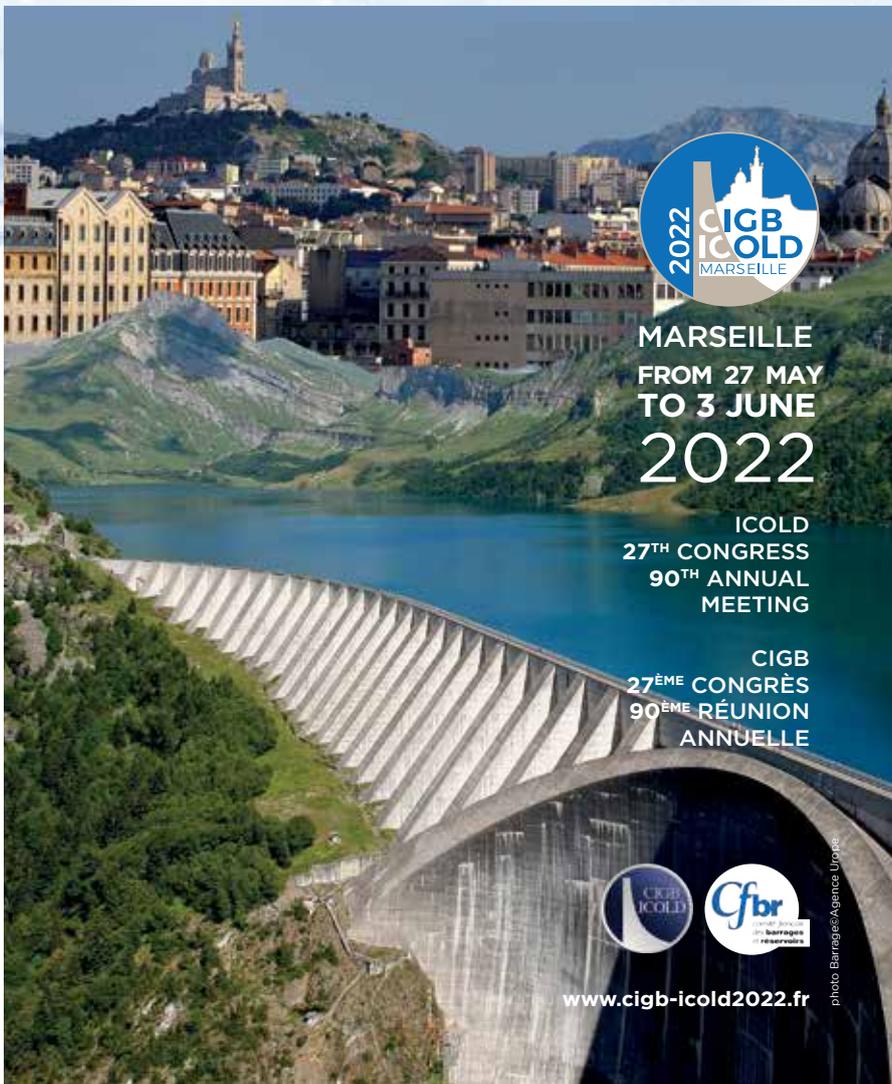
Before modern dams, water energy was already used by our ancestors. "No less than 20,000 watermills in France at the dawn of the 12<sup>th</sup> century...70,000 at the end of the 15<sup>th</sup> century", according to Fernand Braudel. And in 1675 France already had a 35 m high dam, the Saint-Ferréol dam, still in service today.

Today, France has more than 1,000 large dams over 15 m high and nearly 25,000 MW of installed capacity. French design offices and companies are present on all five continents for the design and construction of the dams of the future.

Marseille and the Provence Region are an example of consultation and multi-use management of reservoirs. With the Serre-Ponçon dam, which with 1 billion m<sup>3</sup> of reserve constitutes the largest artificial lake in Europe, and the developments of the Durance-Verdon chain, it demonstrates how these water reserves have enabled the harmonious development of a region with a marked Mediterranean climate.



French "Savon de Marseille"



Marseille has hospitality in its DNA. Founded by Phocaeans in 600 BC on the shores of the Mediterranean Sea, the City of Marseille is the oldest City in France. Nowadays it is the 2<sup>nd</sup> most important city in France and, with its port open to the Mediterranean Sea, it is a historic gateway to France and Europe. It will be able to deploy all its charms to make the congress participants' stay unforgettable.

**What do you expect from this congress?**

First of all, the joy of finally meeting again the great family of ICOLD and all our friends, after these very difficult last months, because of the health crisis that has affected the whole world.

But also to exchange and compare notes with the world's best experts in our businesses at a critical time for our profession, which must play its full role in promoting dams as a key instrument in the energy transition and the fight against climate change.

**What are the main events planned for this congress in Marseille?**

The Organizing Committee, chaired by Bernard Reverchon, is putting all its energy into organizing a Congress, which I hope will remain memorable.

In addition to the traditional General Assembly and the three days of Congress which will be devoted to the four Questions chosen by ICOLD, there will be a Symposium organized by the French Committee on the theme "Sharing water: multi-purpose of reservoirs and innovations".

Based on the success of the condensed courses, set up in Ottawa by the Canadian committee, we wished to renew the experience and propose some courses given by our best specialists on our fields of excellence.

2021 was also the 10<sup>th</sup> anniversary of the creation of the Young Engineers Forum (YEF). To mark the occasion, the CFBR Youth Group is planning a particularly interesting and festive program.

And we are also offering a new feature: a round table discussion on the theme: "Dams and reservoirs, solutions for the future". We are counting on the highest representatives of the organizations in charge of the main water uses, i.e. the World Water Council, IHA, ICID, but also the World Bank, to participate in the debates, alongside the President of ICOLD.

The Southern region is very richly endowed with dams and reservoirs, so we propose technical visits, as well as particularly attractive post-congress tours, without forgetting, of course, to let our friends discover our rich cultural and tourist heritage.

And, of course, top-of-the-range social events, in the French tradition.

**What would you like to say to the members of the ICOLD family to motivate them to come to Marseille in 2022?**

We are putting all our heart and energy into organizing a wonderful event in France, in complete safety.

Marseille and the Southern region are among the most beautiful regions of France, with exceptional culinary and gastronomic traditions, breathtakingly beautiful landscapes and a unique tourist and cultural offer.

We look forward to seeing you all in Marseille, and promise you a very nice stay in France.

Finally, I would like to congratulate our Indian friends from INCOLD for the excellent and inspiring symposium they organized at the end of February in New Delhi and the high quality of the presentations on the Sustainable Development of Dams and River Basins.





Fig. 1: Participants of the Hydropower Europe regional Alpine workshop in Lausanne in September 2019

## ICOLD COORDINATES THE HYDROPOWER EUROPE FORUM SUCCESSFULLY



By Anton Schleiss (Hon. President ICOLD) & Jean-Jacques Fry (President EURCOLD), Coordinators of Hydropower Europe

*Hydropower has a long tradition in Europe and contributed in the first half of the last century significantly to the industrial development and welfare in most of the countries in Europe. The ambitious plan for energy transition in Europe seeks to achieve a low-carbon climate-resilient future in a safe and cost-effective way serving as a worldwide example. The key role of electricity will be strongly reinforced in this energy transition. In many European countries, the phase out of nuclear and coal generation has started with a transition to new renewable sources comprising mainly solar and wind for electricity generation. However, solar and wind are variable energy sources and difficult to align with demand. Hydropower already supports integration of wind and solar energy into the supply grid through flexibility in generation as well as its potential for storage capacity. These services will be in much greater demand in order to achieve the energy transition in Europe, and worldwide. Hydropower has all the characteristics to serve as an excellent catalyst for a successful energy transition.*

The HYDROPOWER EUROPE Forum is supported by a project that has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 826010. Project partners are: International Commission on Large Dams (ICOLD), European Association for Storage of Energy (EASE), European Renewable Energies Federation (EREF), Association of European Renewable Energy Research Centres (EUREC), International Hydro-power Association (IHA), Samui France SARL (SAMUI), VGB PowerTech e.V. (VGB) and ZABALA Brussels SPRL (ZABALA).

