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News & Views

Gotthard 2016 – Opening Event of World's Longest Rail Tunnel

A function was organized at Swiss Embassy, New Delhi, India on 1 June 2016 to mark the inauguration of 57.1 km long Gotthard base tunnel (GBT). The function was organized in parallel to the functions organized at North and South end of Gotthard base tunnel and other consulates on this day. The Chief Guest of the inaugural function was Hon'ble Mr. Suresh Prabhu, Railway Minister, Government of India. Railway Minister urged Switzerland for support so that the upcoming George Fernandes Institute of Tunnel Technology in Goa "bring-in best of knowledge" into the field as he congratulated the Swiss government on official opening of the world's longest and deepest rail tunnel today. In his address Hon'ble Minister also emphasized on the cooperation with Switzerland and other countries to make and upgrade Indian Railway into a world-class Railway system. Before the address of Mr. Suresh Prabhu, Dr. Linus von Castelmur, Ambassador of Switzerland to India and Bhutan, highlighted the salient features of GBT and shared how India has set ambitious targets for not only upgrading the railway network, but also in all spheres. He expressed Switzerland's view to share its hi-tech knowledge with India. The function was attended by more than 100 professionals, including scientists from CSIR-CIMFR Roorkee centre.

GBT has surpassed Japan's 53.9-kilometre Seikan tunnel as the world's longest train tunnel. The salient features of GBT are as follows:

The Tunnel at a Glance

Length:	57.1km
Official Opening:	1.6.2016
Entry into Service:	11.12.2016
North Entrance:	Erstfeld (475m above sea level)
South Entrance:	Bodio (321m above sea level)
End-to-End Travel Time:	20 minutes
Construction Time (without test drilling):	17 years
Workers and Technical Staff:	up to 2,400 people from around 15 countries divided into 3 teams working around the clock
Gotthard base tunnel cost (57.1km):	12.5billion CHF (CHF=Swiss Frank)

*(*Source: Pamphlet distributed at Swiss Embassy, New Delhi during Inauguration Event on 1.6.2016)*

Source: Editors, JRMTT

Vishnugad-Pipalkoti TBM Acceptance

Factory acceptance for the TBM bound for the 444MW Vishnugad-Pipalkoti hydropower project took place last week. The 9.86m-diameter Terratec hard rock double shield TBM will

excavate the 13km of tunnels for the project, which is located in the estate of Uttarakhand, around 500km northeast of Delhi.

Working for main contractor HCC, Seli Overseas will handle the tunnelling which passes through dolomitic limestone along one third of the drive and slates along two thirds of the drive. A 150m section of low overburden, five shear zones and three fault zones are known challenges.

The machine will now be dismantled and sailed up to Mundra Port in India, from where to send it by road up to the project site. The TBM is expected to commence its assembly at the jobsite in July 2016.

A spokesman for the manufacturer gave these details about the TBM's design, which involved input from Seli: "The critical zones will represent the most challenging ones and for that the TBM has been carefully designed. The cutterhead has a very robust yet versatile concept, mounting heavy duty 19" disc cutters but keeping twelve large bucket openings. The 4,200kW electric VFD main drive will allow the cutterhead to cut the hardest rock zones at the maximum speed of 6rpm and also to deliver an exceptional torque over 22,000kNm to cope with those fractured parts of the alignment."

Source: Tunnels and Tunnelling, 20.4.2016
(www.tunnelsonline.info/news)

Institute of Tunnel Technology at Goa, India

On the lines of Prime Minister Narendra Modi's pet project Make in India, Konkan railway is all set to establish the 'George Fernandes Institute of Tunnel Technology' at Margao, Goa, which would be the first of its kind in India and second in the world.

Union railway minster Suresh Prabhu on Oct. 23, 2015 laid the foundation stone for establishing of George Fernandes Institute of Tunnel Technology during the silver jubilee celebration of Konkan railway.

Konkan railway has experience in building tunnels which together amount to more than 120km. It has also drilled tunnels on the Mumbai-Pune Express way.

Konkan railway CMD Bhanu Prakash Tayal said that at present only Austria is conducting a course in tunnel technology and they are charging Rs. 600,000 for one year's course. "Many people are not able to go there," he said, adding that they want to make the institute under the Make in India campaign.

"This is the second institute in the world and we qualify because we have the experience and knowledge in IITs. Many people are retired and I want to get all the people together," Tayal said. In India so far 1000km tunnels have been constructed, 1500km tunnels are under construction and around 2000km tunnels are being designed, Tayal said adding that the institute will save a lot of money and project time will be reduced.

