



87th Annual Meeting
**INTERNATIONAL COMMISSION
ON LARGE DAMS**

JUNE 9-14, 2019 — OTTAWA, CANADA

www.icold-cigb2019.ca

FINAL BULLETIN



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Hosted by:
CDA  **ACB**

The Host

The Canadian Dam Association is proud to host the 87th Annual Meeting of the International Commission on Large Dams in Canada's capital city of Ottawa. This continues our long tradition of collaboration with other National Committees of ICOLD and participation in the development of leading guidance for engineers and other professionals.

Canada is a country rich in water resources: it has over 10,000 dams and ranks third in the world in hydropower production. Canada is also a leading country in mining and the use of tailings impoundments. Canadian expertise in dam building and operation has contributed to developments around the world. Participation in ICOLD encourages the Canadian community to continue to learn and advance the state-of-practice, establish relationships, and expand international markets for Canadian consulting services and products.

Organizing Committee

Johanne Bibeau (Co-Chair) - AECOM
Tony Bennett (Co-Chair) – Ontario Power Generation
Jean-Pierre Tournier – Hydro Québec
Gilles Bourgeois – WSP
Harvey McLeod – Klohn Crippen Berger
Leila Ouahit – Tetrattech
Michel Tremblay – SNC Lavalin
Don Butcher – CDA
Clare Raska – CDA

Sub-Committees:

- Technical Program
- Communications
- Finance, Sponsorship and Exhibits
- Social and Accompanying Persons
- Technical Tours
- Young Professionals

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Please visit our website for up-to-date information including registration, sponsorship and exhibition hall.

www.icold-cigb2019.ca



Invitation from the Canadian Dam Association President

Dear colleagues and friends from the dam world,

It is with great pleasure that I invite you, on behalf of the Canadian Dam Association, to attend the 87th Annual Meeting and Symposium of the International Commission on Large Dams (ICOLD) to be held in Ottawa from June 9 to 14, 2019. As Canada's capital city, the country's two official languages, French and English, are commonly spoken. The event will take place at the Shaw Center, an award-winning architectural icon in the city center next to Parliament Hill where the government sits in majestic neo-gothic buildings. Activities and accommodations will take place in the heart of downtown, a lively and safe area with easy access to shopping centers, open-air markets, recreation and cultural activities.

A highly relevant technical program will allow delegates from around the world to share their expertise in dams and related equipment used in the hydroelectric power, water resources and mining industry. Two days will be reserved for ICOLD's 26 Technical Committees, which are at the heart of ICOLD activities. The Committees will hold meetings on one day, and another day will also be rich in Committee presentations, when about twenty workshops present new topics and take stock of reports completed by the Committees. Delegates will also have the opportunity to participate in the two-day *Symposium – Sustainable and Safe Dams Around the World* - focused on innovation, sustainable development, risks and extreme environments. More than 300 papers from 47 countries have been accepted and a majority of them will be presented orally. One-day or half-day technical visits will take participants to some of the world's leading laboratories, as well as visits to dams and hydroelectric facilities. On the day reserved for the Annual General Assembly, there will be 12 half-day or one-day seminars on current topics, presented in collaboration with partner organizations and companies.

Interesting social activities have also been planned and the accompanying persons program offers activities for all tastes: arts, history, cycling, shopping and more. Finally, participants are encouraged to extend their stay in Canada as part of the proposed study tours, which will allow them to discover, in addition to excellent technological achievements, many of Canada's beautiful tourist regions.

Welcome to Canada! Let's share our experiences!

Jean-Pierre Tournier, P.Eng, PhD

President, Canadian Dam Association



Invitation from ICOLD President

Dear members of ICOLD, colleagues:

On behalf of the Board of Directors and Central Office of the International Commission on Large Dams / Commission Internationale des Grands Barrages (ICOLD/CIGB), it is an honour for me to invite our National Committees to send delegates and their accompanying persons to the 87th Annual Meeting of ICOLD. This meeting will be held June 9 to 14, 2019 in the beautiful city of Ottawa, the capital of Canada.

The ICOLD National Committee of Canada – the Canadian Dam Association (CDA) – has prepared a wonderful program in an exciting venue for this meeting. With over 1000 large dams, including mega-projects such as Muskrat Falls Dam, Complex La Romaine to the East and Site C Dam to the West, Canada has much to be proud of for its development of dams for hydropower and mining, and much to share with the world. As part of this meeting, CDA has organized an important professional Symposium entitled “Sustainable and Safe Dams Around the World” with relevant topics on dams (water and tailings) and levees.

For many years CDA has been a leading proponent for dam safety, providing excellent guidelines within Canada and support to other ICOLD countries. Unfortunately, our dams and hydropower industry has seen several high-profile dam failures or near-failures around the world in the last few years. As we struggle to understand the variety of causes for these incidents, it is important that our industry comes together for open discussions so that all countries and individual engineers in our profession can learn, thus seeking to avoid future costly repeats of these unfortunate events.