Since November 2018, after having submitted with 7 partners a successful proposal to EU Horizon 2020 research and innovation programme, ICOLD is coordinating the HYDROPOWER-EUROPE Forum which is built on the ambition to achieve a Research and Innovation Agenda (RIA) and a Strategic Industry Roadmap (SIR) roadmap for the hydropower sector, based on the synthesis of technical fora and transparent public debates through a forum that gathers all relevant stakeholders of the hydropower sector.

Through an extensive program of review and consultation addressing the whole hydropower sector and stakeholders (including construction, production, environmental and social issues), the Hydropower Europe Forum provides a focal point for reviewing and developing hydropower in Europe, and subsequently European hydropower in the wider world. Building from this extensive programme of consultation, the Hydropower Europe Forum is developing a strategic Research and Innovation Agenda (RIA) as well as a Strategic Industry Roadmap (SIR) towards implementation of the vision “Hydropower in Europe as a catalyst for the energy transition”. Besides the coordination of the whole project, ICOLD is the responsible consortium partner for the SIR document.

A Consultation Platform was created to help manage the Hydropower Europe consultation process (<https://hydropower-europe.eu>). With several rounds of wider stakeholder consultations, each involving hundreds of stakeholders, it was necessary to develop an approach that would help manage that process whilst also supporting data management rules and ethical processes. A successful workshop on environmental and social aspects in October 2020 and a round table with NGOs in January 2021 are recent examples of the increased consultation with civil society. At the moment some 565 stakeholder experts registered and are involved

in the consultation, which may be considered as a success.

Based on the draft structure of the two RIA and SIR document, a first wider consultation process was started including two steps: the first wider online consultation carried out from August to November 2019 and a series of three regional workshops respectively in the Nordic (Lulea, Sweden, 28-29 August 2019, 80 participants), Alpine (Lausanne, Switzerland, 11-12 September 2019, 75 participants) (Figure 1) and Mediterranean regions (Chania, Greece, 30 September – 1 October 2019, 30 participants). In parallel to these regional workshops, a wider online consultation was started which allowed both widening of scope and refinement of specific topic issues.

As a support of the project consortium, a Consultation Expert Panel (CEP) was formed composed of 34 representatives with a wide range of technical, economic, environmental, legal and social knowledge. The focus of the CEP is, on the one hand, to evaluate the structure and content of the Research and Innovation Agenda (RIA) and Strategic Industry Roadmap (SIR) regarding their application in a consulting process with all stakeholders, and on the other hand to analyze and advise on prioritizing the comprehensive information based on the overall consultation processes.

Until autumn 2019 the project consortium prepared a first important document entitled “Current status of hydropower technology” which is openly available and can be accessed through the project website ([www.hydropower-europe.eu](http://www.hydropower-europe.eu)).

Beginning of 2020 the first drafts of the RIA and SIR were prepared by the project consortium which were then discussed with the CEP during an online workshop in March 2020. Based on the CEP feedback the second, considerably enhanced drafts of the Research and Innovation Agenda (RIA) and Strategic Industry Roadmap (SIR)

were finalized. Then a second wider online consultation started in August 2020 accompanied by an online event called “Hydropower seeking its role in the clean energy transition” on 12-13 October 2020. Some 185 stakeholders participated to the second wider online consultation and reach feedback was received regarding the priorities of the 16 identified research themes comprising some 110 topics as well as of the 11 strategic directions including some 40 detailed actions. In March 2021 the ranking results were discussed in a workshop with the Consultation Expert Panel (CEP) with the purpose of establishing a first prioritization of the research themes and strategic actions. Further workshops are planned in late spring and summer 2021 in order to finalize the prioritization also including the results of a complex system analysis for hydropower in Europe as well as European initiatives regarding energy transition and Green deal. In January 2021 the Forum invited the NGO’s who signed the WWF Manifesto on hydropower in Europe to a roundtable where they had the opportunity to express their views on new hydropower deployment in Europe.

The final outcomes of the Hydropower Europe Forum will be disseminated during the HydroES 2021 Conference in Lyon with a special one-day session “Hydropower as a catalyst for the energy transition in Europe” on September 24, 2021. The main results will be presented also in the Symposium during the ICOLD Congress in Marseille in November 2021. Other dissemination events are foreseen during HYDRO 2021 and in Bruxelles in October 2021.

All interested ICOLD members are invited to participate to the online Consultation Process (<https://hydropower-europe.eu>) and to provide feedback and recommendations for the future of hydropower in Europe.



# A GENERAL ASSEMBLY FOR A TIME OF CRISIS

By Michel de Vivo, Secretary General of ICOLD



It was a most unusual General Assembly. Without the hugs and handshakes or kisses so frequent inside ICOLD family. Without the little flags on the tables in front of the delegations, which give a solemn aspect. But it was a real meeting, although shortened by the online conditions: members from America were obliged to wake up very early and some people in Asia were forced to stay up late. We present here the main decisions concerning ICOLD's life. Those who need a more precise report can refer to the circular letter #1972, available on the website.



The Meeting was opened by ICOLD President Michael Rogers at 11:00 (UTC). He reminded the Assembly that, given the exceptional situation, the ICOLD Board met by videoconference on September 14 and 15 and took the following main decisions, which need be ratified at this General Assembly meeting:

“The ICOLD Annual Meeting in NEW DELHI 2020, initially planned in April, then twice postponed because of the ongoing pandemic is postponed until 2023. However, the following videoconferences have taken place or will take place:

- The present ICOLD General Assembly on November 30, 2020, as required by law and our ICOLD Constitution:
- The Meeting of the Chairmen of the Technical Committees with the Board, on November 18<sup>th</sup>, 2020.
- The Technical Committees, Regional Clubs, Forum of Young Engineers, and the group of Frenchspeaking countries were strongly encouraged to organize their own videoconferences before the end of the year
- The Symposium on Sustainable Development of Dams and River Basins organized by INCOLD,

DRIP and CWC was planned to take place as Hybrid event (Physical and virtual both) from 24-27<sup>th</sup> February 2021 at New Delhi.

President Michael Rogers greeted those present and presented the Board members. After congratulating everybody for this first time online ICOLD General Assembly, he noted: “2020 changed everything in our lives, but nothing in the way we care for each other's, nothing in the friendship and relations we have. “This meeting is necessary from a legal standpoint, but it is also an opportunity to get together and to look forward to the future of ICOLD”, he said.

President Michael Rogers asked for one minute of silence in memory of the missing ICOLD persons who have passed since the last Annual Meeting. He introduced the minute with those words: “We are a strong organization because each individual makes a free and voluntary contribution to ICOLD. When someone from the family passes from this life, we grieve, but we also thank them for their service to ICOLD. We thank them for their friendship, and we remember their names, their faces and their minds. And we smile because we remember them: they were part of our lives and they were part of ICOLD.”

## PRESIDENT'S ADDRESS ON BOARD ACTIONS

The President then presented the actions he entrusted to the Board members. “The ICOLD Board faced two main challenges during the last year. The first has been to manage the business of ICOLD despite the loss of revenue that was expected from the Annual Meeting of New Delhi in April. ICOLD has been put in a financial challenge and I know the National Committees have been put in a similar challenge since their own annual conferences have been postponed or canceled. Our Secretary General has done a magnificent job in taking care of our top priorities : to take care of our Central Office staff, to make sure they are in a good condition and that our business continued. We have managed to keep our staff fully employed and to keep our finances balanced. So I want to give a strong thanks to Michel for his good management of our organization during this crisis.” The other challenge was to deal with the Annual Meeting and Congress re-organization due to postponements necessary due to the pandemic. ICOLD is grateful to the national committees of India, Iran, Sweden, and France for their cooperation with the Board in this matter, ensuring the best possible solution.

