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87th Annual Meeting

INTERNATIONAL COMMISSION ON LARGE DAMS

JUNE 9-14, 2019 — OTTAWA, CANADA

www.icold-cigb2019.ca

Hosted by:



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, Ottawa. This continues Canada's 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 15,000 dams and ranks fourth in the world in hydropower production – as well as being a significant producer of minerals from mining. 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 – WSP
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, exhibition hall, and submission of abstracts.

www.icold-cigb2019.ca



Invitation from ICOLD President

Dear ICOLD members, colleagues, ladies and gentlemen,

On behalf of ICOLD I'm delighted to invite delegates from the National Committees of the International Commission on Large Dams (ICOLD), and specialists and experts working in the field of dams and reservoirs as well as their accompanying persons, to the 87th Annual Meeting and Symposium in Ottawa, Canada, which will take place from 9 – 14 June in 2019.

Sixteen years after the very successful ICOLD Congress in Montreal in 2003, the Canadian Dam Association (CDA) has again taken on the challenge of organizing an ICOLD Annual Meeting and Symposium in 2019. With an installed capacity of about 80,000 MW and an annual generation of 380 TWh, Canada is among the most important hydropower producers in the world. Almost 1,000 large dams are in operation. Canada has developed and is still developing its large hydropower resources in an exemplary and sustainable way.

The delegates of the 87th Annual Meeting will have the chance to participate in the Symposium "Sustainable and Safe Dams Around the World" which will focus on innovation, sustainable development, hazards and extreme conditions. Furthermore, current issues will be addressed in special workshops including the workshops of the ICOLD Technical Committees. The outcomes of the ICOLD 87th Annual Meeting and Symposium will certainly contribute significantly to our governing long-term mission, "Better dams for a better world".

In view of our challenge to further develop this century's dams and reservoirs worldwide, which will also be urgently required to mitigate the negative effects of climate change, I encourage you to come to the 87th Annual Meeting, not only to discuss the emerging professional and socio-economic issues, but also to meet the ICOLD family. I'm convinced that CDA will ensure a high quality technical content for the meeting and an attractive social and accompanying person's programme. Besides excellent technological examples of dams and hydropower plants, the delegates will also have the opportunity to discover beautiful and impressive tourist sites in Canada during the study tours.

I'm looking forward to welcoming the ICOLD family, old members or newcomers, in Ottawa, Canada!

Prof Dr Anton J. Schleiss

President of International Commission on Large Dams 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. All CDA members have access to the benefits of the ICOLD organization.

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.



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.

Just across the Ottawa River from Parliament Hill is the Canadian Museum of History, an architecturally stunning building that, with its organic contours and shapes, evokes images of Aboriginal longhouses, earth lodges, and igloos. The National Arts Centre is home to world-class, multidisciplinary performances. ICOLD 2019 events are planned for both of these facilities.

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.





Conference Centre

ICOLD 2019 will be based in the Shaw Centre, an award-winning architectural icon in the heart of downtown Ottawa. With state-of-the-art meeting space, it is an ideal home for ICOLD 2019. The Centre is fully accessible with leading-edge technology infrastructure and environmentally sustainable features and practices.

The ICOLD 2019 venue is situated in Ottawa's safe and convenient downtown core within walking distance of national sights, historic landmarks and the hotels that will accommodate ICOLD participants. It is an easy 20-minute commute from Ottawa's International Airport. Ottawa's character, national treasures, natural beauty, exciting night life and relaxed urban vibe will appeal to all delegates, exhibitors and companions.



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, amenities and cost per night will be available at www.icold-cigb2019.ca in autumn 2018.

Delegates will be able to make a hotel reservation through the ICOLD 2019 housing bureau once they have completed their registration for the Annual Meeting and Symposium. The ICOLD 2019 hotels will not take reservations directly.



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
- Workshops – 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 and Submission of Abstracts

Theme: Sustainable and Safe Dams Around the World

The theme will be addressed through technical papers and a poster session presented on the following topics.

1 Innovation

Recent advancements and techniques for investigation, 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).

Young Professionals (age 35 and under) are especially encouraged to submit papers and posters for the Symposium.

