88th Annual Meeting
INTERNATIONAL COMMISSION ON LARGE DAMS
&
Symposium on
SUSTAINABLE DEVELOPMENT OF DAMS AND RIVER BASINS
APRIL 4-10, 2020 - NEW DELHI, INDIA
Second Bulletin

Organised by
Supported by
Ministry of Jal Shakti
Department of Water Resources, River Development & Ganga Rejuvenation
Ministry of Power

www.icold2020.org
THE HOST

INCOLD is proud to host the 88th Annual Meeting of the International Commission on Large Dams in India’s National Capital Region of New Delhi. INCOLD has a long tradition of collaboration with other National Committees of ICOLD and participation in the development of large Dams as well as leading in providing guidance for engineers and other professionals.

All the dam professionals contribute their expertise in developing large dams for irrigation and other multipurpose uses such as power generation with eco-friendly measures. India is 3rd in terms of number of large dams in the world after USA and China. In terms of irrigation, India ranks 2nd worldwide. The irrigated area in India is the largest, covering ~160 million ha of cultivated land out of which 39 million ha irrigated by ground water and 22 million ha by canals. About two third of cultivation in India is still dependent on monsoon. India is the 7th largest producer of hydroelectric power in the world. As on 31.03.2019, India’s installed utility-scale hydroelectric capacity is 45,399 MW which is 13.10% of its total generation capacity.

India’s state-of-art technology being illustrated by constructing large dams like Bhakra, Tehri, Sardar Sarovar and many more mega projects. The participation in ICOLD 2020 shall encourage the Indian experts as well as global experts from Dam industry to share their experiences among dam community. This event will provide an excellent opportunity to know recent trends in Dam engineering.

VENUE

The event will take place in the India Expo Centre, most suitable Venue for ICOLD 2020 Event. The venue is located in the National Capital Region of New Delhi i.e., Greater Noida. The Expo Centre is within easy access from the metro station and shopping malls. The India Expo Centre is at a distance of 45 minutes drive from the Indira Gandhi International Airport, Delhi.

This state-of-the-art, multi-functional venue with a rare combination of technology merged with world-class facilities and safety standards is suitable for hosting international business-to-business exhibitions, conferences, congresses, product launches, promotional events and most predominantly act as a centralized contact point for overseas buyers and the cottage based manufacturer exporters for conducting business.

FOR INFORMATION, PLEASE CONTACT

ICOLD 2020 Annual Meeting/Symposium Secretariat
Indian Committee on Large Dams (INCOLD)
Plot No. 4, Institutional Area, CBIP Building
Malcha Marg, Chanakyapuri, New Delhi, India-110 021
Ph. 91-11-26115984 / 26116567, Fax : 91-11-26116347
E-mail : abstracts-papers@icold2020.org

SPONSORS AND EXHIBITION MANAGEMENT
Sunil Sharma
Chief Manager, CBIP
Ph. 91-11-26116567/26115984,
Fax : 91-11-26116347
E-mail : sunil@cbip.org M : 91-9811299136

Please visit our website for up-to-date information including registration, sponsorship, exhibition hall layout and submission of abstracts

www. ICOLD2020.org E-mail : abstracts-papers@icold2020.org; sunil@cbip.org
INVITATION FROM THE INCOLD PRESIDENT AND CHAIRMAN OF THE ORGANISING COMMITTEE

Dear ICOLD Members, Colleagues, Ladies and Gentleman,

Greetings from the Indian National Committee on Large Dams (INCOLD).

On behalf of the Indian National Committee on Large Dams (INCOLD), it is an honour for me to cordially invite you and your accompanying person to attend the 88th Annual Meeting of the International Commission on Large Dams and Symposium on Sustainable Development of Dams and River Basins being held in New Delhi from 4-10 April, 2020. I would also like to invite all the Departmental Heads and professionals dealing with Dams in India to this event.

India has built 5264 dams which includes Bhakra, Tehri, Sardar Sarovar and many more mega projects and 437 dams are under construction. The Dam industry in India has contributed significantly towards meeting the growing water and power demand of the country, yet India is facing increasing pressure on water resources due to population growth, urbanization and creeping effect of climate change.

The 88th ICOLD Annual Meeting and Symposium will provide an excellent platform for researchers, scientists, engineers, policy makers and young professionals working in the field of energy and water resources management around the world. This meeting will definitely act as confluence of brilliant minds and provide an interactive platform to share path breaking ideas on the theme ‘Sustainable Development of Dams and River Basins’ besides Special Workshops including the workshops of the ICOLD Technical Committees.