### THREE NEW ICOLD MEMBERS

Three new countries have been elected ICOLD members: Mongolia was elected 102<sup>nd</sup> member. Kyrgyzstan was elected 103<sup>rd</sup> member. Laos was elected 104<sup>th</sup> member. The countries will be presented and given a standing ovation at the Marseille Congress in 2021.

### TWO NEW VICE-PRESIDENTS

Bernard Reverchon (France) was elected Vice-President, term of office 2020-2023.

Dr Carlos Henrique Medeiros (Brazil) was elected Vice-President, term of office 2020-2023. (*Carlos Henrique Medeiros unfortunately died in July 2021 (see Circular Letter 1979)*)

President Michael Rogers warmly thanked the two outgoing Vice-Presidents (Jean-Pierre Tournier and Gerald Zenz) for their service to ICOLD and strong commitments during their mandates.

### 2024 CONGRESS

The city of CHENGDU (China) was acknowledged for its election to organize the 92<sup>nd</sup> Annual Meeting and the 28<sup>th</sup> Congress of ICOLD in 2024. (*The Congress has been moved to 2025 See page 10*)

### A NEW TECHNICAL COMMITTEE

President Rogers gave the floor to A. Chraïbi, who presented the new Technical Committee on Residual Tropical Soils (PowerPoint).

### DAM SAFETY

President Michael Rogers presented the World Declaration. He reminded that Dam Safety has been at the center of his commitment and work inside ICOLD. After more than two years of work on the document, including consultation with National Committees after the Ottawa meeting, the World Declaration has been issued. "My intention was a reaffirmation, an acknowledgment of the importance of dam safety. The document provides a good summary of ICOLD's position on Dam Safety. I thank everyone who worked on this document for their support, and I encourage everybody to read it and to circulate it."

### NEW GUIDELINES FOR TECHNICAL COMMITTEES

Enrique Cifres (Spain) presented the updated ICOLD Guidelines for Technical Committees. Adaptation were needed to improve TC's effectiveness. And some clarifications were asked from the committees. The document has been circulated among the National Committees and some valuable suggestions have been made. Guidelines will now be dynamically adapted in the future.

### HYDROPOWER EUROPE

Anton Schleiss (Switzerland) presented the Research Project named "Hydropower Europe", for which ICOLD is the leader (see page 6)

### FOUR NEW BULLETINS WERE APPROVED

- Integrated Optimal Operation of Cascade Hydropower Stations and Réservoirs
- Flood Evaluation, Hazard Determination And Risk Management
- Dam failures - Statistical analysis
- Current State-of-Practice in Risk-informed Decision-making for the Safety of Dams and Levees

### THREE HONORARY MEMBERS

Three persons were named to receive the title of Honorary Member: Alberto Scuero, Tony Bennett, Robin Charwood. They will be acclaimed in Marseille during the coming Congress.

During this General Assembly other decisions were taken, including the re-appointment of Secretary General Treasurer, Michel de Vivo, for 3 years. Votes were made by hand raising. Secret ballot votes were made electronically, two weeks before the meeting. They were entrusted to a sworn third-party partner (vote under the control of a bailiff). And of course, the accounts and the budget were approved.

\* Due to the global health crisis, it was decided in June 2021 to postpone all ICOLD events for one year. \*



## HIGHLIGHT OF THE DECISIONS TAKEN DURING THE GENERAL ASSEMBLY (SECRET BALLOTS)



### 3 NEW COUNTRIES

Three new countries have been elected ICOLD members: Mongolia, Kyrgyzstan and Laos. The countries will be presented and given a standing ovation during the Marseille Congress in 2021.



### 2 NEW VICE-PRESIDENTS

Bernard Reverchon (France) and Dr Carlos Henrique Medeiros (Brazil) were elected as new Vice-Presidents (term of office 2020-2023)



### CHENGDU 2024

The city of Chengdu (China) has been chosen for hosting the 28<sup>th</sup> Congress of ICOLD in 2024.

# NEW ICOLD PLANNING

**2021**

## VIRTUAL ICOLD 2021

89<sup>th</sup> Annual Meeting

Symposium & Workshop

From 15 to 19 November 2021

**2022**

## MARSEILLE 2022

27<sup>th</sup> Congress & 90<sup>th</sup> Annual Meeting

From 27 May to 3 June 2022

**FRANCE**



**2023**

## GOTHENBURG 2023

91<sup>st</sup> Annual Meeting

From 11 to 15 June 2023

**SWEDEN**



**2024**

## NEW DELHI 2024

92<sup>nd</sup> Annual Meeting

**INDIA**



**2025**

## CHENGDU 2025

28<sup>th</sup> Congress & 93<sup>rd</sup> Annual Meeting

**CHINA**



**2026**

## SHIRAZ 2026

94<sup>th</sup> Annual Meeting

**IRAN**



# COLLECTING STAKEHOLDERS' VIEWS : DAMS AND TERRITORIES WORKSHOPS IN ITALY



**It is well known that there can be conflicts or cooperation in the use of water stored behind dams. Most of dams are now multipurpose and the climate change has forced to think again at the way this water is shared. The Italian National Committee of ITCOLD has done an interesting work in evaluating this relation between a dam and the local stakeholders.**

*By Emmanuel Grenier, from an onsite report in Palermo, with written reports from Antonella Frigerio and Guido Mazza.*

**I**n the aftermath of the conclusions of the World Commission on Dams, in 2000, ITCOLD has created a Working Group “Benefits and problems connected to large dams: social and environmental impact management”, whose Terms of Reference refer to the analysis of the social, economic and environmental role of dams and to the relation between dams and hosting territory.



*A well-attended workshop in the engineering university of Palermo.*

A survey has been operated among the dam owners to establish how they act in the fields of environmental management and local development. This operation gave interesting results, but was relying entirely on self-declaration of 17 companies and it was of course necessary to check among the stakeholders how they perceived the dam-owners activity and how they evaluated the relations between the dam and the environment.

To this end, ITCOLD has organized six regional workshops throughout the country. The first was held on May 2014 in Bolzano Province (North of Italy) characterized by the presence of many dams mainly

devoted to hydropower. The second Workshop was held on October 2015 in Calabria (Southern Italy), a Region characterized by a large number of dams devoted both to hydropower as well as to water supply and irrigation. The third workshop was organized on October 2016 in Bologna (centre-north of Italy) characterized by a mix of dam destinations influenced by the economic characteristics of the territories. The fourth workshop was held on October 2017 in Rieti (Lazio region, centre of Italy), with a territory similar to previous one. The fifth workshop was held on October 2018 in Genova, Liguria region, in an area dams can play a major role to mitigate the meteorological effects caused by climate change. The sixth workshop was held on October 2019 in Palermo, Sicily, a region affected by water scarcity.

In 2019, this author had the chance to participate to this sixth workshop, on the invitation of ITCOLD, and was so enthusiastic about the process that he decided to report in ICOLD Newsletter, so that other National Committees could be inspired by the Italian initiative. A much more complete report by Guido Mazza and Antonella Frigerio will be presented in Marseille in 2022.