This 87th ICOLD Annual Meeting will be an excellent opportunity for more than 1000 delegates, from the 100 ICOLD member countries to come together and collaborate. We will partake in high quality technical meetings; enjoy social gatherings; and cherish many happy smiles at our “annual reunion” in 2019.

I wish safe travels to all of our delegates and their families as they journey from near and far to come together in peace and unity for the betterment of all dams around the world.

Michael F. Rogers

President, International Commission on Large Dams (ICOLD/CIGB)



About ICOLD

The International Commission on Large Dams (ICOLD) is a non-governmental international organization which provides a forum for exchange of knowledge and experience in dam engineering. ICOLD is a leader in setting standards and guidelines to ensure that dams are built and operated safely, efficiently and economically, and are environmentally sustainable and socially equitable. Every year, ICOLD holds an Annual Meeting and Symposium in a selected country.

ICOLD membership consists of the National Committees of more than 100 countries. The Canadian Dam Association (CDA) is the National Committee representing Canada.

Technical Committees of ICOLD are the heart of the organization. Membership on each Committee is determined by the needs of the Committee and the countries that choose to be represented. An important part of the annual ICOLD event is the opportunity for all delegates to observe the meetings and workshops of the Technical Committees and interact with experts from other countries.

Member countries

Afghanistan	Ghana	Pakistan
Albania	Greece	Panama
Algeria	Guatemala	Paraguay
Angola	Guinea-Bissau	Peru
Argentina	Honduras	Philippines
Armenia	Iceland	Poland
Australia	India	Portugal
Austria	Indonesia	Romania
Belgium	Iran	Russia
Bhutan	Iraq	Serbia
Bolivia	Ireland	Slovakia
Bosnia & Herzegovina	Italy	Slovenia
Brazil	Ivory Coast	South Africa
Bulgaria	Japan	Spain
Burkina Faso	Kenya	Sri Lanka
Cameroon	Korea (Rep. of)	Sudan
Canada	Latvia	Sweden
Chile	Lebanon	Switzerland
China	Lesotho	Syria
Colombia	Libya	Tajikistan
Congo (Dem. Rep. Of)	Luxemburg	Thailand
Costa Rica	Madagascar	Tunisia
Croatia	Malaysia	Turkey
Cyprus	Mali	Ukraine
Czech Republic	Mexico	United Kingdom
Denmark	Morocco	Uruguay
Dominican Rep.	Mozambique	USA
Egypt	Myanmar	Uzbekistan
Ethiopia	Nepal	Venezuela
Finland	Netherlands	Vietnam
Former Yug. Rep. of Macedonia	New Zealand	Zambia
France	Niger	Zimbabwe
Georgia	Nigeria	
Germany	Norway	



Annual Meetings and Congresses (Congresses indicated in bold type)

1931 London	1966 Rio de Janeiro	1996 Santiago
1932 Paris	1967 Istanbul	1997 Florence
1933 Stockholm	1968 Stavanger	1998 New Delhi
1934 London	1969 Warsaw	1999 Antalya
1935 The Hague	1970 Montreal	2000 Beijing
1936 Washington	1971 Dubrovnik	2001 Dresden
1937 Paris	1972 Canberra	2002 Iguazu
1938 Vienna	1973 Madrid	2003 Montreal
1939 Zurich	1974 Athens	2004 Seoul
1946 Paris	1975 Tehran	2005 Tehran
1947 The Hague	1976 Mexico	2006 Barcelona
1948 Stockholm	1977 Salzburg	2007 St. Petersburg
1949 Brussels	1978 Cape Town	2008 Sofia
1950 London	1979 New Delhi	2009 Brasilia
1951 New Delhi	1980 Rome	2010 Hanoi
1952 Chicago	1981 Stockholm	2011 Lucerne
1953 Paris	1982 Rio de Janeiro	2012 Kyoto
1954 Paris	1983 London	2013 Seattle
1955 Paris	1984 Tokyo	2014 Bali
1956 Lisbon	1985 Lausanne	2015 Stavanger
1957 Istanbul	1986 Jakarta	2016 Johannesburg
1958 New York	1987 Beijing	2017 Prague
1959 Helsinki	1988 San Francisco	2018 Vienna
1960 Tokyo	1989 Copenhagen	2019 Ottawa
1961 Rome	1990 Sydney	
1962 Moscow	1991 Vienna	
1963 Cairo	1992 Granada	
1963 Paris	1993 Cairo	
1964 Edinburgh	1994 Durban	
1965 Lausanne	1995 Oslo	



Ottawa – Canada’s Capital City

Come to Ottawa and enjoy the best of Canada. Our capital showcases Canadian culture from coast-to-coast-to-coast – from the nation’s treasures and tastes to its favourite pastimes.

