Marseille 2022
The time of Reunion

Levees as a natural expansion of ICOLD’s focus

INCOLD Conférence

Michael Rogers
“Reflection on my term as ICOLD President”

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NEW ICOLD PLANNING

2021
VIRTUAL ICOLD 2021
89th Annual Meeting
Symposium & Workshop
From 15 to 19 November 2021

2022
MARSEILLE 2022
27th Congress & 90th Annual Meeting
From 27 May to 3 June 2022
FRANCE

2023
GOTHENBURG 2023
91st Annual Meeting
From 11 to 15 June 2023
SWEDEN

2024
NEW DELHI 2024
92nd Annual Meeting
INDIA

2025
CHENGDU 2025
28th Congress & 93rd Annual Meeting
CHINA

2026
SHIRAZ 2026
94th Annual Meeting
IRAN
My Dear Friends and Colleagues:

After two years of online meetings, we will finally be able to meet in person! As our President Michael Rogers wrote, “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!”

Hydro 2022 which just successfully took place also in France (Strasbourg) is showing that there is a real appetite to meet again in person and that it is possible.

There are more than 1000 participants registered for this Congress, despite the difficulties: due to the pandemic, we deplored unfortunately a marked absence of some countries from Asia which accustomed us to send more important delegations. Nevertheless, the exhibition is already sold out with many partners wishing to take this occasion to meet their clients and to expose their new ideas to the international dam engineering community.

Many National Committees of ICOLD have expressed their wish to meet again, to share and to live pleasant moments together. This Congress will be a reunion, which we hope will be memorable. The Symposium devoted to the general theme “Sharing water: multi-purpose of reservoirs and innovations” will include for the first time a Roundtable with many high level people. Many events and visits in prestigious places will enable you to discover the French excellence in water management, including the hydroelectric dams that played an essential role in the country’s post-war economic development.

The Dakar World Water Forum, which took place last March, has once more demonstrated how crucial is water storage for societies. More than ever, this 21st century will be the century of water. We, who are the architects of water, will continue to fight for water to be available to all, under acceptable conditions of price and quality.

Despite past and ongoing crises, we remain optimistic: our ICOLD family is a permanent example of what human societies can achieve when they work together in a spirit of cooperation rather than competition.

Michel de VIVO
Secretary General
International Commission on Large Dams (ICOLD)
It has been a great honor to serve as the 25th President of the International Commission on Large Dams (ICOLD) / Commission Internationale des Grands Barrages (CIGB) and I am extremely grateful. I was elected by the ICOLD General Assembly on July 3, 2018, at the 86th Annual Meeting (26th Congress) in Vienna, Austria and my term will end on June 8, 2022, at the 90th Annual Meeting (27th Congress) in Marseille, France. My term of nearly four years will be longest for an ICOLD President since 1958 due to a one-year extension as part of the ICOLD Board response to the COVID Pandemic. When combined with my term as ICOLD Vice President (VP), I’ve spent the last 7 years serving on the ICOLD Board.

My term as ICOLD President has been the most rewarding professional experience of my life. As an organization, ICOLD has dutifully served the profession of engineering for dams since its founding in 1928. The name “ICOLD” carries instant recognition and respect around the world for the 104 member countries with more than 15,000 individual members who contribute to our technical branding, including 28 current technical committees and almost 200 published bulletins on the state-of-the-practice. ICOLD carries great responsibility to gather world-wide experts and expertise to share experiences and lessons learned with the primary mission to make dams safe and protect human life. My personal mission as ICOLD President has been to support these strong ideals of our founding; strengthen the organization with our national organizations and technical committees; and invest in the future as a mentor to our young professionals just starting their careers.

Vienna, Austria 2018

I remember the euphoria of my presidential election and acceptance speech in Vienna in 2018. The excitement of reaching my life-long aspiration to serve as ICOLD President and the humble realization of the weight of this position. I was following a long line of highly respected and successful ICOLD Presidents – Prof. Schleiss (SWITZERLAND), Mr. Nombre (BURKINA FASO), Dr. JIA (CHINA), Dr. Berga (SPAIN) and many others who are recognized leaders in our profession. And, there was also the inspirational leader from my early years at Harza.
Engineering Company – Dr. Jan Veltrop (USA), Harza Chief Engineer and ICOLD President (1988-1991). I could not help but wonder if I would measure up to these great ICOLD leaders.

As I took stock of my situation, I recognized that there was someone who would become one of my closest friends and strongest supporters – ICOLD Secretary-General Michel de Vivo. My preceding three years on the ICOLD Board as Vice President and my collaboration with Michel during the planning and execution of ICOLD 2013 (Seattle, USA) gave me the confidence that I could trust him for sage advice and guidance knowing that he would always support me and protect the integrity of the ICOLD organization. I also had the confidence and support of my strongest advocate and partner, my wife Kristin who I knew would also always be by my side. On that day in Vienna, I remember clearly taking a deep breath and stepping up to the podium to outline my plan as the newly-elected ICOLD President. I remember the room and the faces – some I already knew and many more I would come to know over the next four years – the family of ICOLD!

In my acceptance speech I identified five priority areas that I felt needed my focus to make a positive difference in ICOLD during my tenure as President. These areas were:

i. Dam Safety
ii. National Committees
iii. Technical Committees
iv. Capacity Building
v. Young Professionals

I would go on to solicit support from the ICOLD Board, asking individual Vice Presidents for their help with each priority so that we could work together to make ICOLD stronger. We have all worked together so well over the last four years - the ICOLD Board, SG Michel de Vivo with the Central office staff, and me to strengthen the roots of ICOLD while at the same time surviving our biggest challenge since World War II – a global Pandemic.

**Dam Safety**

My highest priority has always been Dam Safety. Dam Safety has been a passion since my early days as a young engineer at Harza learning under world-class engineers and scientists about the responsibility we hold for quality design to assure safety of the structures and protection of human life. With support from ICOLD VP Michel Lino (FRANCE), the World Declaration on Dam Safety was begun, including significant contributions from ICOLD Technical Committees and National Committees.

It was good to have the cooperation of ICOLD Technical Committee H – Dam Safety, especially Andy Zielinski (CANADA), Chair. The World Declaration on Dam Safety was approved by the ICOLD Board on October 18, 2019, in Porto.

I feel that the World Declaration on Dam Safety is a strong statement by ICOLD that dam safety is our core value and that as engineers and scientists, we must always be diligent to our work every day to protect lives and the critical infrastructure we build. I have been pleased to make many speeches on behalf of ICOLD around the world to reinforce Dam Safety as a core value of ICOLD and the importance of individual responsibility in our daily work for safe design, construction, and operation of dams.

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**World declaration on Dam Safety**

The construction, operation and maintenance of dams and their storage reservoirs have provided significant benefits to humanity by providing water for life, energy for economic growth, and flood protection. Today, water is a driving force for sustainable development, and must be properly managed to ensure availability, accessibility, energy production and flood protection while not harming the environment and future generations, as stated in the “World Declaration on Dam Safety” that was adopted in 2019 by ICOLD. The declaration aims to bring Dam Safety to the attention of the world and promote its importance and the need for better understanding and management of dam safety.

**Pillars of Dam Safety**

With almost 500 billion dams, the safety of each individual dam is critical. ICOLD is committed to promoting safety and sustainability in dam operations.

1. **Structural Integrity and Dam Safety**
   - Ensuring that dams are designed, constructed, and operated in a way that will withstand natural forces and human activities.

2. **Environmental Impact Assessment**
   - Evaluating the potential environmental impacts of dam construction and operation and implementing measures to minimize these impacts.

3. **Human Rights and Equity**
   - Protecting the rights of all individuals affected by dam projects, including indigenous and vulnerable communities.