*Collecting Stakeholders' Views : Dams and Territories workshops in Italy*

# DAMS ARE PART OF THE SOLUTIONS TO CLIMATE CHANGE



*By Jean Pierre Tournier, Vice-President of ICOLD*



I had the privilege of being elected Vice-President during the ICOLD General Assembly held in Prague in July 2018. On this occasion, in my few words of thanks, I mentioned that my priorities would go towards the dissemination of technical expertise (the work of the technical committees constituting one of the pillars of the ICOLD), the participation of young people and the training the next generation, as well as increasing and strengthening the presence of the ICOLD in the world. This presence can be manifested by energizing regional groups, like the European group, but also by participating or being present in the various events (conferences, workshops, forums, etc.) of organizations directly or indirectly interested in dams. On November 22 and 23 2018, I participated in the Canadian Hydropower Forum held

at the Chateau Laurier in Ottawa and organized by the Canadian Hydropower Association. This group has about fifty members, including owners of more than 95% of the hydroelectric power installed in Canada, as well as manufacturers, promoters, consulting engineering companies and organizations interested in the field of water. 'hydro-electricity.

Over 150 delegates attended this Forum. There were, among others, round tables and panels on:

- the present and future of hydroelectricity in Canada with two business leaders, the CEOs of Hydro-Québec and Manitoba Hydro;
- the advantages of hydro electricity with representatives of Electricité de France,

Manitoba Hydro, Rio Tinto Alcan, Red Cross Red Crescent Climate Center and an advisor from Clean Energy Canada as moderator;

- regulatory news with the Vice-President Regulatory Development of the Canadian Environmental Assessment Agency, the Director of Regulatory and Aboriginal Affairs of Transport Canada and the Director General of Fisheries and Oceans Canada;
- relations with the natives representatives who own or co-own power stations, the head of relations with the native communities of Hydro-Québec and an associate of the law firm Fasken Martineau.

We should also note the presence of two important keynote speakers at the lunches, namely:

- **The Honorable Catherine McKenna, Minister of Environment and Climate Change, and**
- **The Honorable James Carr, Minister of Natural Resources.**

We should also mention the holding of a breakfast panel on the action of women in the hydroelectric industry, in partnership with Women In Renewable Energy (WIRE) including the co-founder of WIRE, the CEO of Human Resources of the electrical industry of Canada and the head of generation at Niagara of Ontario Power Generation.

From these two days of meetings, discussions and exchanges, it emerges that the entire “Energy” component in Canada, as well as in North America and finally in the world is in

“cocktail” includes hydroelectricity, wind power and solar power. It is this trio that is being put forward by Canada for its energy transition. The production costs for wind and solar are currently very competitive with hydro, however their production availability is different and storage is required. There is a lot of research for the development of this storage in the form of batteries but this “micro” storage is very expensive while the “macro” storage (water reservoirs) is affordable, with known and controlled costs, or exists already in part. As an indication, it would currently take at least 4,500 years of battery production at the Tesla Gigafactory (50 Gwh per year) to produce the equivalent of the storage of Hydro-Quebec reservoirs. A combination of these three forms of production is therefore the key to the energy transition, hydro serving as the basis for energy storage. However, this availability is not always distributed equally geographically, so we must think globally and have a regional, national approach.



*CEO of Hydro-Québec and Manitoba Hydro, with the President of Canadian Dam Association during the two days meetings*

full transformation to meet environmental imperatives, finally, globally recognized and accepted in principle, while adapting to new economic data. There is a very clear message for a “de-carbonization” (ideally at least 80% by 2050) by gradually replacing for transport, heating and industrial processes the use of fossil fuel by electricity, and biofuels. Nuclear, small and large hydro, pumped reserves, wind, solar and biomass are the most economical options. To limit the impact on the environment, renewable energies must be favored and the winning



# INCOLD Symposium on SUSTAINABLE DEVELOPMENT OF DAMS AND RIVER BASINS & APG SYMPOSIUM ON WATER AND DAMS

THE SYMPOSIUM WAS HELD FROM 24-27 FEBRUARY 2021, IN NEW DELHI, INDIA



*By Devendra Kumar Sharma and Sunil Sharma, from the Indian Organizing Committee.*

**T**o focus on the sustainable development of dams and river basins, INCOLD (Indian Committee on Large Dams), in collaboration with Central Water Commission (CWC), Dam Rehabilitation Improvement Project (DRIP) and National Hydrology Project (NHP) organized a Symposium on “Sustainable Development of Dams and River Basins” under the aegis of ICOLD at New Delhi as Hybrid event from 24<sup>th</sup> to 27<sup>th</sup> February 2021 at New Delhi.

The symposium was inaugurated by Hon’ble Minister for Jal Shakti, Mr. Gajendra Singh Shekhawat on 24<sup>th</sup> February 2021 at Constitution Club, New Delhi. While inaugurating he said that ICOLD Symposium “Sustainable Development of Dams and River Basins” is among the most important subjects to be dealt world over particularly in developing and

under developed countries. Some of the estimates suggest that world food demand could double in the next two decades and consequently it will translate into a huge demand for water. Further, stress on scarce water resources will be caused by population growth, the majority of which will be dependent on agriculture and industrial growth.

Optimum utilization of water is the need of the hour for fulfilling the future demands. Energy has also a major role to play for the overall development of the infrastructure including water resources sector.

World over we are witnessing the effects of climate change with heavy rainfall in areas which were hitherto being considered drought prone and scarce rainfall in areas otherwise considered flood prone.

The climate change could have unpredictable consequences on the water regime. Various studies point towards its adverse impact on the hydrologic cycle that could result in the intensification of both temporal and spatial variations in precipitations.

Floods in one part of the country and droughts in other are a matter of concern. With the climatic change said to be playing its game these imbalances are likely to intensify. The adverse impact of climate change on the ground water table, its quality are also a matter of concern. The challenges of managing water resources in a rational and sustainable manner in this changing scenario will thus require action on many fronts and coordination across different sectors of economy.

In India, we have tried to address these complex inter-relationships through the formulation of a National Water Mission, which is one of the eight National Water Missions that are part of our National action plan on Climate change launched by the Government of India. The main objective of our “National Water Mission” is integrated Water Resources Management by conserving water, minimizing wastage and ensuring its more equitable distribution both across and within various states of our union.

The flagship programmes of Ministry of Jal Shakti namely Dam Rehabilitation Improvement Project (DRIP) to improve the safety and operational performance of large dams and its appurtenances structures in addition to institutional strengthening and National Hydrology Project (NHP) with the World Bank assistance will be presented to the Global dam Community who are keen and looking forward to India’s development and successful implementation of DRIP as well as NHP.

India is committed to ensure water, food and energy security, which is possible only by creation of adequate storages. Dams help to create sizeable storages. To counter the impact of climate change associated risks, India has to create adequate storage capacities. The development of water infrastructure and dams is high on India’s agenda. India is open to adopt new technologies as it progresses in investing in Water Sector, gaining from the best international practices. India is initiating a massive programme of Interlinking of Rivers which will help long distance water transfer with storage dams and associate structures.

Demand for the world’s water, energy and food resources is set to increase dramatically. Scarce resources are coming under increasing stress, endangering water, energy and food security and jeopardizing the fundamental development goals of increased human well-being, economic development and poverty eradication. There are different aspects to the “Food-Energy-Water” nexus including the sustainable use of energy and water to achieve food security. The nexus must be considered in debates about the green economy – going are on track to preventing the global temperature from rising above 2 degrees Celsius.

The other dignitaries who addressed the opening ceremony were Mr. Alok Kumar, Secretary, Ministry of Power; Mr. S.K. Halder, Chairman, Central Water Commission; Mr. Michael Rogers, President, ICOLD; Mr. Michel de Vivo, Secretary General, ICOLD; Mr. D.K. Sharma, President, INCOLD, Chairman of the Organising Committee, and Vice President, ICOLD; Dr. Ali Noorzad, Chairman, Asia Pacific Group, Vice President, ICOLD.