Submission of Abstracts

Authors of technical papers and posters should submit abstracts addressing the symposium themes, using the online system at www.icold-cigb2019.ca.

Abstracts are due by September 15, 2018.



ICOLD Technical Committees

Open Committee Meetings

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

Committee Workshops

In addition to the full day of meetings, some Technical Committees will present workshops, 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 will be determined early in 2019, depending on the progress of the Technical Committees.

Technical Workshops

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

Workshops under consideration include the following:

- Working with indigenous communities on hydropower development – Supported by Canadian Hydropower Association
- Our climate in evolution: Reviewing and adapting dam design and water management operations – Supported by Ouranos
- Reservoir-triggered seismicity and seismic phenomena induced by hydro-fracturing - With participation of scientists from the Geological Survey of Canada
- Towards sustainable mining, governance of tailings dams, and risk management - Supported by the Mining Association of Canada
- Tailings technologies and advances from research – Supported by the Canadian Geotechnical Society
- Design and safe construction practices for dams and hydropower
- Dam foundations: Preparation and supervision of works for embankment dams and other structures
- Regulation of dams – modern approaches and common challenges



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.



The program of short courses is expected to include:

- Dam Safety Reviews
- Mining and Tailings Dam Topics
- Public Safety Around Dams
- Emergency Management for Dam Safety



Technical Tours

Ottawa was originally settled as a trading centre, being strategically located at the confluence of four tributaries to the St. Lawrence River - the Ottawa, Gatineau, Le Lièvre and Rideau rivers. While the use of the waterways as trading routes eventually waned, these rivers were later developed into important sources of renewable energy.

In addition to visiting dams and hydropower facilities, the technical tours will include options to go to some of Canada's premier laboratories in Ottawa and Montréal. These laboratories have an international reputation for servicing the dam industry in Canada as well as supporting international projects.

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 morning of technical papers during Day 2 of the Symposium.

Some of the tours we are working on:

Brookfield Renewable Energy - Le Lièvre River hydroelectric projects

Brookfield Renewable Energy owns and operates one of the world's largest renewable power portfolios. Four hydropower sites located on the Le Lièvre River offer a unique opportunity to visit some of the region's original hydropower developments.



High Falls, Le Lièvre River

Parks Canada - Rideau Canal

The Rideau Canal operated by Parks Canada, was constructed in 1832 to connect Ottawa with Lake Ontario and the St. Lawrence River. As the oldest continuously operated canal system in North America, it was designated in 2007 as a UNESCO World Heritage site.



Jones Falls, Rideau Canal

Ontario Power Generation - St. Lawrence and Madawaska Rivers

Ontario Power Generation's R.H. Saunders GS, combines with the New York Power Authority's Robert Moses GS to span the St. Lawrence River. The 2400 MW installation was constructed in the 1950s as part of the redevelopment of the St. Lawrence Seaway, linking Lake Ontario and the Great Lakes system to the Atlantic Ocean, forming one of North America's most important transportation routes.



R.H. Saunders GS - St. Lawrence River

Hydro Québec - St. Lawrence and Gatineau Rivers

Hydro Québec is the largest producer of hydroelectric power in North America, with over 600 dams listed in the ICOLD register. Technical tours to facilities on the Gatineau and St. Lawrence Rivers, at Rapides Farmers and Beauharnois, will provide the opportunity to view first-hand the practices of one of Canada's premier dam owners and experience Québec hospitality.



Hydro Québec - Rapides Farmers GS

École Polytechnique, NRC-CHC and Lasalle Hydraulics Laboratory

Technical tours will include options to visit some of Canada's most advanced research centers whose work supports the dam and hydropower industry. Researchers at Polytechnique, and the Lasalle Hydraulic Laboratories located in Montréal, along with the NRC's Canadian Hydraulics Laboratory in Ottawa will share cutting-edge R&D work they have underway.

The Hydro-Québec Structures Laboratory at Polytechnique in Montréal is the largest and most versatile high-performance structural testing facility in Canada, where a full suite of static and dynamic tests on large-scale specimens are conducted, integrating hybrid simulation technology to maintain the test specimen in continuous interaction with a numerically-simulated substructure.