4. **Transparency and Accountability**
   - Ensuring that dam projects are managed and operated with transparency and accountability to meet the highest international standards.

5. **Knowledge Sharing and Capacity Building**
   - Promoting the exchange of knowledge and best practices to enhance dam safety and sustainability.

The ICOLD World Declaration on Dam Safety is a call to action for all stakeholders to work together to ensure that dams are designed, constructed, and operated in a way that will protect the environment and benefit humanity.
ICOLD is an international organization that is strengthened by the active participation of each National Committee. As proposed to the 1924 World Power Conference by the French, the constitutive meeting forming ICOLD was held on July 6, 1928, in Paris with the initial group of six countries – France, United States, United Kingdom, Romania, Italy, and Switzerland. From this humble beginning, ICOLD would grow to our current international association of 104 nations representing more than 6.9 billion people - about 90% of the world’s population (2019).

I see an important function of the ICOLD President to represent our organization around the world in meeting colleagues and governmental representatives involved in water and power infrastructure. As ICOLD President, my intention was to travel around the world attending as many ICOLD and ICOLD-sponsored meetings as possible with the considerable financial support from my employer, Stantec. In my first 18 months as President, my wife and I visited 12 countries meeting many of our ICOLD friends and family, including many speeches, meetings, and memorable dinners. In these meetings, I was fortunate to discuss the important role of ICOLD to unite the industry under a common and respected banner for technological quality and excellence for engineers from all national committees.

Vice President Professor Dr. Ali Noorzad (IRAN) agreed to champion improving the work of ICOLD National Committees. As a result of the hard work of SG Michel de Vivo over the last four years, ICOLD has welcomed four additional nations: Uganda, Mongolia, Kyrgyzstan, and Laos. It is wonderful to see this continuous growth of our organization. With the help of Dr. Noorzad, ICOLD has also been able to work with several existing National Committees to build their organizations.

As President, I was inspired by two countries that I’ve been able to directly work with to grow and strengthen their national committees: Malaysia and India. On October 29, 2018, I received an e-mail introducing Prof. Lariyah Mohd Sidek, the Assistant Vice Chancellor (Research) of the Universiti Tenaga Nasional (The National Energy University), Malaysia. Prof. Sidek was in the process of strengthening dam safety in Malaysia, including reactivation of the dormant Malaysian National Committee on Large Dams (MYCOLD). On January 28, 2019, Prof. Sidek and her MYCOLD delegation visited me in my Stantec office in Denver, Colorado, which began a good friendship and strong renewed commitment to dam safety in Malaysia. MYCOLD would go on to organize their first International Conference on Dam Safety Management and Engineering in November 2019 at Top Komtar, Pulau Pinang, Malaysia, which my wife and I attended. This conference was a great success and led to subsequent development of new national governance on dam safety in Malaysia and strong works for dam safety from MYCOLD.

The Indian Committee on Large Dam (INCOLD) continues to be one of the strongest and most active National Committees of ICOLD. Under the leadership of ICOLD Vice President Davendra Sharma (INDIA) assisted by Mr. Sunil Sharma, Chief Manager – Technical, Central Board of Irrigation and Power, India sponsors many international workshops and conferences each year. The influences of INCOLD include support to two recent key measures to improve the safety of dams in India. First, India has partnered with the World Bank to enact the Dam Rehabilitation Improvement Program (DRIP) that is establishing dam safety guidelines and funding rehabilitation for some of India’s oldest dams in the need of greatest...
repair and upgrading. Secondly, India has adopted a new national governance in the form of the Dam Safety Bill of 2021 with a common basis for dam safety legislation throughout the country. There are many dam safety champions in India, including INCOLD that are leading these initiatives, which demonstrates the worldwide commitment and leadership of India for dams. There will be many aspects of India’s DRIP and the Dam Safety Act of 2021 that can serve as templates for success to other countries emulate.

**Technical Committees**

The hard work and heavy lifting of ICOLD is done in our Technical Committees (TCs). As a former Chair of TC-D Concrete Dams, I understand the challenges and frustrations of leading a diverse group of very intelligent and hard working committee delegates who meet only once a year. For the ICOLD Board, a big step forward was the development of “ICOLD Guidelines for Technical Committees” by VP Michel Lino and VP Ahmed F. Chraibi (Morocco). This guideline was updated by VP Jianping ZHOU (CHINA) and VP Dr. Enrique Cifres (SPAIN) in 2020, providing clear guidance for the operation of technical committees.

During my tenure as President, I will always remember three key success stories from ICOLD Technical Committees: TC-LE Levees; TC-H Dam Safety; and Bulletin Publications. Starting with TC-LE, the inclusion of levees into ICOLD is especially important to me primarily due to the terrible images in my memory of Hurricane Katrina - a huge destructive Category 5 Atlantic hurricane that caused over 1,800 fatalities and more than US$125 billion in damage in late August 2005. I saw the vulnerability of levees to these catastrophic events, and I also know that the work that ICOLD does for dam safety can also make these levee structures safer. I supported the initiation of TC-LE in 2017 under the leadership of Rémy Tournant (FRANCE), including the adoption of Question #103 - Small Dams & Levees at the Vienna Congress (2018). I’ve seen this committee grow in stature and confidence including the development of three bulletins during the Pandemic years, one of which is subject to approval at the ICOLD 2022 General Assembly meeting. There is a definitive place for levees in the ICOLD world of focus on safety and security of critical water and power infrastructure. Many lives have been and will be saved by those ICOLD delegates committed to the safety and reliability of levees.

I have already mentioned my passion for dam safety, and I have been heart-warmed to see the hard work of TC-H under the leadership of long-time Chair Dr. Andy Zielinski and incoming Chair Dr. Zeping Xu (CHINA). This committee has been the most active group that I have seen in ICOLD (more than 10 meetings each year!) in the last four years. I vividly remember walking into the Dam Safety TC meeting in Ottawa in 2019 to see the spirited debate on the future path of ICOLD dam safety bulletins. In what could have been a catastrophic split in opinion and personalities, a solid group emerge led by Dr. Robin Charlwood (USA), Dr. Des Hartford (CANADA), and Ms. Clare Raska (CANADA). This core group along with other key supporters picked up the pieces of conflict and put together a plan for three modern dam safety bulletins from basic concepts, principles, and framework (Bulletin #1); dam safety governance (Bulletin #2); and owner’s dam safety management principles (Bulletin #3). Developing consensus among the most committed professionals in the world on such an important topic is never an easy task. I will forever be in awe of the work of TC-H from 2019 to 2022.
The final memorable success of a focus on technical committees was the Bulletin publishing backlog purge. As championed by Hon. ICOLD President Schleiss, I inherited a new process for publishing ICOLD Bulletins and other documents using Balkema Publishing. With a backlog of bulletins to be publish dating back almost 10 years, it seemed like we would never catch up when we were adding newly approved bulletins at each meeting of the General Assembly. A bright spot in the Pandemic years was that the ICOLD Central Office could focus on clearing the backlog of bulletins working with Balkema. With 10 Bulletins published in the last 18 months, ICOLD is now in a much better position of meeting our goal of no more than three-years from bulletin approval to publishing. A key part of meeting this goal is a common bulletin template and timely translation of new documents to French. Technical Committees are now being strongly encouraged to take the responsibility for translation as part of the Bulletin development to expedite the publishing process.