285 full text of technical papers were received from 43 countries, the national and international



Mr. Gajendra Singh Shekhawat, Hon'ble Minister, Ministry of Jal Shakti, Government of India, Lighting the lamp during inaugural session



Inaugural Address by Mr. Gajendra Singh Shekhawat, Hon'ble Minister, Ministry of Jal Shakti, Government of India, during inaugural session



Presidential Address by Mr. R.K. Singh, Hon'ble Minister of State (I/C), Ministry of Power, New and Renewable Energy, Government of India during inaugural session



Welcome Address by Mr. D.K. Sharma, President, INCOLD & Vice President, ICOLD and Hon'ble Chairman, HPERC, during Inaugural session



Group photograph of the dignitaries during inaugural session



An overview of the homepage of the web platform during the Symposium

dam experts out of which 130 technical papers were presented during the 27 technical sessions besides more than 40 presentations in the seven workshops were organized on 27<sup>th</sup> February 2021 on virtual platform. These presentations were made to exchange the experiences and latest development related to the design, performance, rehabilitation, and environmental aspects of dams which would certainly add new dimensions to the body of knowledge on the subject. More than 1700 people from 104 countries participated in the deliberations of the event.

There was also Special Sessions on “Innovative Financing in Dam Projects” and “Use of Geo-synthetics in Dam Engineering” besides Presidential Address by Mr. R.K. Singh, Hon'ble Minister of State (I/C), Ministry of Power, New and Renewable Energy, Government of India. During inaugural session, seven workshops took place: Numerical Analysis of Dams, Roller Compacted Concrete Dams, Reservoir Operation for Handling of Extreme Events, Life Extension Technologies and Strategies for Aging Dams, Sedimentation Management in Reservoirs in Sustainable Development, Seismic Analysis of Dam Design and Tailing Dam Safety Evaluation”

#### PLENARY SESSION

The Plenary session was chaired by Mr. S.K. Haldar, Chairman, Central Water Commission. The presentations were made by the eminent experts from India and abroad.

#### SPECIAL SESSION ON INNOVATIVE FINANCING OF DAM PROJECTS MODERATED BY WORLD BANK

A special session on “Innovative Financing of Dam Projects” was organized on 24<sup>th</sup> February 2021, to have presentations from ICOLD, World Bank, and Power Finance Corporation followed by panel discussions about the modalities and various aspects of financing the dam projects (new dams as well as rehabilitations). The broad topics covered up during the session are key elements in dam projects financing including leverage financing from private sector, Donor agencies and contractual options for project implementation. Mr. Satoru Ueda, Lead Dam Specialist, World Bank welcomed the participants and gave the brief background about the organization of the special session.

#### SPECIAL SESSION ON USE OF GEOSYNTHETIC MATERIAL FOR DAM REPAIR AND REHABILITATION

The session was chaired by Mr. Vivek Kapadia, Director-Civil, Sardar Sarovar Narmada Nigam Ltd. He has also deliver his keynote address on the topic “Application of Geo-synthetics in Restoration of Dam Components subjected to Dynamic Loads - Case Studies of India.

The following issues emerged during the Special Session.

1. Application of Geo-synthetics in Restoration of Dams has underlined importance of geo-synthetics in restoration of dams in the present time when the dams of the world are aging and they require some repair measures. As the world needs dams, we can make them better perform with effective repair measures wherein geo-synthetics have a promising role.
2. Conventional techniques are outperformed by geo-synthetics in several ways – cost, effectiveness, longevity, etc. Issues related to dams are very complex but the solutions with geo-synthetics are not really very complex. Not only the lives of the dams could be extended but also the performance be enhanced by using geosynthetics.

In addition, the following Technical Sessions were conducted during the symposium.

- Modern Technologies in Survey and Investigation for Sustainable Dam Development
- Engineering Challenges and Safety Aspects of Tailing Dams
- Advances in Dam Safety, Risk Assessment and Management
- Rehabilitation Technologies to enhance Dam Safety :
  - Innovations and Adaptations in Intakes, Spillways and Gates
  - Cause of Damages and Structural Performance Evaluation of Dams
  - Underwater Inspection, Robotics and Repair Methodologies for Dams
  - Dam Surveillance and Monitoring
- River Basin Development and Management including Optimization of Reservoirs Operation
- Impacts of Climate Change – Sustainable Dams and Hydropower Development including Pumped Storage
- Modernization, Optimization and Rehabilitation of Aging Dams Simulation Methodologies for

#### Dam Analysis and Design

- Innovative Construction Methodology and Contracting Practices
- APG 2020 Symposium - Design and Analysis Methods of Dams
- Special Session on Young Engineers Forum

#### VALEDICTORY SESSION

The valedictory session was chaired by Mr. P.S. Mahaske, Chairperson, Central Electricity Authority. The Chairman begin his valedictory address by congratulating INCOLD for providing such an excellent platform to all the experts on energy and water resources around the world to share ideas and plan to the way-forward on the theme ‘Sustainable Development of Dams and River Basins’. He mentioned that both water and energy are essential to every aspect of life, social equity, human health, ecosystem integrity and economic sustainability. The longstanding division between energy and water considerations is particularly evident in the case of energy and water management. These resources are fundamentally intertwined; energy is used to secure, deliver, treat and distribute water, while water is used to develop, process and deliver energy.

All over the world, the dams and reservoirs have been playing the dual role of harnessing the river waters for accelerating socio-economic growth and mitigating the miseries of a large population of the world suffering from the vagaries of floods and droughts. To this end, dams have been used for millennia, providing storage for drinking water and irrigation, flood control, and open water for navigation and recreation as well as improving water quantity/quality and generating electricity.

The beginning of the 21<sup>st</sup> century has seen the world grappling with issues like increased global temperature on account of increased greenhouse gases being released into the atmosphere and consequently shifted focus on the development of Renewables like Solar and Wind. With increasing global warming and huge peaking and balancing power demand in light of the growing focus on renewable energy, there has been ever-growing interest in hydropower development in the world and there is renewed thinking

about hydropower projects especially the Pumped Storage Schemes for producing electricity.

The water-energy nexus is critical for understanding the driving forces, feedback relationships and the water and energy cycles for efficient and sustainable use of these resources. In order to manage both water and energy, planners and decision makers need to consider ways that can maximize the supply of one while minimizing the over use of the other. The water and energy section provides these linkages and pulls together the key resources from available sources pertaining to a full range of energy and water resources management. He mentioned that the presentations made by eminent water professionals in Plenary Session, Special Sessions besides the 29 technical sessions conducted during the three days were very interesting and the dam professionals would be enthralled and inquisitive to know about the International Practices in the field of Dams and River Basins. But before we talk about the latest practices on the subject, we must realize that identification of the most suitable and defensible responses will require more holistic assessments to ensure that decisions are comprehensive, far-sighted, and focused on maximizing mutually reinforcing benefits, while avoiding irreparable consequences. He concluded his address that this symposium would have provided valuable food for thought for the participants and the deliberations on Key topics such as Dam Safety, River Basin Development, Flood Management, and Extreme Events, Tailings Dams - Life Extension and Rehabilitation Strategies, Sedimentation Management, and Reservoir Seismicity will certainly be indispensable for the global dam community.

Finally, Mr. Sunil Sharma from INCOLD, proposed the Vote of Thanks to the Chief Guest and other dignitaries as well as to the participants of the Symposium.



# Ageing Water Storage Infrastructure

A report, from United Nations University (UNU), claimed to alert about ageing water storage infrastructure without proposing solutions other than decommissioning. This prompted an answer from ICOLD President Michael Rogers, that we publish here, preceded by a short summary of the UNU report.