The Indian National Committee on Large Dam (INCOLD) has prepared an excellent program in an exciting venue for the 88th Annual Meeting of ICOLD and Symposium. In view of our challenges to further develop dams and reservoirs worldwide and combating the effects of climate change, I invite you to the 88th Annual Meeting and Symposium to discuss and deliberate on emerging professional issues along with meeting the ICOLD family. Special programs have been planned for the accompanying persons. Delegates would enjoy social evening program. Besides visiting excellent technological examples of dams and hydropower projects, the delegates will also have opportunity to discover beautiful and impressive tourist sites in New Delhi and other parts of India get a taste of rich cultural heritage of the country during different tours being organized for the foreign guests to explore India.

I am looking forward to welcoming and meeting the ICOLD family, old members as well as newcomers in New Delhi.

Warm Regards

Devendra Kumar Sharma
President
Indian National Committee on Large Dams

and

Vice President
International Commission of Large Dams (ICOLD)
Dear ICOLD Members, Colleagues, Ladies and Gentlemen,

On behalf of the Directors and Central Office of International Commission of Large Dams (ICOLD), it is an honor for me to invite our 100 National Committees to send delegates and their accompanying persons to the 88th Annual Meeting of ICOLD. The meeting will be held from the 4th to 10th April 2020 in New Delhi, the modern and vibrant capital city of India.

The ICOLD, National Committee of India, has prepared an excellent program in an exciting location. India is a strong and important long-standing member of ICOLD. In a country with 5264 dams and 437 dams under construction, India is a top leader in the world in the development of critical water infrastructure, including important mega-projects such as Bhakhra and Tehri Dam projects and the World Bank supported Dam Rehabilitation Improvement Project. With the support of INCOLD, these modern water infrastructure projects have significantly contributed to the sustainable growth of the agriculture, water supply and power sectors in India to meet the increasing requirements of a strong nation.

I am looking forward to an exciting and memorable ICOLD 2020 Annual Meeting based on the successful past meetings organized by INCOLD, including Congresses in 1951 & 1979 and Annual Meeting in 1998. For ICOLD 2020, the ICOLD technical committees will have the opportunity to organize meetings and workshops to deliberate on recent advances and challenges being faced by dam industry. The delegates of 88th Annual Meeting will also have the chance to participate in the Symposium on “Sustainable Development of Dams and River Basins”, which will focus on important topics such as Dam Safety, River Basin Development, Flood Management and Extreme Events, Tailings Dams - Life Extension and Rehabilitation Strategies, Sedimentation Management, and Reservoir Seismicity. The expected outcomes of ICOLD 88th Annual Meeting and Symposium in India will certainly be indispensable for the global dam community.

In view of the many opportunities and challenges in our industry, I encourage you to come to the ICOLD 88th Annual Meeting in India, not only to discuss the emerging professional topics, but also to see friends in our ICOLD family. I am confident that INCOLD will arrange a high-quality technical content for the meeting along with attractive social and accompanying persons programme.

I’m looking forward to welcoming the ICOLD Family – old friends as well as new-comers in April 2020 in New Delhi, India.

Warmest regards,

MICHAEL F. ROGERS
President of International Commission on Large Dams (ICOLD/CIGB)
The International Commission of Large Dams (ICOLD) is an international organization that provides a forum for exchange of knowledge and experience in dam engineering, construction and operation at the international level. ICOLD leads the profession in ensuring that dams are built safely, efficiently and without detrimental effects for the environment. ICOLD was founded in 1928 with HQ at Paris and includes 101 National Committees.

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Mr. Devendra Kumar Sharma, India (2019-2022)
Dr. Enrique Cifres, Spain (2019-2022)

**ICOLD TECHNICAL COMMITTEES**

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**INTERNATIONAL ADVISORY COMMITTEE**

Mr. M. ROGERS, President – ICOLD, USA
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Mr. KENICHI YOKAYAMA, Country Director, Asian Development Bank
Mr. A.B. PANDYA, Secretary General, ICID
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Mr. R.K. Vishnoi, Director (Tech.), THDC
Convener : Dr. G.P. Patel, Director-WR, CBIP

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Mr. K.A. Keshvani, Director, GERI
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Mr. Pawan Gupta, Vice President, AECOM

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Mr. Amaarpal Singh, L&T
Mr. Biswajit Das, Executive Director, Soma