Ottawa, Ontario, and Gatineau, Québec, together form the National Capital Region, which has a population of about 1.3 million people. It is 352 km northeast of Toronto, 192 km west of Montréal, and just a short (1.5-hour) flight from New York or Boston. Both of Canada’s official languages – English and French – are widely spoken in Ottawa.

Canada’s seat of government enjoys a fairy-tale setting on Parliament Hill, housed in grand, neo-Gothic buildings decorated with fantastic stonework that includes gargoyles, grotesques, and friezes – all overlooking the Rideau Canal and Ottawa River. The Hill is home to the House of Commons, the Senate, and the stunning Library of Parliament. The expansive lawn is open to the public and peppered with statues and monuments.

The National Arts Center hosts world-class multidisciplinary performances. Just across the Ottawa River from Parliament Hill is the Canadian Museum of History. An architecturally impressive building with contours and organic shapes that evoke aboriginal dwellings: long houses, mud houses and igloos. ICOLD 2019 delegates will have an opportunity to explore the Museum during the Cultural Evening.

For the ease of delegates and companions, ICOLD 2019 activities and accommodation will be centred in Ottawa’s lively and safe downtown core. Easy access to entertainment, shopping centres and open-air markets, recreation and culture – the National Art Gallery, national museums of nature, war and aerospace, and the National Library and Archives – create once-in-a-lifetime experiences for all those participating in ICOLD 2019.





Registration

	Regular
Full Delegate <i>ICOLD Member Country</i>	\$1,695
Full Delegate <i>ICOLD Non-member Country</i>	\$1,950
Technical Delegate only	\$1,295
Young Engineer & Student	\$995
Accompanying Persons	\$650
Exhibitor	\$750

Full Delegate Registration

- Admission to committee meetings and workshops, symposium, partner seminars and technical exhibition
- Delegate bag, name badge and conference materials
- Coffee breaks, lunches, Exhibitor Reception and social activities (as per chart) Monday, June 10 to Friday, June 14
- Mobile app for iOS and Android smartphones and tablets
- Technical tours (Thursday, June 13 – limited number of registrants; additional fees apply)

Technical Delegate

- Admission to committee meetings and workshops, symposium, partner seminars and technical exhibition
- Delegate bag, name badge and conference materials
- Coffee breaks, lunches and Exhibitor Reception Monday, June 10 to Friday, June 14
- Mobile app for iOS and Android smartphones and tablets

Other social activities are not included for Technical Delegates but may be purchased at the time of registration. Technical Track Registrants are not eligible to participate in Technical Tours on Thursday, June 13.

Young Engineer and Student

Young Professionals are delegates aged 35 years and under, as of June 15, 2019. Proof of age will be required at on-site registration.

- All benefits of Full Delegate Registration
- Young Professional networking activity (Tuesday, June 11)

Accompanying Persons

- Coffee breaks, lunches and social activities (as per chart) Monday, June 10 to Friday, June 14
- Mobile app for iOS and Android smartphones and tablets

Exhibitor

- Coffee breaks, lunches Exhibitor Reception and social activities (as per chart) Monday, June 10 to Thursday, June 13
- Mobile app for iOS and Android smartphones and tablets



Social Activity Program

You must reserve some events during registration

- Guided city tour (Sunday, June 9)
- Welcome reception (Monday, June 10)
- Exhibitor reception (Tuesday, June 11)
- Cultural evening (Wednesday, June 12)
- Technical tours (Thursday, June 13 – limited number of registrants; additional fees apply)
- Farewell banquet (Friday, June 14)

	Full Delegate & Accompanying Persons	Technical Delegate	Young Professional & Student	Exhibitor
Sunday & Monday: Ottawa City Tour	<i>Included</i>	n/a	<i>Included</i>	<i>Included</i>
Monday: Welcome Reception <i>Shaw Centre</i>	<i>Included</i>	\$150	<i>Included</i>	<i>Included</i>
Tuesday: Exhibitors Reception <i>Shaw Centre</i>	<i>Included</i>	<i>Included</i>	<i>Included</i>	<i>Included</i>
Tuesday: Young Professionals Networking <i>Networking Boat Cruise</i>	n/a	n/a	<i>Included</i>	n/a
Wednesday: Cultural Evening <i>Canadian Museum of History</i>	<i>Included</i>	\$75	<i>Included</i>	<i>Included</i>
Friday: Farewell Banquet <i>Shaw Centre</i>	<i>Included</i>	\$175	<i>Included</i>	\$175

Registration Policies

Registration fees must be paid in Canadian dollars and paid in full by credit card (VISA, MasterCard or American Express) at time of registration.