**O**n January 21, a report\* made the front pages in the news media internationally. The report, “[Ageing water infrastructure: An emerging global risk](#),” by United Nations University’s Canadian-based Institute for Water, Environment and Health, says most of the 58,700 large dams worldwide were constructed between 1930 and 1970 with a design life of 50 to 100 years, adding that at 50 years, a large concrete dam “would most probably begin to express signs of aging.”

The report was carefully drafted to gain media attention with scaring stories on the necessity of massively decommissioning dams and it did succeed: it was featured in some 280 media stories in almost 50 countries in 13 languages reaching an estimated 1.5 billion readers worldwide.

“This report aims to attract global attention to the creeping issue of ageing water storage infrastructure and stimulate international efforts to deal with this emerging, rising water risk,” said co-author Vladimir Smakhtin, Director of UNU-INWEH.

Ageing signs include increasing cases of dam failures, progressively increasing costs of dam repair and maintenance, increasing reservoir sedimentation, and loss of a dam’s functionality and effectiveness, “strongly interconnected” manifestations, the paper said.

The report recognizes that dams, if well designed, constructed and maintained, can “easily” reach 100 years of service but predicts an increase in “decommissioning” — a phenomenon gaining pace in the USA and Europe — as economic and practical

limitations prevent ageing dams from being upgraded or if their original use is now obsolete.

It also details the increasing risk of older dams, the rising maintenance expense, the declining functionality due to sedimentation, the benefits of restoring or redesigning natural environments, and the societal impacts — pro and con — that need to be weighed by policy makers deciding what to do. Notably, “the nature of these impacts varies significantly between low- and high-income countries.”

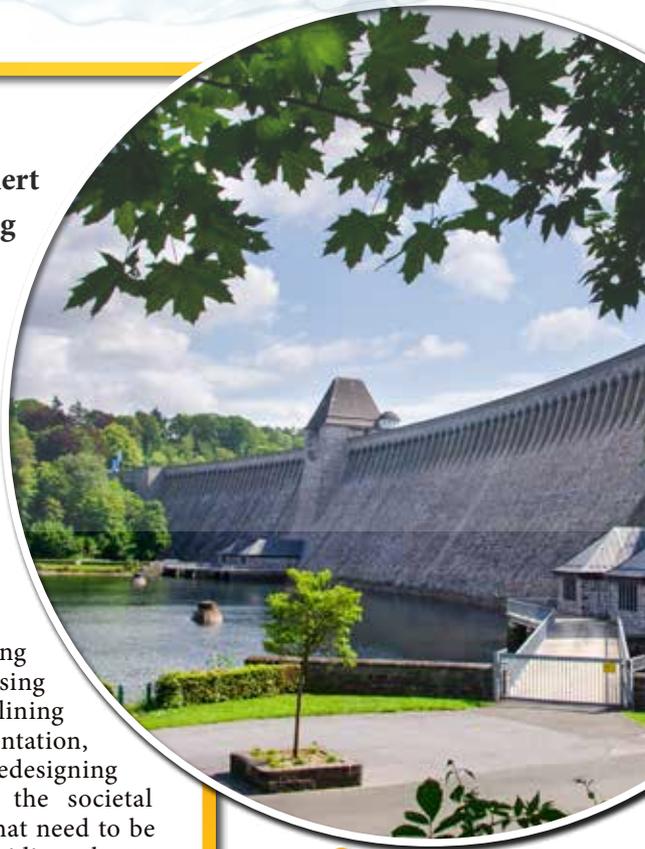
The analysis also includes dam decommissioning or ageing case studies from the USA, France, Canada, India, Japan, and Zambia & Zimbabwe.

## Climate change will accelerate the dam ageing process

“Underlined is the fact that the rising frequency and severity of flooding and other extreme environmental events can overwhelm a dam’s design limits and accelerate a dam’s ageing process. Decisions about decommissioning, therefore, need to be taken in the context of a changing climate.”

Notes lead author and UNU-INWEH Senior Researcher Duminda Perera: “This problem of ageing large dams today confronts a relatively small number of countries — 93% of all the world’s large dams are located in just 25 nations.”

“Large dam construction surged in the mid-20th century and peaked in the 1960s



Old Water Dam. Moehnesee Dam, located 45km in the East of Dortmund. The dam was built between 1908 and 1913.

Dams as old as 2000 years are still serving human communities, in Spain, in Tunisia or in Iran. More generally, dams are infrastructures that are so useful that societies want to keep them as long as possible, through correct maintenance and surveillance. Here is one of the oldest Dam in Europe, on the Monegre River (Spain). Tibi Dam (Masonry Dam) was built between 1580 and 1594

1<sup>er</sup> CONGRÈS

des

# GRANDS BARRAGES

SCANDINAVIE JUIN-JUILLET 1933

VOLUME I

QUESTION 1 a

DÉTÉRIORATION, PAR VIEILLISSEMENT,  
DU BÉTON DES  
BARRAGES - POIDS

- 70s," he says, "especially in Asia, Europe and North America, while in Africa the peak occurred in the 1980s. The number of newly-constructed large dams after that continuously and progressively declined."

According to the report, the world is unlikely to witness another large dam building revolution as in the mid-20<sup>th</sup> century, but dams constructed then will inevitably be showing their age.

The pace of large dam construction has dropped in the last four decades and continues to decline in part because "the best locations for such dams globally have been progressively diminishing as nearly 50% of global river volume is already fragmented or regulated by dams," the report says.

It also mentions "strong concerns regarding the environmental and social impacts of dams, and large dams in particular, as well as emerging ideas and practices on the alternative types of water storage, nature-based solutions, and types of energy production beyond hydropower."

### Drivers of dam decommissioning

The report claims that public safety, escalating maintenance costs, reservoir sedimentation, and restoration of a natural river ecosystem are among the reasons driving dam decommissioning.

However, it recognizes that most dams removed to date have been small;

decommissioning large dams is still in its infancy, with only a few known cases in the last decade., regrets the report.

"A few case studies of ageing and decommissioned large dams illustrate the complexity and length of the process that is often necessary to orchestrate the dam removal safely."

The report states that "Decommissioning will also have various positive and negative economic, social, and ecological impacts to be considered in a local and regional social, economic, and geographic context "critical to protect the broader, sustainable development objectives for a region."

"Overall, dam decommissioning should be seen as equally important as dam building in the overall planning process on water storage infrastructure developments."

"Ultimately, value judgments will determine the fate of many of these large water storage structures. It is not an easy process, and thus distilling lessons from and sharing dam decommissioning experiences should be a common global goal. Lack of such knowledge and lack of its reflection in relevant regional/national policies/practices may progressively and adversely affect the ability to manage water storage infrastructure properly as it is ageing."



In 1933, ICOLD held its first Scientific Congress in Scandinavia. This was 40 years before the creation of United Nations University (1973), at a time when the UN did not even exist. The very first question examined by this Congress was the ageing of Concrete Dams. This a very old preoccupation of ICOLD and its members.



By Emmanuel Grenier

\* Perera, D., Smakhtin, V., Williams, S., North, T., Curry, A., 2021. Ageing Water Storage Infrastructure: An Emerging Global Risk. UNU-INWEH Report Series, Issue 11. United Nations University Institute for Water, Environment and Health, Hamilton, Canada.

# Comments on recent United Nations University publication: "Ageing Water Storage Infrastructure: An Emerging Global Risk"



*Introducing myself as President of the International Commission on Large Dams (ICOLD), the world's preeminent professional organization for Dams and Dam Safety. I have been an active practitioner of civil engineering for the design and construction of dams for more than 40 years. Please find hereafter, my comments on the recent publication Ageing Water Storage Infrastructure: An Emerging Global Risk attributed to the United Nations University Institute for Water, Environment and Health (UNU-INWEH), 2021.*

I appreciate the efforts of the authors to contribute to the discussion of the importance of maintaining global infrastructure, especially the critical function of dams and hydropower in modern society. However, "aging" infrastructure, as characterized in this article and although a familiar soundbite, does a disservice to the real challenges and the benefits of dams in society, and thus the discussions our societies should be having on this important topic. As such, I am concerned that the article will not meet the desired intent to progress the discussion on the management of risks associated with dams.