Others
Dr. C Rajagopal Singh, World Bank
Dr. Sanjay Rana, MD, Parsan Overseas
Dr. Wieland Martin, Chairman, ICOLD Committee on Seismic
Prof. Dr. Ignacio Escuder Bueno, Spain

REGISTRATION FEE

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<th>Registration Category</th>
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<tr>
<td>ICOLD Member Countries</td>
<td>USD 1450</td>
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<tr>
<td>ICOLD Non-Member Countries</td>
<td>USD 1650</td>
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<td>Young Professionals (age 35 and younger)</td>
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<td>USD 750</td>
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<td>Workshops Only - 6 Nos.</td>
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<td>Accompanying Person</td>
<td>USD 750</td>
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<td>Indian Delegates</td>
<td>Rs. 35,000</td>
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*GST extra @ 18%.

Early Bird discount @ USD 150 up to 31-12-2019

On Full Registration of delegate from Member and Non-Member Countries

PAYMENT

• Registration fees will be paid in USD by Credit Card (Visa, Master Card or American Express) through website www.icold2020.org

• By bank transfer as per details given below :


• All Registration and activity fees are subject to Tax (GST @18%)
PROGRAM AT A GLANCE

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<th>Accompanying Person Programme</th>
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<td>Saturday 4th April</td>
<td>ICOLD Board Meeting (09:00 – 18:00 hrs.)</td>
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<td>Dinner of ICOLD Board + INCOLD Reps. (19:30 – 22:00 hrs.)</td>
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<td>Sunday 5th April</td>
<td>Registration Opening (09:00 – 17:00 hrs.)</td>
<td>New Delhi City Tours</td>
<td>Dinner of Board + LOC and Tech. Comm. Chairmen (20:00 – 22:00 hrs.)</td>
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<td>ICOLD Board Meeting (09:00 – 12:00 hrs.)</td>
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<td>Meeting of ICOLD Board and Chairmen of Technical Committees (14:00 – 17:00 hrs.)</td>
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<td>ICOLD Board + Local Organizing Committee (17:00 – 19:00 hrs.)</td>
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<td>Congress Questions Panel meeting (17:00 – 19:00 hrs.)</td>
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<tr>
<td>Monday 6th April</td>
<td>Registration (09:00 – 17:00 hrs.)</td>
<td>City Tours</td>
<td>Welcome Reception (20:00 – 22:00 hrs.)</td>
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<td>Technical Committee Workshops (09:00 – 18:00 hrs.)</td>
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<td>Young Engineers Forum (18:00 – 19:30 hrs)</td>
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<td>Tuesday 7th April</td>
<td>Technical Committees Meetings (09:00 – 17:00 hrs.) – 27 Break Outs</td>
<td>City Tours</td>
<td>Young Engineers Social evening (20:00 – 22:00 hrs) Specifics Private Receptions (20:00 – 22:00 hrs)</td>
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<td>Technical exhibition opening ceremony</td>
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<td>ICOLD Regional Clubs Meetings (17:00 – 19:00 hrs.)</td>
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<td>Wednesday 8th April</td>
<td>Symposium Opening Ceremony (09:30-11:00 hrs.)</td>
<td>City Tours</td>
<td>Cultural Event (19:30 – 22:00 hrs.)</td>
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<td>Press Conference (Political, Board, INCOLD and Journalists) 11:30 – 12:00 hrs</td>
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<td>Symposium Contd. (11:30 – 18:00 hrs.)</td>
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<td></td>
<td>Technical exhibition</td>
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<td>Francophone Delegates Meeting (18:00 – 19:00 hrs.)</td>
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<td>Thursday 9th April</td>
<td>Symposium on Sustainable Development of Dams and River Basins (09:00 – 18:00 hrs.)</td>
<td>City Tours</td>
<td>Specific Private Receptions (20:00 – 22:00 hrs.)</td>
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<td></td>
<td>Technical Tours /Visit to Agra (08:00 – 19:00 hrs)</td>
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<td>Technical Exhibition</td>
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<td>Friday 10th April</td>
<td>88th ICOLD General Assembly (09:00 – 18:00 hrs.)</td>
<td>City Tours</td>
<td>Farewell Dinner (19:30 – 22:30 hrs.)</td>
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<td>Workshops – 3 Nos. (09:00 – 18:00 hrs.)</td>
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TECHNICAL PROGRAM
International delegates from around the world will share their expertise and experience in Dams, Hydropower and Water Resources and the mining industry. The technical program will include:

ICOLD TECHNICAL COMMITTEE MEETINGS – Special invites as observer
ICOLD COMMITTEE WORKSHOPS – Introducing new topics and summarizing completed Bulletins
TECHNICAL WORKSHOPS - Covering wide range of technical subjects in collaboration with ICOLD