**Capacity Building**

The need for sharing and training has been a cornerstone of ICOLD since its formation in 1928. The modern world is seeing soaring demand for reliable water and renewable energy in regions previously without the means to design and build such infrastructure, including Africa. In 2008, ICOLD issued its World Declaration for Dams and Hydropower for African Sustainable Development. The ICOLD Ad hoc TC-Z on Capacity Building was established in 2009 during the Annual Meeting held in Brasilia. The purpose of this committee was initially to handle the training programs and coordinate workshops and technical tours, primarily offered by Turkey, Morocco, and China. It has since grown to look for supporting organizations for Capacity Building internal and external to ICOLD. This is a difficult mission when funding for training and technology transfer is often very limited.

As President, I have been fortunate to work with Hon. ICOLD President Adama Nombre, Chair of TC-Z and ICOLD VP Michael Abebe to look for opportunities to improve the situation of Capacity Building support within ICOLD and our associated partners, including the World Bank. As an example of a key success, CHINCOLD has graciously sponsored 14 Round Table meetings in China on Capacity Building and Sustainable Development of Dams and Hydropower, which I have been attending since 2012. For me, these meetings offered with the greatest of humanitarian efforts from China offer great insights into the needs of many African countries for training as part of technology transfer, which ICOLD can contribute from our leadership position.

In my efforts to support Capacity Building, I have been privileged to work with ICOLD VP Michael Abebe (ETHIOPIA) who has been a strong proponent of Capacity Building during his term on the Board. He worked on many different programs for training and other initiatives to make an important impact to the professional engineers and scientists in Africa. Although not all proposals were successful, his commitment and dedication has been inspirational to many young African members of ICOLD. My hope is that the important work begun by ICOLD President Nombre and VP Abebe will be picked-up by other motivated ICOLD members in Africa to continue the commitment made in our ICOLD World Declaration in 2008.

**Young Professionals**

As ICOLD President, I get asked to make many, many speeches on many different topics at many different occasions. My favorite speeches are those to our ICOLD Young Engineer’s Forum (YEF). These young professionals of engineers and scientists are the future of ICOLD, and I enjoy telling my story from young student engineer of 18-years old at Harza to ICOLD President now approaching retirement. My 40+ year professional career path has been an amazing journey and much of the highlights from that journey are due to my participation in the United States Society on Dams (USSD) and ICOLD.
The original vision for YEF was developed at the ICOLD Congress in Brasilia 2009. A detailed proposal for YEF was submitted to the ICOLD Board in September 2010 with the first YEF gathering taking place at the 2011 Annual Meeting in Lucerne, including the election of the first YEF Chairman Dr. Marco Conrad (SWITZERLAND). The formation of the ICOLD’s YEF group has been the motivation for many countries to formally recognize young professionals within their own national organizations. Since its first official ICOLD YEF meeting in 2011, 23 national committees have formed their own organizations of young engineers, including the YEF group of India (INCOLD) inaugurated in July 2021, which I was fortunate to preside over during a virtual ceremony. The integration of younger members and the diversity of membership of ICOLD should be seen as a high priority for our organization.

During my tenure on the ICOLD Board, VP Leif Lia (NORWAY) and Prof. Dr. Gerald Zenz (AUSTRIA) were inspirational mentors of the YEF group, initiating key encouragement for younger members to attend meetings with discounted fees, special organization events, and awards for distinguished contributions to ICOLD by younger members. I have been especially impressed by two key YEF Chair leaders whom I’ve worked closely with: Amanda Sutter (USA) and Elias Baptista (Mozambique). Each in their own way, they have led the ICOLD YEF Board and members with leadership and motivational commitment to the strong ideals of younger members participating in an organization that is developing younger and more diverse ideals. Their hard work and commitment has inspired me with the confidence that the next generation of dam professionals is well suited to the hard tasks ahead of them.

Concluding Remarks

I will always look upon my time as ICOLD President as a grand adventure and the experience of a lifetime. I hope that the ICOLD family will not see my work over the last four years as being defined by a Global Pandemic, but rather defined by my heartfelt passion that I hold for the spirit and legacy of ICOLD. I will forever be grateful to my wife and children for their love and support of my passion for dams and my service to ICOLD.

Over the last few years, many days during the Pandemic felt like a real matter of survival for individuals and organizations. We mourned the loss of many of our friends and family, including many from ICOLD. No loss hit me harder than my friend ICOLD VP Prof. Dr. Carlos Henrique Medeiros (BRAZIL). His election to the ICOLD Board at our first virtual General Assembly meeting in December 2020 was filled with great expectation based on his life-long commitment to our profession, especially the education of younger engineers. His memory motivates me when I think of his great energy and commitment to ICOLD.

As ICOLD prepares for our first in-person meeting since ICOLD 2019 in Ottawa, I am full of optimism that our organization has emerged from the Pandemic stronger than ever because we have been tested in the cruel forge of despair and uncertainty. ICOLD has kept focus on our important vision and mission to build safer and more reliable dams by freely sharing knowledge and experience on a global scale. As engineers and scientists, we have a high-calling to serve the basic needs of humankind for clean and reliable water and power, along with protections from floods, earthquakes, and other natural disasters. This high-calling is who we are. The important lesson of my time in ICOLD, especially the last four years as President is that this professional calling is also about the journey of a career and the friends & family that we gather around us along the way. I am warmed looking back at the memories from the many ICOLD experiences around the world that my wife and I have shared. We remember many beautiful places and smiling faces with our good friends, good dinners, and good wine.

Thank you to the ICOLD family for giving me this adventure. God bless.
The HYDROPOWER EUROPE conference that took place online on the 23rd February 2022 was the final event of the HYDROPOWER EUROPE Project – a project that was created under the European Union call: “H2020- LC-SC3-2018-2019-2020 (BUILDING A LOW-CARBON, CLIMATE RESILIENT FUTURE: SECURE, CLEAN AND EFFICIENT ENERGY)” and which has been running since November 2018.

The objective of this event was to present the results of the HYDROPOWER EUROPE Project, namely the conclusions drawn from the consultation with sector stakeholders that led to the creation of the Research and Innovation Agenda (RIA) and the Strategic Industry Roadmap (SIR) (See key publications at https://hydropower-europe.eu and see our dissemination video at: https://youtu.be/KwccfOZESxo)

Anton Schleiss, Honorary President of the International Commission on Large Dams (ICOLD) and Professor Emeritus of EPFL, opened the conference by providing an introduction to the status of hydropower in Europe and suggesting that this source of energy could provide increased contributions in the coming years, recognising that only two third of the economically feasible potential had been tapped so far. In fact, in the field of energy production, hydroelectricity remains an excellent and safe supply tool to support the energy transition and the fight against global warming. He revealed that in more than half of the countries in Europe, hydropower still provides a significant share (>25%) of electricity generation, which is important for the success
of the energy transition in ensuring safe electricity supply. Worldwide, hydropower alone produces three quarters of all renewable electricity.

Ms Hélène Chraye, Head of Unit for the Clean Energy Transition and Deputy Director of Clean Planet at DG R&I, followed the opening with an overview of the “Goals of European Hydropower R&I Funding” and the overall EU strategy to meet the targets set by the European Green Deal.

The webinar focused next on the main outcomes of the HYDROPOWER EUROPE project. Anton Schleiss and Jean-Jacques Fry had the task of presenting highlights from our main documents: the RIA and the SIR, which were created after three years of extensive consultation involving more than 600 stakeholders. The final reports (~140 pages each) present 18 research themes with 80 topics (RIA) and 11 strategic directions which include 40 detailed actions (SIR). Two illustrated summary brochures of ~20 pages each have been produced by the forum which give an overview of the high to very high priority outcomes.

From the European Commission, Thomas Schleker, Policy Officer at DG R&I, and Sébastien Mortier, Research Projects Portfolio Manager at CINEA, shared with the audience some impressions about the work of HYDROPOWER EUROPE. They thanked the team for the good coordination and the excellent outputs.

