

शुभ दीपावली  
Happy Deepawali



# BUILT ENVIRONMENT

BI-MONTHLY PUBLICATION OF INDIAN BUILDINGS CONGRESS



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## From President's Desk



Of the 17 UN Sustainable Development Goals, Goal 7, 11 & 12 are very prominent and relevant to the real estate sector in the construction industry.

**Goal 7, Affordable and Clean Energy:** Energy is the dominant contributor to climate change, accounting for approximately 60% of total global green house gas emission. While this goal is specific in its commitment to ensuring access to affordable, reliable and modern energy services, it also targets improvement in energy efficiency.

**Goal 11, Sustainable Cities and Communities:** Rapid urbanization stresses natural resources. It also creates parity between communities. Half the World population lives in cities today. This goal promises to mark urban habitats safe, inclusive, resilient, sustainable and affordable. It pays special attention to persons with disabilities and the need for accessible infrastructure in an inclusive society.

**Goal 12, Responsible Consumption and Production:** Consumption drives production and vice versa, which, in turn, drives the global economy. This goal targets the use and scientific management of natural resources. Material efficient strategies, such as a minimalistic approach to design and material recycling, are encouraged. Responsibly sourced materials that do not damage the environment are key to achieve this goal.

At the COP26 summit in Glasgow on climate change in November-2021, India pledged to cut India's total projected carbon emission by 1 billion tonnes by 2030, reduce the carbon intensity of the nation's economy by less than 45% by the end of the decade and net-zero carbon emissions by 2070. The emission control commitments made by India are expected to benefit the country in the long term with new technologies in energy efficiency, carbon reduction and green fuels. Ambitious targets for COP26 open massive investment opportunities across segments like real estate, renewables, the EV ecosystem, ethanol blending, improvement in energy efficiencies and carbon capture technologies.

India has a long road ahead to reach net zero carbon by 2070, and will need to start with smaller steps. Emissions and climate impacts will soon be significant drivers of the value and performance of real-estate assets. These impacts can manifest in both positive and negative ways for the value of a given real-estate asset.

On the positive side, real estate can help companies meet their emissions reduction targets and buyers/ tenants will likely make greater investment in climate-ready real-estate assets because of the long-term savings that stem from mitigating climate and regulatory risk. Insurance costs, utility costs, and other costs (such as for repairs and maintenance) could decrease in such buildings due to better physical resilience. In turn, the value of these assets could be higher because of more attractive income and operating-cost profiles. As a corollary to these direct impacts on property net operating income (NOI), as investors look to decarbonize and reduce the climate risks in their portfolios, the attractiveness of assets will vary based on their emissions and risks, and capitalization rates will reflect this.

Conversely, buildings with higher emissions profiles will decrease in value over time, as industry players comprehend, account for, and report on climate-related risks. Insurance costs, utility costs, and other operating costs may be higher in these properties.

As the Great Repricing unfolds, opportunities will arise for real-estate players that understand how climate factors affect their portfolios and asset values and can respond in ways valued by tenants, lenders, and investors.

Climate responsiveness is becoming a new basis for differentiation across the value chain in real estate. Companies that create reporting systems to support tenants, lenders, and investors in meeting their disclosure requirements will be more attractive as partners and landlords. Companies and Landlords that help occupiers lower emissions through refurbishment, lower-carbon building systems, and ancillary ways such as solar-energy generation or electric-vehicle charging may gain a competitive edge by offering these value-added services.

Therefore, real estate sector has a bigger role in fulfilling the Nation's emission control commitment made in COP26 summit in Glasgow on climate change, for ensuring the safer, cleaner and sustainable environment for the physical, social and economical health of the society as a whole.



(Vijay Singh Verma)

# V.R.Vaish Memorial Lecture on 'Sustainability in Buildings and Built Environment' and Seminar on "Innovation in Cement & Concrete Technologies" in celebration of 31<sup>st</sup> IBC Foundation Day



Dignitaries on Dais

As part of celebrations of its 31<sup>st</sup> Foundation day, Indian Buildings Congress organized V.R.Vaish Memorial Lecture on 'Sustainability in Buildings and Built Environment' and a Seminar on the topic "Innovation in Cement & Concrete Technologies for Durable Structures" at 11.00 AM on 2<sup>nd</sup> September 2022, in Seminar Hall of Indian Buildings Congress HQ Building at R.K.Puram, New Delhi. Large number of participants from the Construction Industry attended the Programme. Eminent Speakers connected with the construction industry delivered their lecture and presentation on the occasion.

The Programme started by welcoming the dignitaries on the dais followed by lighting of ceremonial lamp.