SYMPOSIUM
Theme: Sustainable Development of Dams and River Basins
The theme will be addressed through technical and poster presentations on the following topics:

The sub themes are:
1. Modern Technologies in Survey and Investigation for Sustainable Dam Development
2. Simulation Methodologies for Dam Analysis and Design
3. Advances in Dam Safety, Risk Assessment and Management
4. Advances in the Rehabilitation of Dams and Appurtenant works:
   (a) Innovations and Adaptations in Intakes, Spillways and Gates
   (b) Advancement in Materials for Dam Repair and Rehabilitation
   (c) New Approaches in Energy Dissipation Arrangements in High Velocity Spillways.
   (d) Causes of Damages and Structural Performance Evaluation of Dams.
   (e) Rehabilitation Technologies to Enhance Dam Safety
In addition to full day meetings some technical committees will present workshop(s), which are open to all interested delegates. Workshops are required for every committee that is starting 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 2020, depending on the progress of the Technical Committees.

IN Cold TECHNICAL WORKSHOPS

Full day technical workshops will be presented in collaboration with ICOLD Technical Committee on the following topics.

1. Workshop on Numerical Analysis of Dams
   Numerical modelling has become an indispensable and powerful tool for design and safety assessment of dams. The benchmark-workshop being organized by IN Cold under the aegis of ICOLD Technical Committee A “Computational Aspects of Analysis and Design of Dams” will provide an excellent opportunity for engineers, researchers and operators to present and exchange their experiences and the latest developments related to the design, performance and monitoring of dams.

2. Workshop on Roller Compacted Concrete Dams
   RCC dams have the virtues of saving a great deal of concrete, building quickly, bringing project cost down, early completion of the project and so on. Hence, this technique of constructing dams has quickly spread and applied since it came out. Today, there are more than 400 RCC dams in more than 40 countries where great successful experiences have been observed. There appears a need to create awareness about RCC technology including planning, design, construction, equipment, cost aspects, O&M etc. especially highlighting the scope for utilization of bulk quantity of fly ash being produced annually in thermal power stations in the country.

3. Workshop on Reservoir Operation for Handling of Extreme Events
   Over the years, India has frequently witnessed the floods causing numerous loss of lives and extensive damages to the infrastructure, agricultural production and other properties in different parts of the country. In recent years, severe floods were experienced in Uttarakhand, Jammu & Kashmir, Chennai and Kerala due to excessive rains have proved that operation policies of existing dams and the structural and non-structural measures are less effective due to anthropogenic activities in the river basins. Such flooding is attributed to the climate change. Thus, there is need for a paradigm shift from flood control to flood management, which has been recognized only during the past decade.

4. Workshop on Life Extension Technologies and Strategies for Aging Dams
   This Workshop will provide participants an understanding of how dam owners evaluate decisions relating to extending the life of a dam and new technologies and techniques that are used globally. The Workshop will identify the common aging mechanisms that relate to potential failure of dams. Some of the aging processes that will be examined include concrete deterioration mechanisms, reduced drain efficiency, erosion of the downstream foundation, erosion due to high velocity, cavitation, gate reliability issues and failure of water stops. The Workshop will conclude with case studies that explore the impact of key aging mechanisms on the safety of concrete dams.

5. Workshop on Sediment Management in Reservoirs for Sustainable Development
   Sedimentation poses a significant threat to the longevity, usefulness, and sustainable operations of both storage reservoirs and run of the river projects. Over time, sediment builds up in reservoirs and displaces usable storage volume, which in turn negatively affects hydropower generation reduces the reliability of domestic and irrigation water supply, flood management services and degrades aquatic habitat. Climate change is also expected to increase sediment loads in many rivers, amplifying the threat of reservoir sedimentation. The workshop will offer a good scope for exchange of experiences in order to understand how efficiently sediment control measures can deal with reservoir sedimentation, their impacts on sediment loads and on trapping of sediment. It would provide exposure of state of the art technology in all aspects of sediment management, especially considering participation of eminent international experts.

6. Workshop on Seismic Analysis for Dam Design and Safety Evaluation of Existing Dams
   The workshop will provide opportunity for dissemination of the international state of the art and good practices in the seismic design of dams by the global experts, which have taken place during the last 50 years. Deliberations will included:
   • From pseudo-static to dynamic seismic analysis of dams.
   • From seismic coefficient to safety evaluation earthquake ground motion.
   • From single ground shaking hazard to multiple seismic hazards.
   • From safety factors to rational seismic performance criteria.

