

### Tunnel Design

- Design Philosophy : Tunnel Design and Management
- Specificities and Stages of tunnel design
- Structural design (Calculation, Dimensioning, Face stability)
- Ground reinforcement techniques
- Geo-investigation and Tunnel Modeling parameters
- Influence of construction methods in design approach
- Empirical, Analytical and numerical modelling methods
- Ventilation
- Design of Face pressure, Soil condition, Backfilling
- Segment lining design for soft ground and hard rock

### REGISTRATION

The registration fee payable by the participants for participation in the workshop is as follows:

Delegate/ Author	Research Student
Rs. 8,000*	Rs. 5,000*

\* GST @ 18.00% extra.

10% discount will be given to Members of CBIP, TAI and ISRM.

### SPONSORSHIP

The Conference will provide an excellent opportunity to national and international organizations; central / state government organizations, public sector undertakings, industrial organizations, equipment manufacturers, entrepreneurs, financial and funding institutions, consulting and construction organizations to publicize themselves by being Platinum / Golden / Silver sponsors or Supporter of the Conference. The sponsorship fees payable and benefits are mentioned below. Interested organizations may communicate their willingness to the Conference Secretariat.

### SPONSORSHIP OPPORTUNITIES

Entitlement	Levels						
	Platinum	Golden	Silver	Supporter	Kit Sponsor	Lunch Sponsor	Dinner Sponsor
	INR 5.00 lacs	INR 4.00 lacs	INR 3.00 lacs	INR 2.00 lacs	INR 2.00 lacs	INR 3.00 lacs	INR 4.00 lacs
Logo on the Backdrop	✓	✓	✓	✓	✓	✓	✓
Complimentary Delegates	10	8	6	2	2	4	6
Audio Visual Presentation (in minutes)	15	10	–	–	–	–	–
Distribution of catalogues	✓	✓	✓	✓	✓	✓	✓
Table Top display facility	✓	✓	–	–	–	–	–
Advertisements (in page/s)	Two	One	One	Half	Half	One	One
Display of name during lunch hours	–	–	–	–	–	✓	–
Display of name during Dinner hours	–	–	–	–	–	–	✓
Name & Logo in the inner flap of the Kit	–	–	–	–	✓	–	–

### PAYMENT

All payments are to be made by the following methods:

**Banker's Cheque payable to :** Central Board of Irrigation & Power, New Delhi

- **Bank Transfer :** Name of Bank : HDFC Bank Ltd. 209-214, Kailash Building, 26 K.G. Marg, New Delhi - 110 001

#### Beneficiary Details

Organization : Central Board of Irrigation & Power

Account No. : 00031110004411 MICR Code No. : 110240001 Swift Code : HDFCCINBBDEL Branch IFSC : HDFC0000003

Bank charges if any, must be borne by the organisation/participants and should not be deducted from the amount remitted to the Conference Secretariat.

### Conference Secretariat

**Secretary General, Tunnelling Association of India and  
Secretary, Central Board of Irrigation & Power**

Malcha Marg, Chanakyapuri, New Delhi - 110 021, India Phone : 91-11-2611 5984 / 2611 6567 Ext. 113; Fax : 91-11-2611 6347

**Contact Person : Mr. Sunil Sharma (Mobile No 91-9811299136)**

Email : sunil@cbip.org; cbip@cbip.org; Website : http:// www.cbip.org

### EXHIBITION

Table Top exhibition facility will be provided to the sponsors organisations at the venue of the Conference. The exhibition will provide scope to present the new technologies, materials and mechanisms including software. Participants will enjoy sufficient time and opportunity to inspect the exhibition, and exhibitors will have an excellent opportunity of accessing a large number of potential buyers/decision makers each day. This opportunity will be allotted on first-cum-first served basis.

**Silver Sponsor and Supporter can also avail this opportunity by making additional payment of Rs. 50,000/-.**

### ADVERTISEMENT OPPORTUNITIES

Limited space will be made available on first-come-first-served basis, for coloured advertisement to the organizations, in the proceedings volume of the Conference. The interested organizations are required to send the CD of the advertisement material in Coreldraw software or in PDF format, in A4 size along with payments as detailed below:

Inner Pages	2nd & 3rd Cover	Back Cover
INR 30,000*	INR 50,000*	INR 75,000*

\* GST @ 18.00% extra.