The Lasalle NHC hydraulics laboratory in Montreal, and the National Research Centre – Canadian Hydraulics Centre in Ottawa, are both premier hydraulics laboratories offering advanced capability in both physical and numerical models for optimizing the designs of spillways, intakes and outlet works, and other coastal science projects around the world.



Polytechnique, Montréal

Post-Meeting Study Tours

Participants are encouraged to extend their stay in Canada as part of the post-conference study tours. These tours will include trips within Ontario, Québec and British Columbia in order to visit some of Canada's most interesting dams, hydropower projects and mining sites over the course of 4 to 6 days. The Québec and Ontario tours will begin in Ottawa on Saturday morning, with Québec tours considering options for participants to explore some of Canada's largest dams associated with the James Bay, La Romaine, Manic-Outardes hydro projects, as well as dams on the Saguenay and St. Maurice Rivers. The tours will also allow participants time to enjoy the sites of Québec City and Montreal from where participants will make their way home.

There will be two short tours in Ontario; one focusing on mine tailings facilities in Northern Ontario and a second tour visiting dams and hydropower sites including stops along Canada's historic Trent-Severn Waterway and the magnificent Niagara Falls. Both tours will terminate in Toronto.

For the more adventurous participants wishing to visit the splendors of Canada's west coast and the Rocky Mountains, two tours are also planned to cover mining dams and hydropower sites in British Columbia. These tours will begin and end in Vancouver, with participants needing to make their own arrangements to be in Vancouver, Sunday June 16th.



Trent Severn Waterway Parks Canada



Highland Valley Copper, British Columbia

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 (age 35 and under) 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.

Social Program

The social program during ICOLD 2019 will include several interesting events for delegates and registered accompanying persons, including the following:

- Monday: Welcome Reception
- Tuesday: Exhibitors Reception
- Tuesday: Young Professionals Networking
- Wednesday: Cultural Evening
- Friday: Farewell Banquet



Gatineau Park



Canadian Museum of History



National Arts Centre



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 luscious 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!

A few examples are listed below. Full program descriptions and costs will be available on the website in summer 2018.

National Gallery of Canada

Calling all art lovers...follow your professional tour guide for a tour of the magnificent National Gallery of Canada where you will enjoy a guided tour of the Permanent Collection. This Gallery houses the largest collection of Canadian art anywhere in the world along with works by internationally renowned artists. Located just steps from Parliament Hill in downtown Ottawa, the National Gallery of Canada is the country's showcase of the visual arts and a spectacular architectural landmark. After your tour, enjoy time in the boutiques along Sussex Drive and in the ByWard Market before walking back to your hotel.



Rideau Canal Cycling Tour

For those who would like to combine moderate physical activity while discovering our beautiful National Capital, cycling along the Canal is the perfect activity! Canada's Capital Region is home to the Capital Pathway network, one of the largest in North America. Join your guide for a leisurely bike ride on the pathways of the historic Rideau Canal – an opportunity to cycle along the only UNESCO World Heritage site in Ontario. Take a break at the spectacular Hogs Back Falls overlooking the Rideau River and enjoy a mimosa and chocolate covered strawberries before continuing your bike tour.



Full Day Visit to Montréal

Board a motor coach for a pleasant two-hour drive to discover the history, evolution and unique atmosphere of Montreal, the second largest Francophone city in the world. Sights will include the impressive Saint-Joseph's Oratory, a Roman Catholic Shrine, Jean Drapeau Park (Saint Hélène and Notre-Dame Islands), site of the 1967 World Fair, Expo '67. Finish the tour in Old Montréal, the birthplace of the city, an area rich in architectural details dating back to the 17th Century. Your guide will walk you to a local restaurant for lunch, followed by free time exploring the city on your own before returning to Ottawa.



Additional tours will be available on the ICOLD 2019 website.

Exhibition and Sponsors

The central hub of ICOLD 2019 will be a multi-functional Exhibition where products and services of interest to the dam community will be on display. Delegates will visit the Exhibition for refreshments, presentations, poster displays and networking.