After lighting the Ceremonial lamp, floral tributes were paid to Late Shri V.R.Vaish, a renowned Engineer of eminence and an outstanding personality in the field of Engineering.



Floral Tributes being offered to Late Shri V.R. Vaish



Lighting of Ceremonial Lamp by the Dignitaries

Shri V.S.Verma, President, IBC in his address welcomed Shri O.P.Goel Founder President, IBC; Shri Sanjay Pant, Deputy Director General (Standardization), BIS; Sh. Pranav Desai, V.P, R&D & head CDIC, NUVOCO; Ms. Smidha Pathak, R&D Manager, CIDC, NUVOCO; Shri Himangshu Rai Vaish S/o Late Shri V.R.Vaish and CMD of Insta Power; former Presidents IBC; EC & GC Members, all other family members of Late Shri V.R.Vaish; Shri V.R.Bansal, Honorary Secretary, IBC; viewers and audiences, present in the event

The President, IBC in his welcome address briefed about the professional journey of late Shri V.R.Vaish, E-in-C (Retd.), CPWD, his contribution to the construction industry and to the IBC. The President IBC further informed that throughout his life, Shri Vaish had worked for the National Development, Engineering Profession and the society. He was associated with Indian Buildings Congress from the very beginning,



Shri V.S.Verma, President IBC, delivering his Welcome Address

and had actively participated in its activities and made outstanding contribution to its development.

He further informed that Shri Vaish was true Karmayogi. Truly in line with the path of Karmayog shown by late Shri V.R.Vaish, the IBC is engaged in the field of Built Environment through its diverse professional activities which include dissemination of knowledge through technical reports, journals, Bi-monthly magazines, Seminars, webinars and conferences. The President also brought out the importance of sustainability in the construction, maintenance & operation of the structures and the innovations in the manufacture of Cement and Concrete to meet the exponentially rising demand keeping in view the sustainability requirement and environmental concern to contain the CO<sub>2</sub> emission.

Shri O.P.Goel, founder President, IBC and former DG(W), CPWD, while speaking on the occasion informed that IBC was conceived as a professional body to bring all stake holders in built environment at one platform. During its last 30 years of journey, IBC has met its objectives largely. He expressed his happiness to have associated with the activities of IBC expressed his appreciation for the work put in by successive office bearers and contribution by the members in development of IBC.

He expressed that it was his proud privilege to be speaking on the programme of V.R.Vaish Memorial lecture. He informed that “born on 23rd September, 1920, late Shri V.R.Vaish, completed his engineering at the age of 20 from the then outstanding Institution,

“Thompson College of Engineering, now IIT Roorkee”. Shri Vaish secured first position in the aggregate and also in many subjects. He also got the award for best student in studies and games combined. He worked in CPWD from 1942 to 1979 a span of 37 years.

Shri Goel recalled memories of his association with late Shri V.R.Vaish. He spoke at length about meticulous functioning and monitoring methodology of Late Shri Vaish which is worth emulating by all of us. He informed that Shri Vaish had a very sharp memory. He used to call him daily to ascertain the availability of cement which was in short supply in those days. His method to monitor the outstanding quality control and audit paras for ensuring their timely disposal was unique. He used to examine the estimates in great



Shri O.P. Goel, Founder President IBC, delivering his speech

details and would go into each calculation of the detailed estimate. His method of monitoring works, audit paras, pending bills, EIs, SIs, CTEs para etc. was outstanding and huge pendency in this direction was cleared during his time.