Constructing tunnels cost around Rs.100 crore per km. "If technology is there and expertise is also there, then around Rs. 20 crore can be saved on tunnelling per km," Tayal said, adding

that the institute will not only be focusing on transport sector but also on irrigation, hydro projects, defence, etc.

Tayal also said that the faculty in the institute would be from IITs, industries and local and foreign experts. He said that the institute will also help neighbouring countries as they also need to do tunnelling.

Prabhu announced Rs. 5 crore for the institute. He also said that in the next few years, the institute would be nationally and internationally recognized.

Source: The Times of India, 24.10.2015

Indorock 2016 – Sixth Indian Rock Conference

Indian Institute of Technology (IIT) Bombay, Mumbai alongwith Indian Society of Rock Mechanics and Tunnelling Technology (ISRMTT) have successfully organized Sixth Indian Rock Conference, 'Indorock 2016' at Indian Institute of Technology (IIT) Bombay, Mumbai on June 17 & 18, 2016. The Organizing committee of Indorock 2016 comprises of Er. A. B. Pandya, Organizing Chairman; Prof. T. N. Singh, Organizing Secretary; Prof. Vikram Vishal, Organizing Joint Secretary; Prof. Rajesh Singh, Coordinator and student volunteers who put their untiring efforts to make the event successful.

The theme of the conference was categorized into geomechanics in hydropower, underground infrastructure, underground technology for mining, and new developments. These themes were further categorized into many subthemes like tunnelling, case studies, risk management, landslides, recent trends, etc.

Indorock 2016 was inaugurated on June 17, 2016. The Chief Guest of the inaugural function was Er. A. B. Pandya, Chairman, Central Water Commission and President, ISRMTT, and the Guest of Honour was Prof. Manoj Arora, Director, PEC University of Technology, Chandigarh. The plenary lecture on rock mechanics in tunnelling was delivered by Er. A. B. Pandya.

During the conference, twelve keynote talks were delivered by eminent experts from the various parts of India including one by Dr. Rajinder Bhasin from NGI, Norway. These speeches covered a wide range of topics from rock mechanics, hydropower, and underground infrastructure to landslide monitoring, mining, and tunneling. There were around 120 abstracts and 100 full papers submitted in the conference covering almost all the topics of geo-mechanics and rock engineering. There were a total of nine parallel sessions on day 1 and twelve parallel sessions on day 2 including two discussion and brainstorming sessions on the 'role of industries'.

The conference was very well received by the participants as a valuable, knowledgeable and enjoyable one, particularly on learning the recent advances in rock mechanics as well as for networking with other fellow researchers. From a futuristic perspective, this conference provided a great opportunity to address its aims related to bringing together information about geotechnical, mining and underground excavation research and encouraging dialogue across the members of the geotechnical research and scientific community and the industry. The majority of delegates rated the conference as a whole to be 'very good' to 'excellent'.

The conference would have not been successful without the generous support of the sponsors. The golden sponsors for the event were the Ministry of Science and Technology, New Delhi, Ministry of Earth Sciences, New Delhi, Maccaferri Environmental Solution Pvt. Ltd. and Wapcos Ltd. The silver and other sponsors include Geobrugg Private Limited, Navayuga Engineering Company Limited, Dextra India Private Limited, GEO-Constech Pvt. Ltd., Beaver infra Consultants Pvt. ltd., Aimil Ltd., Complete Instrumentation Solutions Pvt Ltd, Progressive Machine Tools Limited, Pioneer Foundation Engineers Pvt. Ltd, Heico Hydraulic and Engineering Instruments, Sammon Infracorp Pvt. Ltd, Exploration Engineering Consultant (P) Ltd and R D Konsultants Pvt Ltd

The closing ceremony was organized in the afternoon on June 18, 2016. Dr. V. M. Sharma, Former Director, CSMRS, and Dr. Rajbal Singh, Former Joint Director, CSMRS were the Chief Guest and the Guest of Honour respectively for the closing ceremony of Indorock2016. The conference recommendations were also announced during the closing ceremony, which are as follows:

- Rock mechanics plays an important role in the development of hydropower projects, infrastructure development and other projects like underground storage of oil, nuclear waste repositories and mining engineering.
- Rock mass classification based empirical design approach is very much in use but these approaches shall not be used blindly, i.e. without actually taking the time element into consideration.
- We face lot of geological uncertainties in our projects, especially in the Himalaya. Therefore, to cope up this situation, it is recommended that around 3-4 percent of the project cost shall be used for engineering geological and detailed site investigations.
- With developments of new technologies like aerial electromagnetic (AEM) survey, for investigations using geophysical tools, it is recommended to make these techniques as part of geological and geotechnical investigations.
- Minimum 10 samples should be used from each variant of rock at a particular project site due to large scatter in the properties instead of 5 samples as recommended in BIS/ISRM standards. Indian standards need a review since they are old.
- Modulus of deformation of rock mass should be determined by large size plate jacking tests. Modulus values derived from empirical correlations/indirect methods should be used with caution.
- Of late, tunnels in many infrastructure projects are being constructed using NATM which is found to be suitable in lower Himalaya where rocks are weak and geology is quite varying. Monitoring is important for NATM to be successful, and should be made an integral part of the construction cycle.
- Instrumentation and monitoring shall be integral part of the contract document so that it is implemented with the desired spirit. It is recommended that 3 percent of the project cost shall be earmarked for the instrumentation and monitoring, analysis and interpretive report monthly basis.
- The ISRMTT will help the Government/private agencies for providing the Rock Mechanics/Geotechnical expertise for construction of deep underground cavities.
- In line with the Government of India skill development programme, it is recommended that ISRMTT should join hands with industry/user agencies to technically train the project engineers and geologists of various projects on various aspects of rock mechanics ad tunneling technology.

Source: Organizers, Indorock2016, IIT Bombay, Mumbai

Drive through Underwater Tunnel in River Krishna

India's newest state capital Amaravati will get an underwater tunnel in river Krishna, about three-km long, for vehicular traffic if the state government has its way. The detailed master plan for the upcoming capital envisages a transparent road tunnel from beneath the river connecting the administrative capital with Vijayawada, the commercial hub of Andhra Pradesh, India.

Once completed, it will be the first ever underwater road tunnel in the country. There are about 200 such tunnels around the world. The designers from Singapore have included the under-river tunnel in the detailed master plan for Amaravati which was released late on Saturday night.

The tunnel, which the AP government plans to project as a major tourist attraction, will come up near Ibrahimpatnam on the outskirts of Vijayawada. The backwaters of the Prakasam barrage in Vijayawada extend up to Ferry village near Ibrahimpatnam. Since the proposed tunnel is transparent, motorists using it can see aquatic life.

The underwater tunnel project was included in the detailed master plan following the advice of chief minister Chandrababu Naidu. The capital city core area will be linked to river bank on the Vijayawada side.

Incidentally, the Union shipping ministry recently launched a feasibility study on two such tunnels. While one of the tunnels connects Kakdwip and Sagar Island in West Bengal, the other links Chatham and Bamboo Flat in Andaman Nicobar islands. The Centre has already handed over the task of studying the projects to the National Highways and Infrastructure Development Corporation Ltd (NHIDCL). Subsequently, NHIDCL has called for tenders from consultants to prepare the techno-economic study of both the tunnel stretches.

Sources said the AP government will soon approach the Centre seeking approval for the tunnel in the river Krishna. Officials argue that an underwater tunnel costs less than an overbridge.

Source: The Times of India, 28.12.2015

Going Veg could Prevent 8 million Deaths by 2050

A global switch to diets that rely less on meat and more on fruit and vegetables could save up to 8 million lives by 2050, reduce greenhouse gas emissions by two-thirds, and lead to healthcare related savings, says new research at the University of Oxford.

Switching diets could also avert climate-related damage of $ 1.5 trillion, researchers from the Oxford Martin School found.

The study published in the journal Proceedings of the national Academy of Sciences, is the first to estimate both health and climate change effects of moving towards more plant based diets for all major world regions, a statement from the university said.

They found that adopting diets in line with global dietary guidelines could avoid 5.1 million deaths a year by 2050. Even greater benefits could come from vegetarian diets (averting 7.3 million deaths) and vegan diets (averting 8.1 million deaths).

The researchers also modelled the economic benefits of dietary change and found they could save $ 700 billion to $ 1,000 billion a year on healthcare.

Source: Hindustan Times, 24.3.2016

Dubai to Get New Tower Taller than Burj Khalifa

Dubai is reaching for the sky once again, with the developer of the world's tallest building vowing on Sunday to build an even taller tower bedecked with rotating balconies the elevated landscaping inspired by the mythical hanging gardens of Babylon.