I believe that the authors of this article attempt to directly link dam risk with decommissioning and removal, as evidenced by the lack of mention regarding the societal benefits of dams. Dams stand head-and-shoulders above all other renewable energy sources by providing society with more than just clean renewable hydropower energy. They can provide reliable water supplies, flood control, recreation, and an adaptation to climate change like no other renewable with the ability to store water and energy, and not just while the sun shines and the wind blows.

As a representative of our industry, ICOLD has been studying and documenting the state of the practice for dam engineering for more than 90

years. As President, I can relate to you that our industry would characterize the most significant challenges to dams as:

- A rapidly changing natural world that both threatens to make natural events such as floods and earthquakes more frequent and intense, while at the same time placing more demand on those key societal benefits that dams offer such as clean water and clean power.
- Infrastructure which was designed and constructed with the science and engineering of decades past that now require an infusion of investment to address the advancements in our profession for safety and reliability.
- A fundamental disconnect in society regarding the how land development behavior has privatized gains in and around dams, while socializing the losses and risks that invariably come with increasing populations.

So, I submit that the authors have missed the point and that the challenge is not really aging of dams. Engineering design and construction of dams must be appreciated for its robust nature intrinsic for generations in practice and regulation. Dams are designed, built, carefully supervised, and maintained as an ever indispensable, vital part of our society's critical infrastructure. Careful regulation and a strong professional state of the

practice built on global cooperation through organizations such as ICOLD have shown that dam structures can have a life expectancy of hundreds to thousands of years.

Professional organizations such as ICOLD exist to facilitate sharing of knowledge and experience so that dams are designed and built with a strong focus on meeting design intent with consideration for resiliency and sustainability for the future. One need only look at the Roman dam near Extremadura, Spain, Proserpina Dam which was commissioned back in the 1st century AD. It was built to provide water supply to the city of Emerita Augusta. This dam has lasted more than 2000 years serving as a key part of the regional infrastructure to provide clean water to people. It shows that with proper engineering, good construction and regular maintenance, the dams that we design and build today can continue to serve people of our world for many, many generations.

It is inaccurate and a gross misunderstanding of the technology of dam design to describe the average life expectancy of a dam is to last 50-100 years. Modern high hazard dams have been designed for extreme events such as "probable maximum" flood and "maximum credible" earthquakes, events which have a probability of one in thousands of years. ICOLD has been a driving force for global cooperation and collaboration in dam

safety through publications and regular technical seminars and training. More than just a repository of the World Registry of Dams (WRD) referenced in the UNU-INWEH article, the 104 countries of ICOLD – a United Nations of dam engineering – brings together knowledge and experience without regard to political or geographic boundaries. Through ICOLD's publications of experience and guidelines, the world's population is better served by those in the profession of dam engineering committed to excellence and safety.

ICOLD's recent [World Declaration on Dam Safety](#) reaffirms our industry's commitment to the safe development of dams around the world. The World Declaration touches different areas, including ICOLD's long-term mission and commitment to dam safety considering the changing conditions of dam safety around the world. The declaration addresses the important aspects of dam safety, including structural integrity, surveillance and monitoring, instrumentation, and basic design, and discusses what it means to have a successful dam safety program.

A critical statement in the ICOLD World Declaration is that for the hundreds of thousands of dams of all sizes around the world, we must all do our part in managing risks: owners must take full responsibility for their projects with a regular and routine safety assessments; Governments must also do their part to protect those at risk with strong governance and oversight; and communities must plan and develop land around critical infrastructure in a responsible and sustainable manner.

The continued use of dams of all sizes must be weighed against their ability to continue to serve a useful purpose related to their design intent and risks for continued operations. Our industry considers decommissioning of dams in context as just one of many risk management strategies, but certainly not the sole means or even primary means of addressing risks as implied in the article. The cost of dam removal is influenced by many site-specific factors, including treatment of accumulated reservoir sediments, stream restoration, and loss of operational benefits (flood control, water supply, power, recreation, etc.). While there are certainly exceptions, in

general the experience of our industry has been that regular refurbishment and good upkeep will be less expensive than dam removal, and more beneficial to society. When these critical risk management decisions are made on dams, multiple criteria are considered, not just economics. Chief among the decision objectives are public safety and the co-equal goals of the environment.

Instead of ageing of water storage infrastructure, the largest "emerging" risk factor should be the increase in unregulated downstream development without consideration of the corresponding risk escalation. Society has been quick to "privatize development gains and socialize development risks". That is, profits from flood plain development are kept by the developers, while damages from developing in known flood risk areas are left to insurances and government reimbursement of losses.

There are many strong advocates for increasing safety related investment in dams. For example, the World Bank in just the last few years has invested over a billion US\$ in the Dam Rehabilitation Improvement Program (DRIP) in India. More investment like this is needed around the world, especially in those countries like the United States where recognized lack of investment in critical infrastructure has been documented by the American Society of Civil Engineers (ASCE) and others for decades. Unfortunately, only when a bridge collapses; a power grid shuts down; or a dam spillway erodes does the proper (but short-lived) attention be brought to bear on the systemic problems.

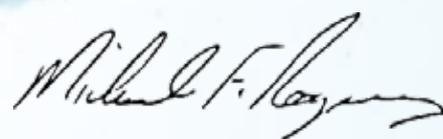
I applaud the UNU-INWEH for this publication – any publication – that brings a light to infrastructure challenges of our generation. We owe it to the next generations to take care of what has been given to us so that they may have similar opportunities for success. In a society focused on "green" sustainability, more recognition is needed of the benefits of carbon-clean and renewable hydropower as the world's largest and most viable market for clean power and water for developed and developing countries and people on our planet. Water is a renewable resource in the hydrologic cycle powered by strong cosmic features – sun, wind, and gravity – that sustains our planet. A strong four-legged chair of water, sun, wind, and

gravity can support a growing global population using the experience gained in a history of good and tragic lessons learned.

Nothing – not man nor grandest feat of man's ingenuity – can escape the rigors of time. We should be reminded that "We are made wise not by the recollection of our past, but by the responsibility for our future." (George Bernard Shaw). As stated in the UNU-INWEH article, it is agreeable that "value judgements will determine the fate of many of these large water storage structures." These value judgements must, however, be informed by science and not passions to remove these silent protectors and servants of citizens in our modern society. Dams should not be damned for their age or environmental stigma. Science and technology demonstrate that water can work with solar, wind and gravity forces to create a sustainable and environmentally friendly service to meet the basic needs of humankind around the world for clean and reliable sources of water and power, along with the protections of flood control and many other benefits.

In summary, "Ageing" is not an emerging risk in the profession of dam engineers. Rather, it is a long-held, well-documented and understood element of risk that is considered in the design and construction of dams of all sizes. I invite your representatives to participate in broadening the conversation addressed in the subject article by attending and engaging our profession at our next Congress in Marseille, France in June 2022 to recognize the hard work and progress already made in solving these challenges. We are paying attention to this risk and would welcome your help and contributions. As a representative of the profession, ICOLD remains committed to this vision of Better Dams for a Better World.