Finally, Mark Morris, a team member from SAMUI France, closed the event by highlighting again that the outcomes of the HYDROPOWER EUROPE forum confirm hydropower as a key partner and catalyst for the clean energy transition not only in Europe, but also worldwide. He thanked all consortium members of the HYDROPOWER EUROPE project, the Consultation Expert Panel as well as the more than 600 stakeholders participating through the HYDROPOWER EUROPE Forum for the efficient and fruitful collaboration during the 40 month project period. His gratitude for the funding also went to the European Commission represented by the participating officers who gave valuable input during the project. The Forum was able to gather a large family of experts and stakeholders, and with its continued support, public awareness on the important role of hydropower can be further increased in the future.

Anton Schleiss concluded the event by highlighting again that the outcomes of the HYDROPOWER EUROPE forum confirm hydropower as a key partner and catalyst for the clean energy transition not only in Europe, but also worldwide. He thanked all consortium members of the HYDROPOWER EUROPE project, the Consultation Expert Panel as well as the more than 600 stakeholders participating through the HYDROPOWER EUROPE Forum for the efficient and fruitful collaboration during the 40 month project period. His gratitude for the funding also went to the European Commission represented by the participating officers who gave valuable input during the project. The Forum was able to gather a large family of experts and stakeholders, and with its continued support, public awareness on the important role of hydropower can be further increased in the future.

Anton Schleiss, Honorary President of ICOLD, and Jean-Jacques Fry, President of EURCOLD, are addressing the audience in Strasbourg (France) during Hydro 2022 event. They were able to present the results of their work with Hydropower Europe.

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).
As President of the International Commission on Large Dams (ICOLD) / Commission Internationale des Grands Barrages (CIGB), it is my honor to work with our Board and technical committees to further the mission and vision of ICOLD. As an international professional organization, ICOLD has evolved from our original founding to address technical considerations of an expanding sphere of influence greater than a simple focus on “Large Dams.” While staying true to our heritage, ICOLD has expanded our technical focus to include many areas of study for the planning and influences of dams of all types. For example, we now have technical committees that consider Climate Change, Public Awareness Around Dams, Engineering Activities with the Planning Process for Water Resources Projects, Cemented Materials Dams, Hydromechanical Equipment, and many others.

A few years ago, several ICOLD national committees brought the focus of dams that form levees (also called dikes) under the ICOLD umbrella of shared experiences for design and safety. The inclusion of levees has become a clear and present technical priority for ICOLD. The purpose of this message is to encourage all ICOLD National Committees and Technical Committees to continue the embracement of levees into the technical approach and scope of your individual ICOLD organizations.
Levees are an integral part of critical flood defense infrastructure in most countries around the world, including most ICOLD-member countries. Dams and levees have many similarities, but also with distinct differences and unique technical challenges. In our profession, there are overlapping professional interests relevant to both dams and levees, including the interactions of these structures as a system within the catchment/watershed. An increased awareness and work supporting levee safety within ICOLD will also improve the safety of all dams.

Over the past ten years, ICOLD has undertaken significant intentional efforts to raise the international awareness of levee safety by providing an international forum for the exchange of knowledge and best practices for design, construction, operation, and management of these critical structures. These efforts have included establishing a working group on Levees and Flood Defenses under the European Club of ICOLD (EUCOLD) in 2015 and selecting Question 103: “Levees and Small Dams” for the 26th ICOLD Congress in Vienna, Austria (2018). Also in 2018, the EUCOLD Working group was expanded to create ICOLD technical committee on levees (TC-LE), with the goal to address international technical, governance and policy issues related to levees and flood defenses. The ICOLD TC-LE committee currently includes more than 20 member countries. It is one of the most active technical committees in ICOLD, including ongoing preparation of two cornerstone Bulletins:

ENCOURAGE ALL ICOLD NATIONAL COMMITTEES AND TECHNICAL COMMITTEES TO CONTINUE THE EMBRACEMENT OF LEVEES INTO THE TECHNICAL APPROACH AND SCOPE OF YOUR INDIVIDUAL ICOLD ORGANIZATIONS

Construction of an overflow resistant dyke on the Rhône between Beaucaire and Fourques (France, 2011).

The Dams Newsletter
across the world is over half a million kilometers. Together, these levees provide flood risk reduction to over 700 million people, which is about 10% of the world’s population. Levees help protect trillions of dollars in property and economic value across the world from regular threats of flooding. They also provide important social, ecological, and recreational benefits, serving as riverine habitat corridors, regional trails, recreational parks, and community infrastructure.

I believe that there is a need to continue the expansion of the international community on levees. ICOLD has shown that it is well-suited to provide strong international and inspirational leadership in the professional development of standards and guidelines for all types of dams, which can be expanded to include levee infrastructure. This international leadership supports a compelling case for all ICOLD national committees and technical committees to deliberately expand their terms of reference to include levees. This can be achieved by:

1. Expanding the mission and objective statements of national committees to embrace levees as well as dams. It is recommended that national committees set up sub-groups or technical committees in parallel with ICOLD’s TC-LE to provide a forum for consideration of technical issues relevant to levees in their country; and
2. Strategically expand the terms of reference of ICOLD Technical Committees to include technology regarding levees. It is recommended that all ICOLD committees review their Terms of Reference for opportunities to add “levees” to their focus.

Based on the experience of national committees that have already incorporated levees into their mission, this deliberate expansion of scope will provide tangible benefits, including opportunities to recruit additional members in ICOLD National Committees; a broadening and strengthening of the national technical community of practice through identification of common challenges; and a comprehensive exchange

- “Levees around the world, Characteristics, Risks and Governance”
- “Comparison of dams and levees; similarities, differences and recommendations”

These Bulletins will show the clear similarities of scope and scale between levees and dams around the world. Many countries, including most of those that contributed to these Bulletins, major levee portfolios of over 1000 km of levees, with some of the earliest levees constructed more than 4000 years ago. The total length of levees

Sea wall in Den Helder (Netherlands)
increase in the international influence and impact of the work of the technical committee and ICOLD.

In summary, as ICOLD President I strongly invite our National Committees and Technical Committees to embrace the inclusion of levees as part of our organizational mission and technical focus supporting ongoing and future activities of ICOLD. This will contribute to the international

of knowledge and technical expertise between dams and levee practitioners.

The advantages to ICOLD technical committees adopting this approach include opportunities to involve members from additional countries; inclusion of additional technical experiences, approaches, and perspectives to advance professional practice; and an

influence and sustainability of ICOLD, as well as safety of critical levee infrastructure. Please look for opportunities to engage with professionals from ICOLD TC-LE at our ICOLD 2022 Congress in Marseille. Thank you.
Climate change and global warming issues are compelling nations to plan for more and more green energy sources. Many countries are targeting to cut their thermal power generation in a phased manner and make greater use of solar, wind and hydro power to fill the gap. Hydropower is the second largest contributor of energy generated in India. However, so far the country has utilized only about 32% of its total 145,000 MW hydropower potential and therefore, enormous opportunities exist for future expansion. The greatest hydropower potential in India exists in the three major transboundary river basins (Ganges, Indus, and Brahmaputra), but all these basins have experienced substantial changes in precipitation and air temperature affecting the availability of water required for hydropower generation. A majority of hydropower projects in India are run-off-the-river (RoR) schemes and in future also, in lieu of storage schemes, RoR schemes with diurnal storage may be preferable due to submergence, site conditions and other environmental issues. But in the climate change scenario, uncertainty in stream flow patterns may have a major impact on peaking power generations due to small pondage of RoR schemes. In order to mitigate this, RoR schemes would require certain increase in pondage capacity.