All registration and activity fees are subject to 13% HST.

Registration Cancellation

A refund of registration fees less a \$100.00 (+ tax) administration charge will be processed for requests submitted in by email to the ICOLD 2019 Annual Meeting/Symposium Secretariat no later than May 15, 2019.

As of May 16, 2019, registration fees are non-refundable.

Cancellation of CDA Short Courses, Social Activities and Study Tours

A minimum number of participants is required for all paid CDA short courses, social activities and study tours. ICOLD 2019 reserves the right to cancel a paid activity that does not have the minimum registrants required.

Delegate Substitutions

Requests for substitutions must be made in writing to the ICOLD 2019 Annual Meeting/Symposium Secretariat.



Hotels

ICOLD 2019 has reserved room blocks and negotiated special conference rates for participants in a selection of hotels that are within walking distance of the Shaw Centre. Information about the hotels including descriptions and amenities is available on the ICOLD 2019 website.

Please note that delegates must make hotel reservations through the ICOLD 2019 housing bureau, after having completed their registration for the meeting. Hotels will not take reservations other than from the Housing Bureau.

Hotel	Rate/night (CAD)	Walk to Shaw Centre
Andaz Ottawa	\$269	9 minutes
Courtyard Marriott	\$245	9 minutes
Fairmont Chateau Laurier	\$275-\$355	4 minutes
Les Suites	\$239-\$359	6 minutes
Lord Elgin	\$239	9 minutes
Novotel Ottawa	\$249	4 minutes
Westin Ottawa	\$274	1 minute
University of Ottawa	\$37-\$135	12 minutes

Housing/Accommodation

You must first register for ICOLD 2019 to access the Housing bureau. By booking within the room block, you are supporting ICOLD 2019. A link will be provided after you register.

Housing Advisory: Intertask Conferences is the official and exclusive Housing Bureau for ICOLD 2019, and the only organization authorized to liaise on behalf of ICOLD 2019 for hotel room reservations. Should you be contacted by a supplier by email and or telephone indicating that you must book your accommodations, DO NOT engage with them.

Technical Program

International delegates from around the world will share their expertise in dams and related equipment for hydropower, water resources and the mining industry.

The technical program will include:

- Symposium – Sustainable and Safe Dams Around the World
- ICOLD Technical Committee meetings – Open to all delegates, as observers
- ICOLD Technical Committee workshops – Introducing new topics, and summarizing completed Bulletins
- Partner Seminars – Covering a wide range of technical subjects, in collaboration with partner organizations
- Short courses for professional development - Dam safety topics, based on CDA guidance publications
- Technical and study tours

Symposium

Theme: Sustainable and Safe Dams Around the World

This theme will be addressed in technical papers and a poster session on the following topics:

1 Innovation –

Recent advancements and techniques for investigations, design, construction, operation and maintenance of water or tailings dams and spillways.

2 Sustainable Development –

Planning, design, construction, operation, decommissioning and closure management strategies for water resources or tailings dams (e.g. climate change, sedimentation, environmental protection, risk management).

3 Hazards –

Design, mitigation and management of hazards to water or tailings dams, appurtenant structures, spillways and reservoirs (e.g. floods, seismic, landslides).

4 Extreme Conditions –

Management for water or tailings dams (e.g. permafrost and ice loading, arid/wet climates, geo-hazards).

A full listing of the Papers selected for Oral Presentation will be available on the ICOLD 2019 website in early May.





ICOLD Technical Committees

Committee Workshops (Monday, June 10)

In addition to the full day of meetings, some Technical Committees will present workshops on Monday, June 10, which are open to all interested delegates. Workshops are required for every committee that is starting a new mandate, so that the work will appropriately reflect international requirements and conditions. Similarly, when a committee has completed a draft Bulletin, they present their approaches and findings to obtain feedback from a broad representation of ICOLD delegates. The workshop program is available on the ICOLD 2019 website.

Open Committee Meetings (Tuesday, June 11)

As part of the program for the 87th Annual Meeting, all delegates are invited to attend the meetings of ICOLD Technical Committees as observers, to gain insight into the development of the ICOLD Technical Bulletins that are so influential on dam engineering and development practices around the world.

ICOLD COMMITTEES	
A	Computational Aspects of Analysis and Design of Dams
B	Seismic Aspects of Dam Design
C	Hydraulics for Dams
D	Concrete Dams
E	Embankment Dams
F	Engineering Activities with the Planning Process for Water Resources Projects
G	Environment
H	Dam Safety
I	Public Safety Around Dams
J	Sedimentation of Reservoirs
K	Integrated Operation of Hydropower Stations and Reservoirs
L	Tailings Dams and Waste Lagoons
LE	Levees
M	Operation, Maintenance and Rehabilitation of Dams
N	Public Awareness and Education
O	World Register of Dams and Documentation
P	Cemented Material Dams
Q	Dams Surveillance
RE	Resettlement Due to Reservoirs
S	Flood Evaluation and Dam Safety
T	Prospective and New Challenge for Dams and Reservoirs in the 21 st Century
U	Dams and River Basin Management
V	Hydromechanical Equipment
W	Selection of Dam Type
Y	Climate Change
Z	Capacity Building and Dams



Partner Seminars

Full and half-day partner seminars will be presented on Friday, June 14, 2019, in collaboration with Canadian partner organizations and companies.