Sincerely,



Michael F. Rogers

President, International Commission  
on Large Dams



**New !**

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**Bulletin 163**  
**Dams for Hydroelectric Energy**

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**Bulletin 175**  
**Dam Safety Management**  
*Pre operational phases of the dam life cycle*

DAM SAFETY MANAGEMENT:  
Pre operational Phases of the Dam Life Cycle  
GESTION DE LA SÉCURITÉ DES BARRAGES:  
Phases de Conception, Construction et Mise en Service  
Bulletin 175

Bilingual En / Fr 6 Chapters / 206 pages

**What's inside!**  
Dam Safety Management is a major concern during the entire lifetime cycle of a dam scheme. This is particularly true for the operational phase of the scheme that represents by far the longest period in its lifetime cycle.  
Bulletin 154 presented a general approach and concepts to be applied to dam operation. The current Bulletin 175 extends the developed concepts to all phases preceding the operational phase. Many risks associated with the operation of existing dams have their origins in other phases preceding the actual operation.  
Although there are numerous ICOLD Bulletins addressing technical aspects of planning, design, construction and commissioning of dams, there is not a single Bulletin which covers the subject in a comprehensive manner. The current document is a first attempt to capture all relevant dam safety aspects in all preoperational phases by systematically characterizing the actors involved, their roles, the activities and complex interactions present in different phases of the dam life cycle. An Overarching Safety Management System is specifically developed that can be applied to all actors involved.

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**Bulletin 140**  
**Mathematical Modelling of Sediment Transport and Deposition in Reservoirs**  
*Guidelines and Case Studies*

MATHEMATICAL MODELLING OF SEDIMENT TRANSPORT AND DEPOSITION IN RESERVOIRS:  
Guidelines and Case Studies  
MODÉLISATION MATHÉMATIQUE DU TRANSPORT ET DES DÉPÔTS DE SÉDIMENTS DANS LES RÉSERVOIRS:  
Lignes Directrices et Études de Cas  
Bulletin 140

Bilingual En / Fr 6 Chapters / 334 pages Guidelines & Case Studies

**What's inside!**  
As reservoir sedimentation has proven to be a serious problem in South Africa, research in this field has been ongoing for more than 70 years.  
This publication emanates from extensive research which has been undertaken over the past 30 years with the support of the South African Department of Water and Sanitation as well as the South African Water Research Commission. A great deal of information has fortunately also been obtained from China. Given the universal nature of hydraulic formulae it is not surprising, yet gratifying, that Chinese and South African data generally conform to the same mathematical relationships. This indicates that these relationships should be applicable in other countries as well. Much of the information contained here has been condensed from a more comprehensive publication.  
This ICOLD Bulletin follows on Bulletin 115 "Dealing with reservoir sedimentation", which gave guidelines for management of reservoirs to limit sedimentation. The guidelines on mathematical modelling of sediment transport dynamics in reservoirs in this document can be used during the planning and design of new dams, as well as for the management of existing dams.

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# STATE OF BULLETINS PUBLISHED

On the request of the Committee Chairpersons, during their meeting with the Board on November 18<sup>th</sup> 2020, the Central Office has created a new page on ICOLD's Website. It is available in the Members section (second line of the dropdown menu, members only: [https://www.icold-cigb.org/GB/members\\_section/statement\\_of\\_the\\_bulletins\\_edition.asp](https://www.icold-cigb.org/GB/members_section/statement_of_the_bulletins_edition.asp)).

This "STATEMENT OF THE BULLETINS EDITION" is precisising, for each bulletin already available in English in a preprint version, who is in charge of the translation in French, the state of this translation work and the state of the lay-out process.

In this page, you can see that **eight new Bulletins** (with the name of their TC Chairperson in brackets) are expected to be published this year 2021: they are mentioned in the statement as "Transl & Lay-out OK Given to Editor".

- 145: Physical properties of hardened conventional concrete in dams (Charlwood)
- 159: Supplement to the Position Paper on Dams and the Environment (Shirai)
- 161: Dams and Water Transfers – an Overview (Thatte)

- 162: The Interaction of Hydraulic Processes and Reservoirs – Management of the impacts through construction and operation – Downstream impacts of large dams (Machado)
- 163: Dams for Hydroelectric Energy (Ruggeri)
- 173: Integrated Operation of Hydropower Stations and Reservoirs (Cao)
- 179: Asphalt Concrete Cores for Embankment Dams (Tournier)
- 181: Tailings Dams Design – Technology Update (McLeod)

Moreover, the following four Bulletins have been approved by the virtual General Assembly of November 30<sup>th</sup> 2020.

- 186: Integrated Optimal Operation of Cascade Hydropower Stations and Reservoirs
- 187: Flood Evaluation, Hazard Determination and Risk Management
- 188: Dam failures - Statistical analysis - Ruptures de barrages, Analyse statistique
- 189: Current State-of-Practice in Risk-informed Decision-making for the safety of Dams and Levees

# LATEST NEWS - LATEST NEWS

## DEATH OF VICE-PRESIDENT

### CARLOS-HENRIQUE MEDEIROS

As we were going to print, we learned the death of Vice-President Carlos-Henrique Medeiros on July 5. The President Michael Rogers immediately declared that "our entire ICOLD family is devastated by this terrible news. Carlos was such an energetic and vibrant person with so much enthusiasm, especially for his new position as ICOLD Vice President for the Americas. He was also a remarkable President of CBDB – Brazilian Committee on Dams, elected for the period: 2017 – 2020, as well as a former professor on Foundations and Earthworks, Earthfill Dams and Soil Mechanics and Special Topics of Geotechnics and an active member of ICOLD Technical Committee on Dam Safety. We have lost both a very valuable Vice-President and a friend." Carlos-Henrique Medeiros will be missed by everyone in our organization and certainly within the global profession of dam engineering, where he was a recognized expert for many years with a passionate commitment for dam safety.



## VIRTUAL EVENT

FROM 15 TO 19 NOVEMBER 2021

Originally scheduled for June 2021, the MARSEILLE CONGRESS had already been postponed to November 2021 due to COVID 19. The current situation of the pandemic and the uncertainties about the possibilities of participation in the Congress by our member countries still does not allow us to consider holding it in 2021.

ICOLD will organize a **Virtual Conference on November 15<sup>th</sup> - 19<sup>th</sup>, 2021** (same week as initially foreseen for the Marseille Congress) mainly including a Tech. Cttees Chairs Meeting, a Symposium, Tech. Cttees Workshops and a General Assembly (detailed information and program will be sent later)

This one-year postponement is also applied to all other ICOLD events. This is the new agenda:

- |      |                     |                 |
|------|---------------------|-----------------|
| 2022 | MARSEILLE (France)  | <b>CONGRESS</b> |
| 2023 | GOTHENBURG (Sweden) | ANNUAL MEETING  |
| 2024 | NEW DELHI (India)   | ANNUAL MEETING  |
| 2025 | CHENGDU (China)     | <b>CONGRESS</b> |
| 2026 | SHIRAZ (Iran)       | ANNUAL MEETING  |

OUR NEXT EVENT WITH AQUA MEDIA



**POSTPONED  
IN 2022**

# AFRICA 2022

## WATER STORAGE AND HYDROPOWER DEVELOPMENT FOR AFRICA

Lake Victoria, Uganda, Africa

THE INTERNATIONAL JOURNAL ON  
**HYDROPOWER  
& DAMS**



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Daniel Couvidat



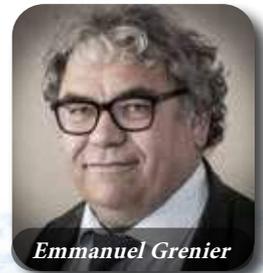
Nathalie Schauner



Michel de Vivo



Laetitia Coutant



Emmanuel Grenier

*The Central Office Team looks forward to seeing you soon in good shape, in June 2022 for our 27<sup>th</sup> Congress in Marseille.*

*Please stay safe!*

THE DAMS



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