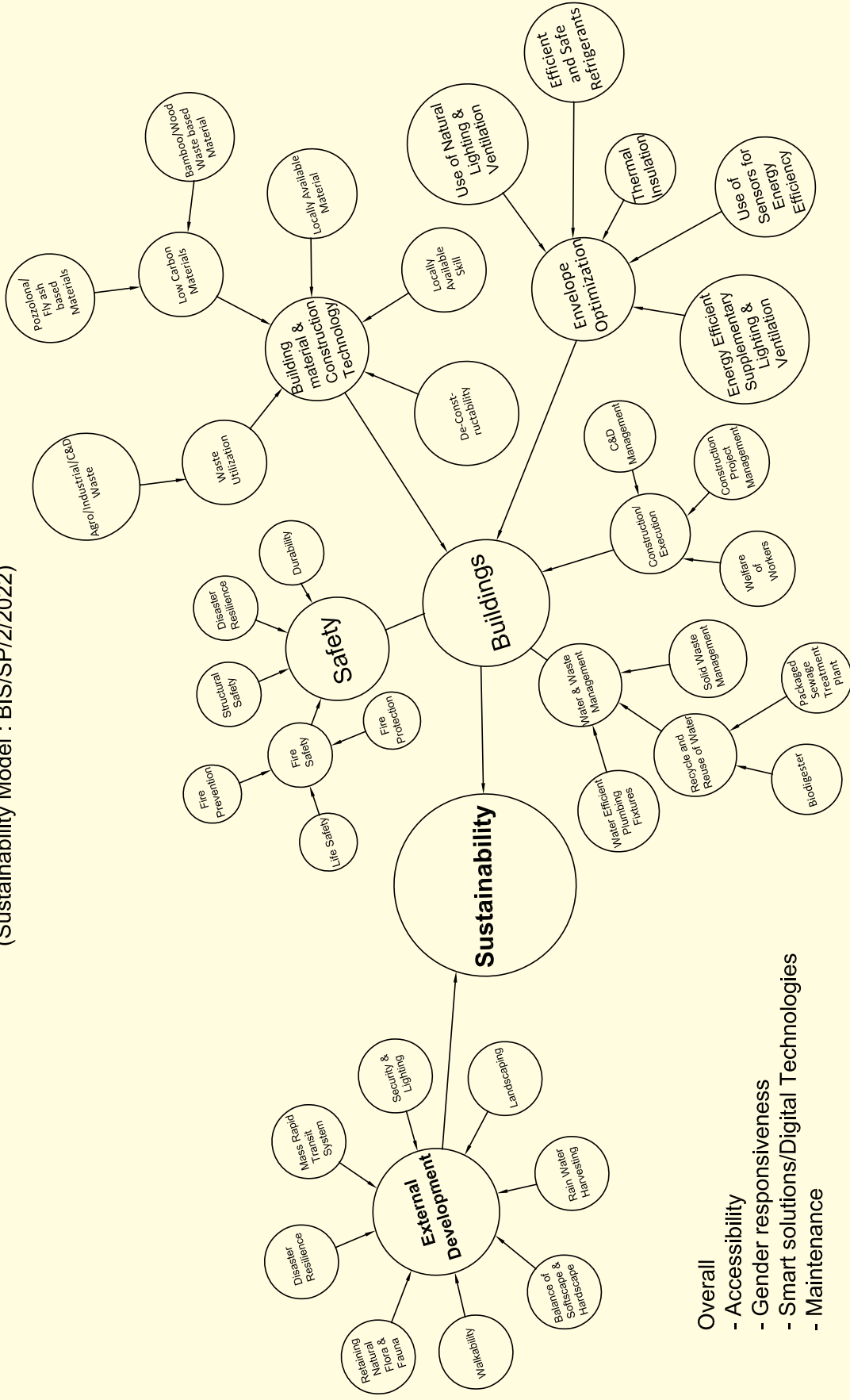
He worked for the National Development, welfare of Engineering fraternity and society. Shri Goel, desired all to resolve to follow the ideals of late Shri V.R.Vaish in our functioning.

Shri Sanjay Pant, Deputy Director General (Standardization), BIS detailed out the need of ensuring sustainable building construction industry.

For ensuring sustainability he emphasized to incorporate the same in envelope optimization in planning of the building to ensure energy efficiency, building material and construction technology in using low carbon materials, locally available skills & materials, agro/Industrial/C&D Waste utilization, solid waste management, Bio digester, packaged sewage treatment plant, water efficient materials and plumbing fixtures, fire safety & protection, structural safety, disaster resilience, durability, retaining of natural

# Sustainability in Buildings and Built Environment

(Sustainability Model : BIS/SP/2/2022)



- Overall**
- Accessibility
  - Gender responsiveness
  - Smart solutions/Digital Technologies
  - Maintenance

flora and fauna, MRTS, security lighting, landscaping, rainwater harvesting, walkability, welfare of workers etc. For ensuring the sustainability in construction



**Shri Sanjay Pant, DDG (Standardization), BIS,  
delivering the V.R.Vaish Memorial lecture**

industry, he emphasized the importance of overall accessibility, gender responsiveness, smart solutions/digital technologies and maintenance of buildings.

He informed that around 40% of the world's energy resources are used in our buildings – both residential and commercial. Estimates show that the use of electricity contributes approximately 70% of total greenhouse gas emissions due to our reliance on coal power. Passive design principles including thermal mass, external shading, building orientation, cross ventilation and better insulation in buildings lead to less reliance on energy hungry mechanical systems to maintain comfortable internal temperatures. Using renewable energy further reduces a building's environmental impact. Good building design decreases power consumption, saves money and reduces the effects of climate change. On the other hand, poor building design is uneconomical and contributes to greenhouse gas emissions.