## Information Bulletin & Call for Papers

# Conference on Tunnelling in Himalayan Geology

11 - 13 October 2017 at Hotel Radisson Blu, Jammu

## Workshop on Tunnel Design

10 October 2017



Under the aegis of



International Tunneling &  
Underground Space Association

Organised by



Tunnelling Association of India  
Central Board of Irrigation & Power



Northern  
Railway

Co-organised by



IRCON



KRCL



## INVITATION



In the modern era of infrastructure development, under ground excavations have been playing vital role in the field of Railways, highways, metros, hydropower, water supply, irrigation etc. In order to provide quick and short linkages to remotely located areas, harnessing hydropower potential of the country without disturbing the natural and environmental aspect of the areas, underground activities for construction of Railways, highways, hydroelectric projects are being undertaken. Many such projects are under construction and many more are under consideration in our country.

Northern Railway, at present, has undertaken Udampur-Srinagar-Baramulla Rail Link (USBRL) project of length 272 km as National project in the state of Jammu and Kashmir 161 km of stretches have already been commissioned in various phases. The work in the balance length of 111 km, i.e., from Katra to Banihal is in progress. USBRL has been the most challenging and daunting project in the construction of mountain Railway, post independence. The project is traversing through hostile and inaccessible locations, encountering fragile, friable & intricate geology of young

Himalayas, which is replete with geological surprises, uncertainties and imponderables.

World most advanced & state-of-art technologies are being utilised for construction and renowned National and International designers & consultants have also been associated with the design and supervision of this project. Katra-Banihal leg of USBRL project predominantly involves tunneling works of 97 km (87%), including the longest tunnel T-49 (length 12.7 km) of the country. This leg also includes iconic Chenab Bridge, which will be the highest Railway Arch bridge on the Globe and Indian Railways' first cable stayed bridge on Anji Khad. As of now, 46 km out of 97 km tunnelling work have been completed. Some of the stations on this project are located on bridges and inside tunnels. USBRL is going to be the engineering marvel of unparalleled benchmark in the annals of construction industry.

On behalf of Northern Railway and organising committee, I take great pleasure in extending cordial invitation to professionals, various Govt. departments, tunnel contractors, technical research institutes, consultants, manufacturers, universities and sponsorers, who are actively involved in tunneling and underground construction activities, to participate in the technical conference on "Tunnelling in Himalayan Geology" from 11<sup>th</sup> to 13<sup>th</sup> October 2017 at Jammu.

I look forward to welcoming you in Jammu and I believe that interactions on the different aspects of tunneling and sharing of different experiences, during the two days deliberations followed by one day field visit to USBRL tunnelling site will be very fruitful and beneficial to all those associated with the tunneling industry.

(R.K. Kulshreshta)

*General Manager, Northern Railway &  
Chairman of the Organising Committee*

## INTRODUCTION

In order to provide desired linkages to the remotely located areas and for exploitation of the hydro potential of the country, particularly in Himalayan ranges, extensive underground activities for road, railways and hydroelectric projects is being undertaken. Many such projects are under construction and many more are under consideration. Excavation for tunnels and caverns in Himalayan ranges, which are considered youngest mountain in the world require use of most complex mixture of excavation methodologies as type of the rock changes very frequently in short distances. Despite best efforts and use of latest technologies including Radar mapping, there is always slight uncertainty in pre-assessing the type of rock expected to be encountered. Thus, it becomes difficult to arrive at definite conclusion regarding adoption of the technologies/ combination of technologies for excavation in Himalayan ranges. Thus it is being observed that at difficult sites, a combination of excavation methodologies is being used including conventional drilling, blasting, use of road headers and now concerned authorities have started using TBMs too.

Engineers working for underground excavations in Himalayan ranges, therefore, need continuous interaction and information dissemination to up-date their knowledge covering all aspects of underground works. Interaction with fellow engineers involved in similar activities also is of great help to these field engineers. The "Conference on Tunnelling in Himalayan Geology" therefore, is being organized to meet the objective.