Authors are invited to submit abstracts addressing the symposium themes, using online system at E-mail: abstracts-papers@icold2020.org Web: www.icold2020.org

Abstracts due date is 31st October, 2019

COMMITTEE WORKSHOPS
## Sponsor Opportunities

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<tr>
<th>Opportunities Available</th>
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<th>Platinum</th>
<th>Golden</th>
<th>Silver</th>
<th>Bronze</th>
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1. Double booth includes 2 exhibitor registrations
2. Includes 1 exhibitor registration
3. Does not include events with exclusive sponsors such as Young Professionals’ Event, Technical Tours, etc.
4. Technical Tour Sponsors will receive one complimentary tour registration for the tour sponsored.
5. Workshop Sponsors will receive benefits specific to the workshop sponsored i.e. signage outside workshop room, verbal acknowledgement at the beginning of the workshop, one (1) complimentary workshop registration for the workshop sponsored and the workshop sponsor can also provide a promotional item as a handout at the workshop.

1500 International Delegates Together in one Place
EXHIBITION

The central hub of ICOLD 2020 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.

Your business will benefit from:

- Opportunities to showcase your products and services to a broad audience of attendees across all segments of the market
- Qualified lead generation for new business results
- Branding opportunities to optimize exposure for your company, products and services
- Cost-efficient networking platform to meet the key players, interact with existing customers and build critical new contacts to grow your business and expand your results

The Exhibition will feature:

- All exhibitors in the same room
- All ICOLD 2020 activities in the same facility while the Exhibit Hall is open
- Plenary sessions on the same floor as the Exhibit Hall
- Complimentary food & beverage for delegates in the Exhibit Hall
- Special “Exhibitor Reception” in the Exhibit Hall with no competing events, and no additional cost to delegates or exhibitors

BOOTH PACKAGE

Booth Package 9m² (3 m x 3 m)

If you do not wish to build your own stand, the Booth Package is an excellent choice! We will then take care of the basic needs, such as wall panels, electricity and carpeting. Booth Packages are available from 9 m² (3 m x 3 m).

<table>
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<th>For 3 x 3 m space</th>
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<tbody>
<tr>
<td>Exhibitor (Space only)</td>
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<td>Exhibitor (With stand)</td>
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*GST extra @18%

Included services

- White-walled panels
- One spotlight
- One electrical outlet
- A fascia with name board, including regular lettering in black, in a standard style on the open sides of the booth
- Carpet (4 choices of colours)
- Booth cleaning
- Furniture: 1 counter, 2 high chair or stools, 1 green plant, wastebasket, 1 brochure rack
- 1 congress fee incl. congress catering and all social events

Space Only

The Space Only option offers you a unique chance to create and build your own stand. Please note when booking this service just one 6’ table and two chairs are included. All other services can be booked separately; this information will be provided upon request. The purchase of at least one exhibitor badge is obligatory. The number of exhibit spaces is limited – reserve your spot as soon as possible!

GENERAL INFORMATION

Registration and Hotel Bookings

Information on registration and hotels can be found at www.icold2020.org

Registration will begin in November, 2019.

A Letter of invitation for obtaining travel Visas will be available on the ICOLD 2020 website when registration opens.

Passport and Visa

Check with Indian High Commission, Embassy, Consulate or travel agent to find out what documents are required to enter India which may be obtained from www.indianvisaconline.gov.in.

Language

Hindi and English are most spoken languages in India.

Weather

The weather in April can range from a low of 26 degrees Celsius, to a high of 36 degrees Celsius; average rainfall is 25 mm.

Currency

Indian Rupees (INR)

Electricity

India’s electrical supply and outlets (sockets, wall plugs) of 220 Volts and 50 Hertz (cycles per second).

Distance from Airport

The New Delhi International airport is 40-50 minute drive from ICOLD 2020 venue.
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Booth Package

Booth Package 9m² (10' x 10')
If you do not wish to build your own stand, the Booth Package is an excellent choice! We will then take care of the basic needs, such as wall panels, electricity and carpeting. Booth Packages are available from 9 m² (10' x 10').

Price for 18m² (10' x 20') hard wall booth package: $14,000
Price for 9m² (10' x 10') hard wall booth package: $7,500

Exhibitor (Space only) (3 m x 3 m) USD 5600
Octonom Style Booth (3 m x 3 m) USD 6700

For more details refer: Web: www.icold2020.org