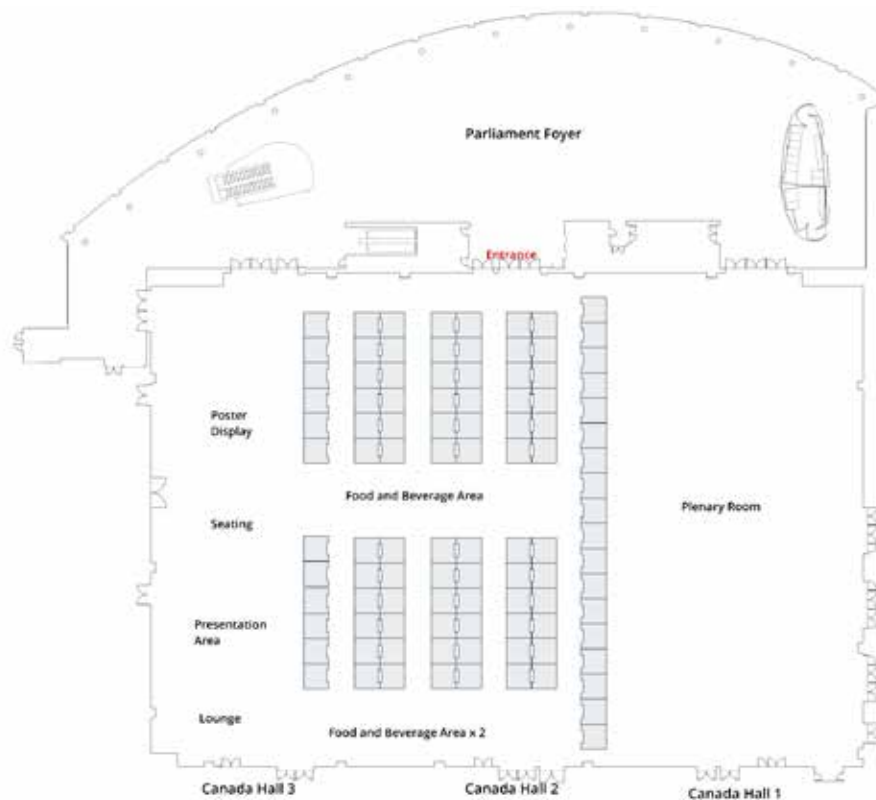
Participation by leading equipment suppliers and consulting companies from North America and around the world will allow delegates to identify potential partners for their design, construction, monitoring and maintenance needs.

[Contact us now to reserve your space.](#)

Sponsorship and recognition opportunities may be customized upon request. For additional information, visit www.icold-cigb2019.ca or contact Marie Laplante, 613-235-0442, ext. 233, support@icold-cigb2019.ca.

Floor Plan (layout subject to change)

Shaw Centre



We'd like to thank the following organizations for their early, and continued support.

BC Hydro • Hydro Québec • Ontario Power Generation

AECOM • Klohn Crippen Berger • WSP

General Information

Registration and hotel bookings – Information on registration and hotels can be found at www.icold-cigb2109.ca. Registration will begin in autumn 2018.

A Letter of invitation for obtaining travel Visas will be available on the ICOLD website when registration opens.

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 – The MacDonald Cartier International airport is a 20 minute drive to downtown.



For information, please contact

info@icold-cigb2019.ca
www.icold-cigb.ca

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Program-at-a-Glance

Saturday, June 8

- CDA Short Courses

Sunday, June 9

- Meeting: ICOLD Officers
- Meeting: ICOLD Officers and CDA Organizing Committee
- Meeting: Young Engineers Forum
- City Tour
- CDA Short Courses

Monday, June 10

- Meeting: ICOLD Officers and Technical Committee Chairs
- Technical Workshops: Presented by ICOLD Committees
- Meetings: ICOLD Regions
- Optional Daytime Events
- City Tour
- Welcome Reception

Tuesday, June 11

- Meetings: ICOLD Technical Committees (Open to observers)
- Optional Daytime Events
- Exhibition and Technical Seminars
- Exhibitors Reception
- Young Professionals Networking

Wednesday, June 12

- International Symposium
- Exhibition and Technical Seminars
- Optional Daytime Events
- Cultural Evening

Thursday, June 13


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

Friday, June 14

- ICOLD General Assembly
- Technical Workshops
- Optional daytime events
- Banquet & Closing Ceremony

Saturday, June 15

- Study Tours

 Included with full ICOLD registration  Additional fees apply