With a view to provide information at international level of knowledge and experience gained in the large scale underground structures and tunnel projects for the benefit of future projects throughout the world, delegates will be provided with a unique opportunity through this conference to facilitate exchange of views and ideas with professionals who have been actively involved in the success of the tunnel projects in complex geological conditions. A large number of experts are likely to participate to stimulate the debate on the challenges met and the lessons learnt, with the application of new practices and technologies. It is in this context that this Conference on "Tunnelling in Himalayan Geology, is being organised by Tunnelling Association of India, Central Board of Irrigation and Power (CBIP) and Northern Railway jointly with their associates IRCON and KRCL on 11-13 October 2017 at Hotel Radisson Blu, Jammu which would be unique experience for the participants.

## TOPICS

### Planning, Investigation and Design of Tunnel & Underground Projects

- Planning, Investigation & Interpretation of Geological Data;
- Engineering Classification and Characterization of Rock Mass;
- Hydraulic and Structural Design of Tunnels;
- Stabilization and Support System for Tunnelling;
- Mapping of tunnel face for support system design and forecasting problems areas
- Determination of In-situ Stresses for Underground Excavation;
- Instrumentation Monitoring, Back-analysis and Modelling Methodologies;
- Analysis and design methodologies including effect of seismicity on underground structures.

### Tunnel & Cavern Construction Technologies and Equipment

- Innovation in excavation technologies related to Himalayas
- Advance probing during tunnel excavation by different techniques
- Construction methodologies for tunnels including remedial measures for large collapses;
- New Developments – NATM Experiences;
- Rock support method – Rock bolting & Rock anchoring etc.
- Water ingress, roof collapse and squeezing ground conditions
- Cost optimization in tunnel construction – Assessment of new developments and cost saving in excavation, construction equipment, single shell lining system, spray applied water proofing membranes etc.

### Risk Analysis and Management

- Risk analysis and Decision-making Techniques in Tunnel
- Better preparedness against Tunnel Related Natural Hazards

### Environmental and Social Impact

- Environmental and Social Impact Assessment of Tunnel and Underground Works and their Norms and Methodologies;

### Ventilation and Fire Safety in Tunnels

- Fire Safety Arrangement and Measures in Tunnels
- Challenges and issues in the fire protection of tunnels
- Tunnel ventilation system

### Contractual, Insurance aspects and Financing of Tunnel and Underground Projects

## CASE STUDIES

### INDUSTRY SPECIAL ASPECTS

In addition, the following Tunnel and Underground Industry special aspects will also be covered in the special session on industries special aspects will be presented by the sponsors during the conference.

### EXCAVATION

#### 1. Mechanised Tunnelling Equipment

##### *Tunnel Boring Machines*

##### **Drill and Blast Method**

#### 2. Roadheaders

- ❖ Use of road header in tunnel and underground construction
- ❖ Instrumented road headers
- ❖ Tool optimization
- ❖ Conquering different grounds

#### 3. Innovation in Equipments Used in Underground Excavation and Concrete Lining Concrete Pumps, Formwork, Rock Bolting - Rock Anchoring - Various other Equipments, Ventilation Fans and Instruments for Drilling, Mucking, Transporting Equipments, Concrete Lining ----- Underground Construction

#### 4. Materials

- ❖ Innovation in materials, segments and shotcrete
- ❖ Future development of shotcrete lining & associated methods
- ❖ Use of Fibres for fibre control

#### 5. Waterproofing

- ❖ Waterproofing for Tunnels and Underground Structures, Injections, Pre-grouting, Membrane Sheets, Spray-on Water Proofing Membranes
- ❖ Composite Tunnel Lining
- ❖ Contractual Aspects, Liability and Costs

### WHO SHOULD ATTEND?

The conference will be of interest to Tunnel Designers & Operators, Engineers, Geologists, Regulatory Bodies, Government Departments, Tunnel Building Contractors & Consultants, Suppliers of Products & Services for Tunnelling Construction, Fire Authorities dealing with Infrastructure Tunnels, Technical and Research Institutes, Universities dealing with Tunnelling, Organization & Associations active in the Tunnelling World Instruments manufacturers and Funding Agencies.

### CALL FOR PAPERS/CASE STUDIES

The papers/case studies on the subject are invited. Intending authors may send full text of paper(s)/case study(ies) as per the guidelines/ instructions given below so as to reach the Conference Secretariat by **15<sup>th</sup> September 2017**. The papers/case studies accepted for presentation will be notified immediately thereafter. Only original contributions that have not been published or presented at any other conference/symposium/seminar are acceptable, otherwise the paper will not be considered. The full length paper will be reviewed by the Technical Committee for oral presentation.