Keeping the above in view, International Conference on “Hydropower and Dams Development for Water and Energy Security – Under Changing Climate” was organised under the aegis of International Commission on Large Dams (ICOLD) by Indian Committee on Large Dams (INCOLD), Central Board of Irrigation and Power (CBIP) and THDC India Limited.

The conference was organised, to provide an excellent opportunity to Indian and international dam and hydropower engineering professionals and agencies to share their experiences, ideas and latest developments in sustainable development of dam and hydropower; for water and
energy security, extreme events due to climate change, govt. policies, environmental and socio economic aspects, dealing with natural hazards and risks, pumped storage development – current trends & future challenges and dam safety management etc. Besides, it would also provide an opportunity for networking with the world renowned dam experts from different countries and global organizations involved in dam construction, management and operation and maintenance, for mutual benefits.

The Conference was inaugurated by Hon’ble Minister for Power and New & Renewable Energy, Shri R. K. Singh. He addressed the august gathering of dam and hydropower professions during the Opening Ceremony. The other dignitaries who addressed during the Opening Ceremony are Dr. R.K. Gupta, Chairman, Central Water Commission, Shri Devendra Kumar Sharma, President, INCOLD and Vice President, ICOLD and Chairman, H.P. Electricity Regulatory Commission, Mr. Michel de Vivo, Secretary General, International Commission on Large Dams, Prof. A.K. Chaturvedi, Director, IIT Roorkee, Shri Raghuraj Madhav Rajendran, Joint Secretary – Hydro, Ministry of Power, Shri A.K. Singh, Chairman and Managing Director, NHPC Limited, Shri N.L. Sharma, Chairman and Managing Director, SJVN Limited, Shri R.K. Vishnoi, Chairman and Managing Director, THDC India Limited and Shri A.K. Dinkar, Secretary General, INCOLD and Secretary, Central Board of Irrigation and Power.

Hon’ble Minister mentioned that hydropower is the largest source of renewable electricity today, with over 1,300 GW of installed capacity providing more than 15% of the world’s electricity. The twin challenges of development and climate change mean that we need to both increase the total amount of electricity generated whilst significantly increasing the contribution of low carbon sources. The transition to clean energy is urgent and vital. Although much of this new renewable energy deployment will be led by wind and solar PV/their variable nature means that there will be a significantly increased demand for sources of flexible low carbon generation. Consequently, the International Energy Agency and the International Renewable Energy Agency both
assess that to cost effectively keep global warming to below 2°C at least 850 GW of new hydropower capacity is needed. For the more ambitious Net Zero target (limiting temperature rise to below 1.5°C) the numbers are even greater, with at least 2/500 GW of capacity needed. Hydropower will, therefore, play a key role in future energy systems as an enabler of variable renewables, as well as a renewable energy source itself. By 2050 hydropower will be the dominant source of system flexibility.

He also mentioned that hydropower is not only clean but is also capable of providing flexibility and storage capacity that will be needed by an increasingly dynamic Indian power grid, requiring a substantial amount of power from generation sources that have quick start and stop capability and can offer grid balancing services. Highly flexible hydropower, with an ability to effectively store energy in its reservoirs and to respond quickly to system requirements will have a vital role in the future Indian power system.

Total 70 technical papers were incorporated in the Conference proceedings including 15 from ICOLD, ICID and IHA experts besides the communication papers. The conference generated overwhelming response and total 300 delegates registered for the conference including 70 authors and speakers. In addition, participants from 104 ICOLD Member countries participated in the conference through virtual mode, which include President, ICOLD; President IHA; Honorary Presidents of ICOLD; Chairman, ICOLD Technical Committee on Dam Safety and other distinguished researchers, engineers and academicians from different parts of the world. The presidential address to the Conference was delivered by Hon’ble Minister of Power and New & Renewable Energy, Government of India, Shri R.K. Singh, which highlighted the importance of the theme of the Conference in contemporary context.

Eminent experts and dignitaries attended the Conference in person, which includes the likes of President INCOLD, Secretary General ICOLD, Chairman, Central Water Commission, Director IIT Roorkee and apex level policy makers, administrators and proponents of hydropower in India and other countries.
The proceedings of the Conference were spread by Plenary Session followed by six technical sessions and a Valedictory session. In total 7 keynote addresses and 6 expert speeches were delivered by veteran hydropower and dam professionals and distinguished experts. Stimulating presentations were made by the authors, which generated encouraging response and invited intriguing discussions. The deliberations of the Conference have been very important as they establish the urgency of large scale development of storage dams, hydropower projects and pumped storage hydropower projects across the world. The experts had a unanimous opinion that storage dams mitigate the adverse impacts of Climate Change in an emphatic manner and creation of new storage is the only solution for water, energy and food security.

The valedictory session was chaired by Shri R.K. Vishnoi, CMD, THDC India Limited and Chairman of the Organizing Committee. He presented the overview of the technical presentations made by national and international experts.

The technical committee of this Conference has pondered over the technical papers presented during the Conference and consequentially, following major recommendations, with special reference to water resources and hydropower development in the emerging situation of climate change emerged from the deliberations of the Conference:

1. The Climate Change is a reality and a phenomenon that is already affecting all of us. The General Climate Change (GCC) models yield scary results w.r.t. temperature rise and its effects on temporal and spatial distribution of precipitation as well as on hydrological cycle. The effects of climate change shall be site specific and shall vary in different regions, implying that some regions may experience increased precipitation and surface runoff whereas some other regions may be subjected to significant reduction in precipitation and deficiency in water availability.

2. Development of water storage projects is the main solution to combat the adverse impacts of climate change.

3. The energy demand scenario due to increase in population and developmental activities shall have cumulative effect on climate change. There will be a rise in requirement of food, which shall require more energy allocation for agriculture. In addition, more energy shall be required for mitigating the effects of temperature rise.

4. Reduction in carbon emission is essential and development of hydropower is the only solution as it yields low carbon and clean energy with zero resource.

5. As per forecast models, world hydropower installations shall have to be doubled within next 30 years. India has to contribute more in development of new hydropower projects as it has vast hydropower potential which is untapped.

6. India has nearly 150 GW hydropower potential, out of which nearly two third is unharnessed. Two largest river basins, namely Ganga and Brahmaputra basins are grossly underpenetrated, insofar as hydropower development is concerned. India, therefore, needs to come-up with master plan for phased development of large hydropower projects, with special emphasis on development of large water storage projects on major rivers. This is important for India’s own water and energy security as well as for India’s contribution towards mitigation of effects of Global Climate Change.

7. Dams and hydropower projects should be developed with due consideration to sustainability criteria. Dams need to be designed so as to have maximum positive effects and least negative effects. A few dams may be constructed solely for the purpose of Environment and recreation.

8. The increase in demand of energy, water and food is inevitable due to increase in population. The utilizable water is not showing any noticeable improvement. Further, a large share of available water is used for agriculture. Food production also has huge energy demand for extraction of ground water for irrigation. Development of new water storages is essential to combat this food-water-energy nexus.

9. India has vast potential for new water storage and hydropower projects, a large portion of which is unharnessed. The water storage in the largest river basins, namely Ganga and Brahmaputra basins, in India is meagre. Thus, India has a major role to play towards developing new water storage dams and hydropower projects. This is important for India’s own water, food and energy security as well as for India’s contribution towards mitigation of effects of Global Climate Change.

10. New dams should be developed with due consideration to sustainability criteria. Dams should have maximum positive effects and least negative effects. A few dams may be constructed solely for the purpose of Environment and recreation.

11. Emphasis has to be laid not only on construction of new water storage dams but also on renovation and restoration of the existing water storage reservoirs.
Existing dams, which do not serve their intended function and also are not possible to be restored, should be replaced with new water storage dams.