1 - Working with Indigenous Communities on Hydropower Development. Supported by Waterpower Canada and Hydro Québec

The workshop will discuss processes of meaningful consultation and inclusion that have been applied to build relationships and achieve outcomes that more broadly share the benefits in a collaborative and equitable manner – covering development projects, procurement practices and capacity building with Indigenous communities.

2 - ICOLD Bulletin 164: Internal Erosion Workshop. Supported by ICOLD Committee E, Embankment Dams, ICOLD Committee LE, Levees, and Internal Erosion Working Group

This workshop is aimed at dam engineers and technical specialists, regulators and dam owners involved in the design, construction and operation of dams, levees and tailings dams. Participants will gain improved understanding of internal erosion mechanics and how to make engineering assessments to limit the risks related to this phenomenon.

3 - Emerging Intelligence Technologies Adaptable for Dam Safety Management. Supported by KNCOLD and Canadian Dam Association (CDA)

This seminar will address emerging intelligence technologies that may be adaptable for dam safety management. Participants will develop ideas on how to improve efficiency and productivity through data visualization, intuitive understanding, data synchronization, and extracting value and knowledge from information.

4 - Workshop on Nonlinear Weir Design. Supported by Utah State University, University of Liège and Électricité de France

The workshop – organized by experts from research and practice – will cover all relevant stages of a labyrinth and a piano key weir project, from the first theoretical design to detailed studies and practical considerations related to the construction. Several real examples in France and the USA will illustrate the technical presentations and time will be devoted to Q/A and discussion.

5 - Towards Sustainable Mining®, Governance of Tailings Dams, and Risk Management. Supported by the Mining Association of Canada (MAC)

The seminar will also present systems for risk assessment, risk management and development of critical controls for identification and monitoring of the main dam failure modes.

6 - Small Hydro Development Utilizing Existing Dam Infrastructure. Supported by the Ontario Waterpower Association (OWA).

The workshop will present decision-making tools and community based guidance on small waterpower developments.

7 - Dam foundations: Preparation and Supervision of Works for Embankment Dams and Other Structures. Supported by Hydro Québec

In this workshop, a review is done of the main criteria for treating foundations adopted at Hydro-Québec for embankment dams, with emphasis on the analysis of cases where practical, creative solutions have been adopted to minimize the scope and costs for foundation treatments in strict compliance with the applicable criteria.



8 - The Non-Commercial Aspects of Construction Management. Supported by SNC Lavalin, Hatch and International Hydropower Association

The workshop would include presentations and discussion on the following topics:

- Worker health and safety;
- The benefits of training for specific technical tasks; could include training for the site lab and field inspections;
- Quality control and Quality Assurance;
- Adapting to field conditions; and
- The importance of comprehensive As-Built reports and documentation.

9 - Regulation of Dams – Modern Approaches and Common Challenges. Supported by ICOLD Committee H, Dam Safety

The workshop will outline the regulatory framework applied under the various legal constructs experienced internationally to regulate both conventional water retaining dams and tailings structures, as well as highlight practices from across Canada.

10 - Our Climate in Evolution: Reviewing and Adapting Dam Design and Water Management Operations. Supported by Ouranos.

This session will showcase some initiatives undertaken to identify potential impacts of climate change on water resources and useful tools tailored to assist decision makers in identifying sound adaptation solutions to become more resilient.

11 - Tailings Technologies and Advances From Research. Supported by the Canadian Geotechnical Society (GCS)

This seminar will seek to compile a worldwide reference of current tailings research and discuss opportunities for collaboration and identification of future research possibilities. Speakers will present some of the key research initiatives currently in progress.

12 - Physical and Numerical Modelling for Hydraulic Structures Design and Assessment of the Hydraulic Conditions. Supported by Lasalle/NHC and SNC Lavalin

The workshop will focus on the use of physical models and numerical (3D) models in the design and assessment of hydraulic conditions for hydroelectric and hydraulic structures.

- Advantages of each type of model.
- Combined use of numerical and physical models.
- Review of numerical and physical modelling on recent projects



CDA Short Courses

The Canadian Dam Association (CDA) will offer optional short courses prior to ICOLD 2019. The training material is based on CDA guidance publications which are applied in Canada and internationally. These classroom sessions are eligible for professional development credits as required in many jurisdictions. Pre-registration is required for all workshops and space is limited.