The government-backed company behind the project, Emaar Properties, hopes the new tower will entice a fresh wave of view-seeking homeowners even as it raises numerous other promised skyscrapers and repairs a prominent one gutted by fire on New Year's Eve.

Company chairman Mohamed Alabbar said the new observation tower would be "a notch" taller than the 2,717-foot Burj Khalifa. Just how much taller he wouldn't say. Unlike the Burj Khalifa, the new $1 billion tower will not be a traditional sky-scraper but more of a cable-supported spire containing "garden" observation decks graced with trees and other greenery. Emaar said it will also contain a boutique hotel, restaurants and glass balconies that rotate outside the wall of the tower.

The structure's design means it is unlikely to be widely recognized as a taller "building" than the Burj Khalifa even if it surpasses it in height.

The Chicago-based Council on Tall Buildings and Urban Habitat, for example, says at least 50% of a structure's height must contain usable floor area for it to be considered in its ranking of the world's tallest buildings. That typically disqualifies telecommunications and observation towers that have only a small number of floors.

It and the Burj Khalifa could also be surpassed by a skyscraper being built in Jiddah, Saudi Arabia, that promises to rise more than 1 km high.

The new Dubai tower will be the centerpiece of a new 6 square-kilometre development on the edge of the Dubai Creek, near a protected wildlife sanctuary that regularly attracts flamingoes and other water birds.

Alabbar likened the structure, designed by Spanish-Swiss architect Santiago Calatrava Valls, to a 21st century Eiffel Tower that can act as a magnet not just for tourists but also for property buyers willing to pay a premium for nearby apartments with a view. It is due to open by the time Dubai hosts the World Expo in 2020.

"Many of our customers would like to have that view. And if you ask me what is the financial model, that is the financial model," he said.

Emaar followed a similar strategy when it raised the Burj Khalifa, which opened in 2010.

Source: Hindustan Times,11.4.2016

IGS Roorkee Chapter

The brain storming session on the theme 'Assessment of Engineering Properties of Rock Mass for Rock Engineering Applications' was held in the Cautley room of Department of Civil Engineering at IIT Roorkee on 27.9.2015 at 15.00 hrs. The session was attended by Prof. T Ramamurthy, Chairman, Prof. T.G. Sitharam, Convener, Prof. Bhawani Singh, Special Invitee, Prof. K.S. Rao, Member, Dr. R.K. Goel, Special Invitee, Dr. Rajbal singh, Special Invitee, Prof. M.N. Viladkar, Dr. Mahendra Singh and Dr. N.K. Samadhiya, Members of the Technical Committee.

A base document was prepared and presented by Dr. Mahendra Singh. The convener requested all the members in turn to give their opinion regarding various aspects to be included in the guidelines. In addition, presentations were also made by Prof. T.G. Sitharam, Dr. Rajbal Singh and Dr. R.K. Goel. The contributions prepared by Prof. T. Ramamurthy, Prof. K.S. Rao and Prof. Bhawani Singh were also circulated. The session continued for more than three hours. Some of the important decisions made during the session include the followings:

i. In future, attempts should be made to invite some design engineers also in the meeting so as to seek their opinion.
ii. The theme shall be re-worded as "Guidelines for Assessment of Engineering Properties of Rock Mass for Rock Engineering Applications"
iii. Limitations of the empirical correlations to be used for estimation of design parameters for design purpose be highlighted for their judicious use.
iv. Major projects should necessarily involve field testing.
v. The members were of the opinion that it should become mandatory to spare some percentage of the project cost for geological and geotechnical field investigations (5% of the total project costs in case of small projects and 2% of the total project cost in case of large projects).
vi. Similarly, the field instrumentation and monitoring of critical structures should also be made mandatory for which a sum of 3% of total project cost be set aside.
vii. Experts should be involved, especially, at the time when the field tests are conducted.

Source: IGS News, Vol.47, No.4, 2015

India's First Bullet Train between Mumbai and Ahmedabad!

India has bitten the bullet with a historic agreement on building the country's first high-speed rail corridor linking 505 km between Mumbai and Ahmedabad at an estimated cost of ₹ 988,050 million or $ 18.6 billion signed on Dec 12, 2015 in the presence of Prime Minister Narendra Modi and his Japanese counterpart Shinzo Abe.