12. Renewable Energy is the future of this planet. However, RE should be viewed as complimentary to hydropower and not as a competitor or replacement of the same. More RE installations would eventually mean more requirement of hydropower plants and PSPs for enabling round the clock RE dispatch.

13. All existing reservoirs should be analysed for acting as either upper or lower reservoir for the PSPs and technically viable sites for PSPs should be identified. In addition, sites feasible for development of off-river PSPs should be identified and projects should be taken up for implementation with a sense of urgency.

14. Quality research is required to be taken up for improving the cycle efficiency of PSPs, which will bring down the cost of energy storage through PSPs. Apart from the above, a huge support is required at policy level to make the PSPs more viable and attractive so that more and more project developers are interested in such projects. Recent policy initiatives of Government of India for PSPs are well taken by the world hydro-community and it is exemplary for other Governments. However, India should take the lead and evolve more policy support for fast development of PSPs. Dedicated financing models are required to be established for PSPs.

15. Sedimentation of Reservoirs is a major issue as it reduces the valuable storage by 1% per year. In India alone, the loss of reservoir capacity is equivalent to approximately INR 1.0 Trillion every year. There is a 3R philosophy for management of sedimentation:
   • Restrict – the generation of sediments by exhaustive Catchment Area Treatment
   • Route – the sediment to downstream of reservoir by not allowing it to settle within the reservoir.
   • Remove – the deposited sediment by hydraulic or mechanical means at least in case of small storages.

16. There are impediments to dam construction which have resulted in slow growth of water storage projects in India. These include R&R issues, environmental issues and dam safety concerns. New and improved policies are required to be rolled out for extensive coverage of the concerns of all stake holders. The norms of Environmental Flow should be evolved based on scientific plus socio-cultural norms and these should be stringently implemented.

17. Large-scale myths pertaining to the adverse effects and risks associated to dams have been propagated by dam opponents and environmental activists. This is the time when the dam-proponents, administrators and the Governments should initiate intensive awareness drives, educating the masses about the importance and benefits of the Dams. The budget for such awareness drives and publicity campaigns may be allocated as a firm percentage of the CSR budget of the existing projects.

18. PSPs are the best energy storage devices for Renewable Energy. More RE installations would eventually mean more requirement of PSPs. All existing reservoirs should be analysed for acting as either upper or lower reservoir for the PSPs and the technically viable sites for PSPs should be identified. In addition, sites feasible for development of off-river PSPs should be identified and projects should be taken up for implementation with a sense of urgency. Important aspect of ground water recharge due to construction of dam and PSPs should be given due importance.

19. Special attention needs to be paid to longevity of Storage Dams and hydropower projects. Dams, if carefully designed and constructed; and properly maintained can serve their intended function for hundreds of years, thus, making the actual cost of energy generation almost miniscule. Hence, the hydro projects should be promulgated as the source of cheapest energy in addition to cleanest energy.

20. Dam safety is the most crucial aspect and must be given top priority. The failure of even a single dam is to be treated as failure of the industry. The Dam Safety Act, 2021, enacted by Government of India is a welcome step. The implementation of this Act needs to be taken up seriously and dams of all sizes need to be brought under the ambit of the Act. The dam operating authorities need to be made more aware of the importance of Dam Safety even beyond the provisions of the Dam Safety Act, 2021.

POINTS FOR IMPLEMENTATION TO THE MINISTRY OF JAL SHAKTI:

1. Dams are the only long-term solution to mitigate the adverse effects of climate change and to ensure water, energy and food security in the emerging scenario.
2. New water storage dams, preferably with over-the-year storage, are essential to be built and an immediate initiative is required. India, having vast untapped potential for storage development, needs to take a lead. World is looking forward to the Govt. of India initiative in this matter.
3. Policy framework is required to be put in place for action to be taken on priority for renovation and restoration of existing storage projects. The ones which cannot be restored need to be replaced with new projects.

4. The upcoming water storage projects need to be developed with focus on sustainable development. The governments, regulators, planners and designers are required to take necessary steps to ensure that the dams have maximum positive impact. For small basins, at least one dam per river basin be constructed for environmental restoration and rejuvenation of rivers.

5. Reservoir sedimentation causes depletion of water storage capacity. Adequate policy measures and stringent supervision of implementation of project specific Catchment Area Treatment Plans are required to be put in place to restrict/reduce sediment entry into reservoirs.

6. New improved policies are required to be launched to handle the perpetual issues of R&R, Law & Order and Environmental concerns including E-Flow.

7. Governments are required to come-up with policy directives for enhancing public sentiments in favour of dams by educating them about the benefits and positive effects of such projects. The budget provisions for publicity campaigns need to be made and notified.

8. Existing reservoirs are required to be re-visited for their potential utilization as a component of the PSP. Off-the-River PSPs should be focussed and implemented as a matter of urgency.

9. The regulators and dam operators should pay special attention towards optimum operation policy and adequate maintenance of the dams so as to ensure their safety and longevity.

10. Appropriate mechanism for effective implementation of Dam Safety policy is required to be in place, over and above generating awareness among operators towards safety of dams.

**POINTS FOR IMPLEMENTATION TO THE MINISTRY OF POWER:**

1. Storage type hydropower projects are the only long-term solution to mitigate the adverse effects of Climate Change and to ensure sustainable energy security in the emerging scenario, in addition to water and food security.
2. New hydropower projects, are essential to be built and an immediate initiative is required. India, having nearly 100 GW unharnessed hydropower potential, needs to take a lead. Special focus should be laid on large river basins, such as Ganga and Brahmaputra basin. World is looking forward to GoI initiative in the matter.

3. Policy framework is required to be in place for action to be taken on priority for renovation, restoration and up-gradation of existing hydropower projects. The ones which can not be restored need to be replaced with new projects.

4. Action towards reduction in carbon emission is the immediate priority for the world and India's commitment to install 500 GW non-fossil fuel based power capacity by 2030 and making the country net zero carbon by 2070 has been welcome by the ICOLD. The task is challenging and the master plan for achieving this needs to be launched on priority. Rest of the world may take lead from the vision of India and act accordingly.

5. The upcoming hydro projects need to be planned with focus on sustainable development. The governments, regulators, planners and designers should take necessary steps to ensure that the dams have maximum the positive impact.

6. Renewable energy installations need be developed at fast pace. However, PSPs, commensurate with the RE capacity should be implemented as a parallel activity to ensure RTC dispatch of RE under all demand scenarios.

7. Adequate government support is required for making the PSPs attractive for developers. A policy intervention in financing models and methodology of cost-benefit analysis is required.

8. A sense of urgency is required to be invoked among Practicing Engineers and researchers for evolving the techniques for improvement in cycle efficiency of the PSPs. Government support for R&D is required to be pencilled in.
Jean-Pierre Tournier, Vice-President (2017-2021) has been honored by the Engineering Institute of Canada (EIC), which awarded him the KY Lo Medal for “his contributions to the engineering community at the International level.”

This Medal was established in 1997 to recognize and encourage Canadian contributions in the field of engineering at the world stage and also to honour K.Y. Lo, Professor Emeritus of the University of Western Ontario, for his outstanding contributions to the field of geotechnical and civil engineering.

The KY. Lo Medal is awarded to a member of the Constituent Societies of the EIC who has made significant engineering contributions at the international level. Such contributions may include:

- promotion of Canadian expertise overseas;
- training of foreign engineers;
- significant service to international engineering organizations;
- advancement of engineering technology recognized internationally

We all know that Jean-Pierre has made contributions in each of these four fields, but we, at ICOLD, are fond of underlining his great service to our Commission. His expertise in rock-filled dams led him to be the Canadian representative to the Technical Committee E on Embankment dams since 1998 and to chair this Committee since 2010. He served in four Congresses as General Reporter or President of a Question.