Public Safety Around Dams

Saturday, June 8 and Sunday, June 9

\$695/person

A two-day course, Dams and Public Safety, provides training on public safety risk assessment based on the methodologies presented in the Canadian Dam Association's *Guidelines for Public Safety Around Dams, 2011*.

The course will benefit managers and operators of dam facilities involved in risk management assessments or decisions related to public safety. This practical and hands-on course gives realistic case studies and tools suitable for immediate application to assessment of public safety risks at a facility. The instructors have received special training in the CDA methodologies and materials, and they are experienced in applying the methods. Classes are limited in size to maximize participation, and case studies are addressed in small working groups.

Emergency Management for Dam Safety

Sunday, June 9

\$395/person

This one-day course outlines a process to assist dam owners in preparing emergency preparedness and response plans, in order to serve the basic needs of the owner, community first responders, and those who regulate dam safety.

Tools and examples of good practices are presented for preparing and maintaining Dam Emergency Plans and inundation maps, and determining activation levels for emergency response. The course is interactive with small group discussions and exercises that use a case study to illustrate key points.

Dam Safety for Mining Dams

Sunday, June 9

\$395/person

Topics will include those in the CDA *Technical Bulletin on Application of Dam Safety Guidelines to Mining Dams, 2014* as well as additional guidance on tailings dam inundation analysis, environmental consequence classification, slope stability, mine waste structures, dam safety reviews, and the role of Engineer of Record in a dam safety management system.

There will be an opportunity for participants to share updates on other international guidance for mining dam safety. The course will be taught by highly qualified engineers with direct experience with mining dams, both in Canada and internationally. A print copy of the CDA *Technical Bulletin on Application of Dam Safety Guidelines to Mining Dams, 2014* (bilingual, English and French) is included in the registration fee.

Dam Safety Reviews

Sunday, June 9 – Workshop will be offered in both English and French

\$395/person

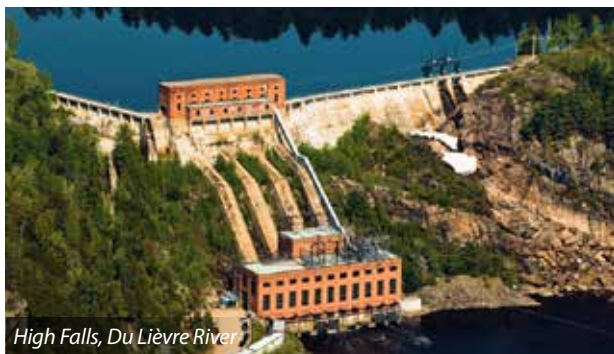
An overview of the process presented in the CDA Technical Bulletin: Dam Safety Reviews (CDA 2016). Participants will gain an understanding of the roles and expectations of the Dam Owner and the Review Engineer, as well as the context of the Dam Safety Review within a dam safety program or management system. The course is designed for dam owners, consultants and regulators who want to gain a better understanding of good practice as described in the CDA DSR Technical Bulletin.

The course outlines the steps that should be carried out by a Dam Owner in preparation for a Dam Safety Review, the activities undertaken by the Review Engineer, and the need for follow-up by the Owner after the report has been delivered.

Technical Tours

ICOLD 2019 participants will be able to select from full day and half day technical tours on Thursday June 13, 2019. The half day tours will allow participants to attend a half day of technical papers during Day 2 of the Symposium. Additional fees apply. Visit the ICOLD 2019 website for a full list and description of the tours available.

Technical Tours	Length	Fee
1A – Dufferin and High Falls with Ottawa River Boat Cruise	Full Day	\$75/per person
1B – Dufferin and High Falls with Ottawa River Boat Cruise	Full Day	\$75/per person
2 – Beauharnois GS and Lasalle NHC with lunch and site seeing in Old Montreal	Full Day	\$60/per person
3 – Beauharnois GS, site seeing in Old Montreal and St Lawrence Boat Cruise	Full Day	\$75/per person
4 – R.H. Sanders and Ottawa River Boat Cruise	Full Day	\$75/per person
5 – Lasalle NHC and Ecole Polytechnique with lunch and site seeing in Old Montreal	Full Day	\$60/per person
6 – Queens University Laboratories (tailings/geomembrane testing facilities) and 1000 Islands Boat Cruise	Full Day	\$75/per person
7 – Chat Falls GS	Half day (morning)	\$30/per person
8 – NRC Hydraulics Lab and Beauharnois GS with lunch and site seeing in Old Montreal	Full Day	\$60/per person
9 – Chaudière Falls GS and Ottawa River Boat Cruise	Half day (afternoon)	\$45/per person
10 – Farmers GS and Ottawa River Boat Cruise	Half day (afternoon)	\$45/per person
11 – Chaudière Falls GS and Rideau Canal Boat Cruise	Half day (afternoon)	\$45/per person