Addressing a joint press conference with Abe, Prime Minister Modi said that the Japanese premier's "extraordinary package of approximately $ 12 billion on easy terms and technical support for the project was greatly appreciated".

Describing the high speed agreement with Japan as a "historic decision" that would scale up rail operations in India, Modi said that "no friend would matter more in realizing India's economic dreams more than Japan. He described Abe as a "personal friend and a great champion of India-Japan partnership".

Welcoming the signing of a memorandum on technological cooperation in the railways sector, the two Prime Ministers noted in a joint statement that India's rail modernization and expansion plans open up commercial opportunities for Japanese companies in high speed rail, station re-development and rolling stock manufacturing.

In its feasibility report submitted in July 2015, the Japan International Cooperation Agency (JICA) indicated to a seven year construction plan (2017-23) for the high speed corridor. Contrary to certain opinions expressed in the Indian establishment favoring the Broad Gauge option for building the line on grounds that this would provide for inter-operability, JICA has recommended that the project be taken up on the internationally accepted "Standard Gauge".

Tickets are expected to be priced one and a half times higher as compared to the AC-I fares of the premier Rajdhani trains, officials said.

The Japanese "tied loan" for the project - which is said to have been offered at an interest rate as low as 0.1% - comes with the precondition that 30% equipment will be purchased from Japanese firms.

The high speed line will have an embankment construction of 318 kilometers, with 162 kilometers of viaducts and 11 tunnels with a total length of 27.01 kilometers. Of these, a 2.16 kilometer long undersea tunnel is proposed to link Mumbai with the Thane Creek.

Once the line is built, travel distance between the two cities will be reduced from the existing seven and a half to two hours flat, with 12 train stoppages with maximum stoppages of 2 minutes each at Surat, Vadodara and Ahmedabad.

Source: Hindustan Times, 13.12.2015

Proposed River Links

The inter-basin water transfer links that India is working on are as follows:

- Kosi-Mechi
- Kosi-Ghagra
- Gandak-Ganga
- Ghagra-Yamuna (completed)
- Sarda-Yamuna (completed)
- Yamuna-Rajasthan
- Rajasthan-Sabarmati
- Chunar-Sone Barrage
- Sone Dam-Southern tributaries of Ganga
- Manas-Sankosh-Tista-Ganga
- Jogighopa-Tista-Farakka (Alternate)
- Farakka-Sunderbans
- Ganga (Farakka)-Damodar-Subernarekha
- Suberrnarekha-Mahanadi

Source: Hindustan Times, 9.2.2016

Bringing Sikkim Closer

Northeast Frontier Railway (NFR) has begun construction of the North Bengal-Sikkim Railway Link, a 52.7km stretch of track that will connect Sevoke, North Bengal, to Rangpo, Sikkim. The broad gauge rail line (5ft 6in) has a proposed 65km/hr speed limit. The rail link will pass through the steep terrain of the Kanchanjungha mountain range foothills and the Teesta river valley. About 32km (60%) of the route will have to be built in tunnels. Once operational, it will be the first time Sikkim has been connected to the main Indian rail network, and as such is expected to boost local tourism and the region's economy. The project has following features:

Number of bridges and tunnels:	28 bridges, 14 tunnels
Length of longest tunnel:	5.1 kms
Original deadline of completion:	December 2015
Stuck because:	Clearance, since it goes through protected forest land
Between:	Sevoke in Bengal and Rangpo in Sikkim
Estimated cost:	More than ₹ 1,339/- crore
Strategic value:	Since Sikkim shares border with China, the rail link will enable military movement to the region in short times.

Source: Hindustan Times, 4.2.2016

The World's Big Donors

Bill Gates:	Founder, Microsoft, Lifetime donations $ 27 bn, 32% of net worth
Warren Buffett:	Chairman Berkshire, Lifetime donations $ 21.5 bn, 32 % of net worth
George Soros:	Founder Soros Fund, Lifetime donations $ 8 bn, 35 % of net worth
Azim Premji:	Chairman Wipro, Lifetime donations $ 8 bn, 50% of net worth

Source: Hindustan Times, 22.4.2016

Humour

- Compound interest is the eighth wonder of the world. He who understands it, earns it. He who doesn't, pays it.

- Albert Einstein

- A good politician is the one who takes whole credit of work done by all others and passes on blame of failure to all others.
- Wise persons learn from each other when they meet. Fools starts quarrelling with each other whenever they meet.

- Proverb