Before this EIC award, Dr Tournier had received many distinctions like the prestigious award Inge Andersson from the Canadian Dam Association or the Geoffrey Meyerhof price from the Canadian Geotechnical Society.

By Emmanuel Grenier, from ICOLD Central Office

The Dams Newsletter  23
When a country launches an important dam program, ICOLD is always part of the project

From our Special Reporter

On February 14, 2022, President Michael Rogers along with several other ICOLD experts participated in an International Symposium on a Global Perspective of Pakistan’s Hydropower Development. The symposium was sponsored by Pakistan’s Water and Power Development Agency (WAPDA) with Chief Guest Honorable Prime Minister Mr. Imran Khan. ICOLD President Rogers spoke on the topic of “An International Perspective - Dams and Hydropower in Pakistan and the Role of ICOLD”. President Rogers was in Pakistan as Chairman of the Board of Management for the joint venture serving WAPDA as the Construction Manager for the Diamer Basha Dam – a new 272-meter-high roller-compacted concrete dam on the Indus River. The Diamer Basha Consultants Group (DBCG) construction management team is a joint venture on international and local Pakistan firms, including Stantec, AFRY, DOLSAR, NESPAK, ACE, and MMP. President Rogers works for Stantec as Vice President and Global Practice Leader for Dams.

The international symposium was developed to highlight the government’s commitment to a “Decade of Dams” where the current installed hydropower capacity will double to over 20,000 MW to serve the people of Pakistan. President Rogers was joined at the symposium by other international experts active in ICOLD, including Dr. Marco Conrad (AFRY-Switzerland, Chairman, ICOLD Committee D-Concrete Dams), Mr. Knut Sierotzki (AFRY), Mr. Cem Aker (DOLSAR-Turkey), Mr. Mark Fox (SMEC-Australia), Mr. Yan Jiaqiu (PowerChina-China), and Ms. Hong Na (CGGC-China). In addition to the Prime Minister, the symposium was well attended by government officials, international ambassadors, academia and the press corps with local live news broadcasts. As primary sponsor of the symposium, Lt. General Muzammil Hussain (Retd), Chairman WAPDA presided over the proceedings acknowledging the ambitious efforts by Pakistan investing billions of dollars (US) to further develop its natural resources by constructing critical infrastructure for irrigation, water supply, hydropower and flood control. The Decade of Dams program includes the Diamer Basha Dam, Mohmand Dam, Dasu Dam, Nai Gaj Dam, Kurram Tangi Dam, Tarbela 5th Extension Hydro Powerhouse, Harpo Hydro Powerhouse, Sindh Barrage, Kachhi Canal Extension and the K-IV Project. When completed, these projects will add 14.7 million cubic meters of water storage; 11,369 MW of hydropower capacity; 44,700 MWh of generation; irrigation water for 3.5 million acres of farmland; and 359 million liters per day of urban water supply.

In his presentation, President Rogers introduced ICOLD as the “United Nations of Dam Engineering” with its 104 countries representing more than 5 billion people around the world. He stated ICOLD’s mission of collecting and documenting the state of the art for dam engineering practices all over the world with 93 years of experience in all types and sizes of dams and levees. ICOLD’s support to the global professional community is done through 26 Technical Committees formed by worldwide experts that publish bulletins accepted as guidelines and standards worldwide. President Rogers noted that ICOLD leads the dam engineering profession in setting international standards and publishing guidelines to ensure that all dams are built and operated safely, efficiently, economically, and are environmentally sustainable and socially equitable. He confirmed that ICOLD is proud to assist all nations to meet the challenges of the 21st century in the development and management of the world’s water and hydropower.
resources with a commitment to international collaboration supporting pillars of dam safety in design, construction, initial filling, operations, and emergency preparedness.

President Rogers discussed ICOLD’s consistent commitment to the safety of dams, including the recently published World Declaration on Dam Safety (2019). He noted several key risk factors in the design of dams & hydropower, including Extreme Events (floods, earthquakes) / Foundations / Structural. Construction: Flooding (diversion, cofferdams) / Unexpected Geotechnical (foundation, tunnels)/ Schedule & Budget Impacts of Changed and Unknown Conditions. Initial Filling: Initial loading of structures and foundations. Operations: Reservoir sedimentation / Gates & Valves / Overtopping/ Climate Changes. Emergency Preparedness: Public transparency / Social responsibilities / Emergency Action Planning. He continued that there are also recognized construction risks to schedule and budget noting that it is usual for dams & hydropower construction projects to have high risks for change orders due to changed field conditions requiring design changes, including conditions such as unknown geologic conditions, inflation, supply chain, and others. To address these risks, international practice is to allocate owner-controlled contingency when establishing construction budgets and schedules.

In addressing Pakistan in particular, President Rogers identified surface water availability as a key natural resource to infrastructure developments. The Indus Cascade is Pakistan’s most precious asset that leads to clean sustainable development for urban water, irrigation and electric power. Annual surface water availability of Pakistan is 179 MCM (million of cubic meters) compared to 1,945 MCM for South Asia and 43,676 MCM worldwide. Installed hydroelectric capacity of Pakistan is just 9386 MW, which is lagging the other developed countries. President Rogers supported the Pakistan Decade of Dams program as a brave and ambitious initiative to pave the way to Pakistan’s Road to Prosperity. He praised Pakistan commitment to develop the Decade of Dams program for modern dams and hydropower projects to expand and modernize its economy.

In his summary, President Rogers gave ICOLD’s commitment to support Pakistan. He stated that ICOLD is committed to supporting Pakistan through its National Committee on Large Dams (PANCOLD) headed by President Mr. Ahmed Kamal, Chief Engineering Adviser to the Government of Pakistan and Chairman Federal Flood Commission. His commitment to Pakistan for design & construction included providing ICOLD standards & guidelines as well as support for international experts to engage in knowledge transfer & training for human resources to local Engineers. For example, on the Diamer Basha Dam Project more than 50 foreign experts are involved in design and construction supervision working hand-in-hand with the local engineers ensuring transfer of state of the art knowledge. He thanked Honorable Prime Minister Khan for his attendance at this important symposium and Chairman WAPDA for the kind invitation to ICOLD international experts to provide presentations on the state-of-the-practice for dam engineering that is being applied to Pakistan’s Decade of Dams.
The O Technical Committee is well known for its work on the World Register of Dams but it is less known for its new activity on documentation. Its President, Patrick Le Delliou sets out this new aspect.

The documentation of ICOLD

Publishing in the field of dams and dikes is one of ICOLD’s major activities.

Technical committees whose activity is the backbone of the Commission’s work. There are now 27 technical committees in operation. Their mission is mainly to prepare one or more technical bulletins that synthesize and take stock of particular topics. Since the founding of the ICOLD in 1928, 177 bulletins have been approved and therefore available from ICOLD. Of these bulletins, 152 have been definitively published but the whole can be found on ICOLD website.

The other major activity of the Commission is to organize, every three years, a congress bringing together more than one thousand specialists from all over the world around four questions. The questions of the 27th Congress of Marseille 2022 are:

- Q 104: Concrete Dams Design Innovation and Performance
- Q 105: Incidents and Accidents concerning dams
- Q 106: Surveillance, Instrumentation, Monitoring and Data Acquisition and Processing
- Q 107: Dams and Climate Change

More than a hundred questions have been addressed during the 27 Congresses organized since 1933. For each question, between 30 and 50 reports are proposed by the National Committees members of ICOLD. Initially published as a book for each of the questions, there is enough to fill an entire library even if the edition is now in digital format. In addition, there are complementary communications to the questions of the Congresses. Still in figures, it is 5870 reports available, that is to say a considerable mass of information. The proceedings of the Congresses are available from the ICOLD Central Office, on its website https://www.icold-cigb.org/.