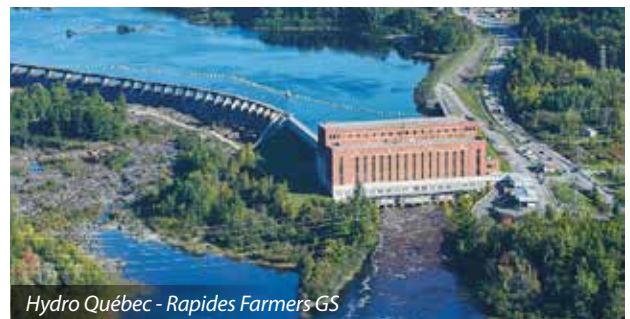
High Falls, Du Lièvre River



Jones Falls, Rideau Canal



R.H. Saunders GS – St. Lawrence River



Hydro Québec - Rapides Farmers GS

Post-Meeting Study Tours

Participants are encouraged to extend their stay in Canada as part of the post-conference study tours.

Post-conference study tours will take place in Ontario, Quebec and British Columbia. During these trips, participants will have the opportunity to visit some of Canada's most interesting dams, hydroelectric projects and mining sites over a period of 3 to 4 days. Tour descriptions and costs available on the ICOLD 2019 website. One of the attractive features for the Post-Meeting Study Tours is that they will terminate in Toronto, Montreal or Vancouver, allowing delegates to travel home from one of these international airports.

Tours	Rate/person in single room*	Rate/person in double room*
ST1 – Ontario Tailings Dams (June 15-17) <i>Ottawa – Cornwall – Gananoque – Niagara Falls – Toronto</i>	\$1,247	\$923
ST2 – Ontario (June 15-17) <i>Ottawa – Val d'Or – Timmins – Sudbury – Toronto</i>	\$1,620	\$1,400
ST3 – British Columbia Tailings Dams (June 16-18) <i>Vancouver – Lac Le Jeune – Kamloops – Vancouver</i>	\$1,648	\$1,496
ST4 – Quebec (June 15-18) <i>Ottawa – Beauharnois – La Romaine – Montreal</i>	\$3,100 (min/max): 15	\$2,675 (min/max): 15
ST5 – Quebec (June 15-17) <i>Ottawa – Shawinigan – Charlevoix – Montreal</i>	\$1,500	\$1,175

* Plus applicable taxes.



Young Professionals

ICOLD 2019 will offer a unique learning opportunity for individuals from around the world who are in the early stages of their careers. As well as specific events and initiatives targeted at these delegates, the ICOLD 2019 event integrates young professionals into all aspects of the program.

The Young Professional program will include:

- ICOLD Young Engineers Forum
- Networking event for young professionals
- Young professional paper award
- Young professional poster award
- Sponsorship categories to support young professionals
- Mentorship opportunities
- Information booth in Exhibition Hall

Young professionals are especially encouraged to attend ICOLD Technical Committee meetings and workshops, in addition to the Symposium and other events. Attendance will provide a unique opportunity to engage with technical subject matter experts from around the world and participate in the development of leading practices.

Companies and ICOLD National Committees will benefit by having young professionals attend this international event, where they can establish contacts with technical leaders and organizations at the forefront of dam engineering. This exposure will enable them to take the lessons learned back to their home organizations to improve projects and practice.

Note: for the purposes of registration and participation in the Young Professionals social events and Awards delegates are to be 35 years of age or under as of the June 15, 2019. However, participation in the ICOLD Young Engineers Forum is open to delegates 40 years of age and under.





Ottawa City Tour

Delegates will begin their ICOLD 2019 experience with a city tour of Ottawa featuring a captivating past, an abundance of culture and filled with historic buildings and world-class museums, the highlights of the city tour include Parliament Hill, the Supreme Court of Canada, the Rideau Canal, the Residence of the Prime Minister, the Residence of the Governor General, the National Gallery of Canada and the Canadian Museum of History.

Accompanying Persons

Ottawa is a cosmopolitan city with lush green spaces, scenic bike paths, and the Rideau Canal waterway – a UNESCO World Heritage Site. The ICOLD 2019 accompanying persons program will include activities for all interests: art, history, cycling, shopping and more!