### GUIDELINES FOR PREPARATION OF PAPERS/CASE STUDIES

The paper/case study shall contain a descriptive, but brief title, name(s) and affiliation of the author(s), address for correspondence (including fax numbers and e-mail addresses), detailed information about the objective, methods, results and conclusion, to enable correct appraisal of the suitability of the proposed paper/case study for the Conference.

The full text of the paper/case study, **not exceeding 10 pages of A4 size**, in single space and 10 Point Normal Times Roman Font, both in MS Word and PDF, need to be sent through e-mail only at sunil@cbip.org. Only original contributions that have not been published or presented at any other forum are acceptable.

At the end of the references, the author(s) must furnish bio data not exceeding 100 words as per sample given below, along with a passport size coloured photograph:

"AAAAAA graduated in Civil Engineering from the University of PPPPPP in 1965. He obtained a Ph.D. in Civil Engineering at the University of QQQQQQ. From 1969 to 1980 he worked for RRRRRR, specialising in design and construction of gates at hydro plants. In 1980 he joined SSSSSS Company as Hydraulic Design Chief Engineer, where he

worked on civil aspects of the following hydro projects: xxxxx, yyyyyy and zzzzzz. From 1988 he has been Professor of Hydraulic Engineering at the University of GGGGGGG, where he specialises in analysis of model test procedures for hydraulic gates".

### SCHEDULE

- Submission of Papers

**15<sup>th</sup> September 2017**

- Intimation of acceptance of Papers

**30<sup>th</sup> September 2017**

### PROGRAMME

<b>11<sup>th</sup> October 2017</b>	
08:30 – 09:45 Hrs.	Registration
10:00 – 11:00 Hrs.	Inaugural Session
11:30 – 13:00 Hrs.	Plenary Session
14:00 – 15:30 Hrs.	<b>Technical Session I</b> – Planning, Investigation and Design of Tunnel, Cavern & Underground Projects
16:00 – 17:30 Hrs.	<b>Technical Session II</b> – Risk, Contract Management and Financing of Tunnel and Underground Projects
<b>12<sup>th</sup> October 2017</b>	
09:30 – 11:00 Hrs.	<b>Technical Session III</b> – Tunnel & Cavern Construction, Technologies, Equipment
11:30 – 13:00 Hrs.	<b>Technical Session IV</b> – Industry Special aspects <ul style="list-style-type: none"><li>• Conventional &amp; Mechanized tunneling equipment</li><li>• Materials</li><li>• Waterproofing</li><li>• Lighting</li></ul>
14:00 – 15:30 Hrs.	<b>Technical Session V</b> – Enviornmental and Social impacts, Safety issues including Ventilation
16:00 – 17:30 Hrs.	<b>Technical Session VI</b> – Innovative Techniques
17:30 – 18:00 Hrs.	Valedictory Session
<b>13<sup>th</sup> October 2017</b>	Visit to USBRL Project Site
<b>Morning Tea</b> : 1100 – 1130 Hrs. <b>Lunch</b> 13:00 – 14:00 Hrs. <b>Evening Tea</b> : 15:30 – 16:00 Hrs.	

### OFFICIAL LANGUAGE

The official language of the Conference is English.

### DATE & VENUE

The conference is proposed to be held on 11-13 October 2017 at Hotel Radisson Blu, Jammu.

### REGISTRATION

The registration fee payable by the delegates, including authors of papers, for participation in the conference is as follows:

Countries	Delegate/ Author	Research Student	Accompanying Person
India	Rs. 15,000*	Rs. 7,500*	Rs. 7,500*
Others	US\$ 700*	US\$ 300*	US\$ 300*
* GST @ 18.00% extra. 10% discount will be given to Members of CBIP, TAI and ISRM.			

### WORKSHOP

The objective of this workshop is to update the knowledge of tunnelling professionals, i.e., Engineers, Geologists and tunnel technician to understand the various issues & challenges being faced during investigations, design, construction and how they can be overcome.

### TOPICS

#### General

- Linkages between site investigation, design and construction
- Surface and sub-surface Investigation