Finally, for more than 20 years, on the occasion of each ICOLD Annual Meeting, the National Host Committees have been organizing symposia on a technical theme of their choice. Over 23 years, there are still nearly 3500 communications that add material of undeniable technical interest. These papers are generally available from national committees or have been published by specialist publishers.

This treasure trove of technical contributions for dams with a very wide scope of subjects and themes, it is
above all the result of the work of several hundred specialists from the 104 member countries, a considerable editing work for the ICOLD Central Office or the secretariat of the National Committees. There are a total of 9500 documents like reports, communications, newsletters. It is also more then 16000 authors coming for 110 countries.

The abundance of documentation has its classic other side. How to find your way around? How do I find a particular article or report? How to find all the reports that evoke a specific technical point? How to build a list of bibliographic references for a particular dam? It is not, or is not yet, a question of accessing the reports themselves. The first question is first of all to identify the relevant reports with regard to the question we are asking.

To answer this basic but fundamental question and continuing a work initiated by the French Committee of Dams and Reservoirs, the O Committee of ICOLD on the register of dams and documentation is currently developing a database on the 9500 documents already mentioned, each object of the database being characterized by a support (congress, newsletter, symposium), a serial number within the event, a year of publication, a title (in English and French – except for the first congresses for which other languages were used), one or more authors, and, as far as possible, keywords, the name of one or more dams if applicable...

This work of listing and describing the articles represents a considerable but indispensable effort. It is underway for past events by completing the database for new ones, for example by adding about 300 records for the 27th Congress of Marseille in 2022. In addition, Committee O is developing a possibility of connection between this database and that of the world register of dams (more than 60,000 large dams listed) with the classic difficulties of variable spellings or aliases. To date, more than 5000 links concerning 2500 large dams have been identified.

The schedule of this ant work provides for a first stabilized version of the database at the end of 2022.
More than 700 hydropower professionals were able to assemble in person for the twice-postponed HYDRO 2022 conference and exhibition in Strasbourg, from 25 to 27 April; for the first time since HYDRO 2019 in Porto, they were able to see each other’s faces not framed in computer screens, and to speak without fear of being accidentally switched to ‘mute’.

The overall theme was ‘The Roles of Hydro in the Global Recovery’, and this was well reflected in the opening speeches, as well as throughout 29 technical sessions, on technology, safety, finance, environment, climate, and many other topics.

ICOLD President Michael Rogers was disappointed not to join the conference, as COVID 19 had thwarted his plans just a few days before. But he sent a message assuring participants that he was there in spirit, and gave a virtual talk on the importance of water and energy infrastructure to meet the needs of increasing populations for reliable energy and dependable power supplies. He drew attention to the varying levels of development across the
globe, and referred to ICOLD’s role in bridging the capacity gap, through the dissemination of knowledge and experience. He also mentioned the importance of including hydropower in discussions on climate, and encouraged us to work with the science of climate change.

ICOLD Secretary-General Michel de Vivo gave an opening speech in which he underlined the need for more large dams for water storage, drawing attention to the role of reservoirs in irrigated agriculture and food security, as well as to mitigate the effects of climate change by helping to control floods and droughts. He stressed the need to help the less developed countries implement multipurpose schemes. Overall, he said, there was a need to build more large dams, to improve old ones, and to increase storage capacity. He then outlined the role and mission of ICOLD in responding to world challenges, and ensuring the safety, economics, efficiency and environmental compatibility of large dams.

Klaus Jorde, Secretary of the International Energy Agency’s Technical Committee Programme, outlined two major reports launched by IEA in the past year: the first focused on how the energy sector could reach net zero greenhouse gas emissions by 2050, calling for a doubling of hydro installed capacity. But the subsequent Hydropower Market Report predicted that this growth rate would not be achieved. Jorde stressed that the urgent need for more storage, hydropower and pumped storage should be high on the agenda of political decision makers.

Pravin Karki, Global Lead for Hydropower & Dams at the World Bank, outlined the support given by the Bank to hydro projects (a total of 131 in the past 20 years in 68 countries, representing an investment of US$ 17 billion). He outlined some of the challenges facing development, and commented that project planning should be thoughtful and transparent, to alleviate environmental risks and social impacts on populations. He also stressed the great benefits of multipurpose projects.
A team of four from the World Bank contributed to subsequent sessions on disaster risk management, cross-border projects, pumped storage and sedimentation management.

In her preview of the conference, Alison Bartle remarked that the theme ‘Roles of Hydro in the Global Recovery’ had originally been conceived to refer to the post-pandemic recovery, but now extended to the roles of hydro post-COP 26 in Glasgow, where discussions on phasing out fossil fuels within meaningful time frames had had less than spectacular outcomes. However, she reported that research for the last edition of the H&D World Atlas and Industry Guide had revealed increasingly ambitious targets in many nations, in their transition to the use of renewable energy. Global hydro capacity and production had continued to increase steadily, and hydro was supplying more than 30 per cent of national electricity in 74 countries, and more than 50 per cent in 44 countries.

A total of 29 sessions at HYDRO 2022 covered subjects such as innovations in technology; finance and project development, including legal and contractual aspects; environmental issues and ESG; climate and flood management; civil engineering, including safety, refurbishment, materials for dams, tunnelling and spillways; the important role of pumped storage, particularly working in synergy with intermittent renewables; and, small-scale hydropower. The aim as always was to provide practical information for the delegates from more than 65 countries to take home.

Alison Bartle, in previewing the programme, speaks of the important role of hydro post-COVID 19 and post-COP 26.

Speakers discussing the importance of operation and maintenance, in a session chaired by Laurent Mouvet of Switzerland.

Denis Aelbrecht of EDF welcomes delegates and speaks of his company’s portfolio of dams, focusing on those in the eastern region.

ICOLD Secretary-General Michel de Vivo underlines the need for more storage dams in his opening address to HYDRO 2022.
Several sessions were dedicated to EU-backed initiatives, including HYDROPOWER EUROPE, a scheme to establish research needs and a strategic road map for hydro in Europe, which is led by ICOLD; HYPOSO (Hydropower Solutions), focusing on support for small hydro development in Latin America and Africa; and, HYPOS, which aims to enhance satellite-based water management.

African speakers from Angola, Namibia and Rwanda joined the session on cross-border projects, speaking of major projects such as Baynes, and Rusumo Falls. Other highlights of the event were sessions dedicated to floating solar PV panels, and hybrid renewable energy systems.

A major technical exhibition ran alongside HYDRO 2022, and the conference was followed by a study tour to EDF’s Kembs plant on the Rhine; this large scheme, built in the 1930s, has recently been upgraded with the addition of a small hydro plant, and a number of environmental enhancements, to increase biodiversity in the region.

It was announced in Strasbourg that HYDRO 2023 will take place in Edinburgh, UK, from 16-18 October next year. Scottish engineers will have much experience to share in terms of large and small hydropower development, pumped storage (with three new large schemes planned), and marine energy.

A session on climate was chaired by Denis Aelbrecht of EDF, who chairs ICOLD’s Committee on Climate, and he drew attention to the work being undertaken by his committee.
OUR NEXT COLLABORATION WITH AQUA MEDIA

ASIA 2023
WATER RESOURCES AND RENEWABLE ENERGY DEVELOPMENT IN ASIA

14 - 16 March 2023
Kuala Lumpur, Malaysia

https://www.hydropower-dams.com/

The Central Office Team looks forward to seeing you soon in good shape, in June 2022 for our 27th Congress in Marseille. Please stay safe!

THE DAMS NEWSLETTER

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