MONDAY JUNE 10, 2019	Time	Cost per person/tour
Brisk Walking tour - breakfast on own	07:30-08:30	\$15.00
Rideau Hall & Aboriginal Experience	10:00-15:00	\$130.00
Gatineau Park Tour	09:30-12:30	\$70.00
Guided Tour National Gallery of Canada	13:00-16:00	\$70.00
TUESDAY JUNE 11, 2019	Time	Cost per person/tour
Brisk Walking tour - breakfast on own	07:30-08:30	\$15.00
Rideau Canal Cruise & Tour of Canadian War Museum	09:30-15:30	\$130.00
Cycling Along the Rideau Canal	09:30-12:00	\$130.00
Cobblestone & Courtyard Walking Tour and tour of Royal Canadian Mint	13:00-16:00	\$50.00
WEDNESDAY JUNE 12, 2019	Time	Cost per person/tour
Brisk Walking tour - breakfast on own	07:30-08:30	\$15.00
Day Trip to Montreal	08:00-17:00	\$200.00
Thousand Islands Cruise, lunch, tour of Kingston	08:00-17:00	\$200.00
Gatineau Park	13:00-16:00	\$70.00
FRIDAY JUNE 14, 2019	Time	Cost per person/tour
Brisk Walking tour - breakfast on own	07:30-08:30	\$15.00
"Step Back in Time" - Upper Canada Village	08:30-15:30	\$200.00
Cobblestone & Courtyard Walking Tour and tour of Royal Canadian Mint	09:30-12:30	\$50.00
Discover the Hill - Canada's seat of Government	13:00-16:00	\$50.00



Exhibition

The central hub of ICOLD 2019 will be the Exhibition where consultants, product suppliers and contractors will be showcasing their organizations and capabilities. Delegates will visit the Exhibition for refreshments, presentations, poster displays and networking.

Participation by leading equipment suppliers and consulting companies from North America and around the world will allow delegates to identify potential partners for their design, construction, monitoring and maintenance needs.

General Information

Registration and hotel bookings – Information on registration and hotels can be found at www.icold-cigb2019.ca.

A Letter of invitation for obtaining travel Visas is available on the ICOLD website.

Passport and visa – Check with a Canadian high commission, embassy, consulate or travel agent to find out what documents are required to enter Canada. A list of countries and territories whose citizens require a visa to enter Canada as visitors can be found at www.cbsa-asfc.gc.ca/noncan-eng.html. Ensure that you review the new entry requirements now in effect regarding Electronic Travel Authorizations for visa-exempt foreign nationals.

Language – English and French are the national languages of Canada, and both are widely spoken in Ottawa.

Weather – The weather in June can range from a low of 15 degrees Celsius, to a high of 26 degrees Celsius; average rainfall is 91mm.

Currency – Canadian dollar (\$)

Electricity – Canada's electrical supply and outlets (sockets, wall plugs) are the same as those found in the United States. The electrical supply is 120 Volts and 60 Hertz (cycles per second).

Local Transportation – The conference centre, attractions and restaurants are within walking distance of the ICOLD 2019 hotels. Ottawa is very safe for walking. There are two city bus systems in Ottawa. OC Transpo operates in the Ontario side of the Ottawa River and the Société de Transport de l'Outaouais operates on the Québec side. You can transfer between these systems and both offer convenient trip planning tools on their websites.

Distance from Airport – Ottawa's MacDonald Cartier International airport is a 20 minute drive to downtown.

Professional Congress Organizer Intertask Conference, a JPdL Company

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Sponsor & Exhibition Management Blair Tryon

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Registration, Accommodation and Social Events

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Program-at-a-Glance

Visit icold-cigb2019.ca for detailed information.

Saturday, June 8

■ CDA Short Courses

Sunday, June 9

■ Meeting: ICOLD Officers and Technical Committee Chairs
■ City Tour
■ CDA Short Courses

Monday, June 10

■ Technical Workshops: Presented by ICOLD Committees
■ Meeting: Young Engineers Forum
■ Meeting: Francophone Committee
■ Optional Daytime Events
■ City Tour
■ Welcome Reception

Tuesday, June 11

■ Meetings: ICOLD Technical Committees (Open to observers)
■ Meetings: ICOLD Regions
■ Optional Daytime Events
■ Exhibition
■ Exhibitors Reception
■ Young Professionals Networking

Wednesday, June 12

■ International Symposium
■ Exhibition
■ Optional Daytime Events
■ Cultural Evening

Thursday, June 13

■ International Symposium
■ Exhibition
■ Technical Tours (Half and full day options)

Friday, June 14

■ ICOLD General Assembly
■ Partner Seminars
■ Optional daytime events
■ Banquet & Closing Ceremony

Saturday, June 15

■ Study Tours

■ Included with full ICOLD registration

■ Additional fees apply



ICOLD Supporters 2019

Diamond



Silver



Bronze Plus

Brookfield

Bronze



Lunch



Lanyard



Wifi



Young Professional
Social Event

MAPEI

Young Professional
Supporter

**Ontario Power
Generation
WSP**

Young Professional
Paper/Poster Award

Hatch

CDA Workshops

Wood