He stressed that placement of windows also plays a major role in energy saving. The positioning and size of windows impacts on the amount of artificial lighting required during daylight hours. To maximize light ingress, it is preferable to use clear glazing. You can use highlight or roof windows to increase lighting levels in buildings with deep floor plans. He suggested for careful study of the location of the project. Is there the chance of overshadowing from neighbouring buildings? If so, the designer should consider how to overcome any potential problems through clever window placement or reorienting the building.

He suggested for trying to cluster heated rooms together. Separate rooms with doors and apply internal insulation to walls adjacent to non-heated rooms. For example, adjoining garages and storage areas can be just

as cold as the temperature outside. "Thermal mass (e.g. exposed concrete floor) can store and release heat in winter when exposed to direct sun. In summer, thermal mass can assist with passive cooling by releasing the stored heat at night through effective means of ventilation (night purging).

He further informed that sustainable construction not only mean improved health for the people who use the buildings, it also has been shown to improve workers productivity during construction due to better surroundings, work environments, and noise protection. He advocated for selection of sustainable construction materials and products by evaluating several characteristics such as reused and recycled content, zero or low off gassing of harmful air emissions, zero or low toxicity, sustainably harvested materials, high recyclability, durability, longevity, and local production. Ensure habitable rooms do not rely on artificial lighting throughout the day. Install energy efficient artificial lighting, including sensible lighting controls. Consider renewable energy production for a proportion of water heating, space heating and electricity demands.

Shri Pranav Desai, VP R&D and Head Construction Development and Innovation Centre (CIDC), Nuvoco Corp. Ltd., made a detailed presentation on the innovation in Cement and Concrete. He informed that due to the boom of infrastructural installations around the world and the maintenance costs which have developed in the meantime for the repairing & rehabilitation of structures, a pronounced consciousness need to be developed for improving the quality.



**Shri Pranav Desai, VP R&D and Head CIDC, Nuvoco Corp. Ltd.  
making his presentation**

He further informed that industries are looking for the customized concrete which are extremely light weight having better strength, flexible structures and also features like high heat and electrical conductivity properties. From more environmental friendly mix methods of concrete that can literally heal itself;



new concrete technology offers seemingly limitless possibilities to the future of construction. There has been remarkable developments in the technology of cementitious materials, mineral additions and admixtures, coupled with advances in production methods, which have led to a wide range of high performance concrete that can provide cost-effective, environmentally sound solutions for the most demanding applications. He gave a detailed account of technologies like Void reduction, hydrophobisty and reducing water demand being adopted for meeting the specific demand of customers.

For meeting the specific need of construction, he made a presentation on blended cements like micro fibre cement, Hydrophobic cement, low carbon cement, limestone calcined cement, Portland lime cement and the benefits accrued to the construction industry in the form of low CO<sub>2</sub> emission, higher utilization of waste materials like slag and fly ash for ensuring the sustainability.

Ms. Smidha Pathak, R&D Manager, CDIC, Nuvoco Corp. Ltd., made a presentation on innovations in Concrete. In her presentation, she deliberated upon composition, applications, and benefits of ready to pour non-shrink packed wet micro concrete, dry mix packed concrete, self-compacting, self-levelling & free flowing concrete, low density, thermal insulative concrete, lightweight structural concrete, high flow cohesive concrete, low strength easily pumpable concrete, crack resistant concrete, concrete with longer retention upto 6 hours, concrete with reduced thermal cracks etc.



Ms. Smidha Pathak, R&D Manager, CDIC, Nuvoco Corp. Ltd., making her presentation

Keeping in view the fact that our country is signatory to the UN resolution on Sustainable development Goals, the participants appreciated the innovations in cement and concrete which will go a long way in achieving the targets set for reduction in CO<sub>2</sub> emission to ensure sustainability.



View of Audience

The questions raised by the audience on different types of innovations in cement and concrete were also replied by Sh. Pranav Desai and Ms. Smidha Pathak.



Shri Himangshu Rai Vaish, expressing his gratitude and thanking IBC

Shri Himangshu Rai Vaish, son of Late Shri V.R. Vaish and CMD of Insta Power in his speech expressed his gratitude to the speakers on the occasion and thanked the IBC for arranging the V.R.Vaish Memorial lecture.



Shri V.R. Bansal, Hony. Secretary presenting his Vote of Thanks

At the end of the lecture and Seminar, Shri V.R.Bansal, Honorary Secretary, IBC proposed the Vote of Thanks.

## Gallery showing Welcome of the dignitaries during V.R.Vaish Memorial Lecture



Sh V.S. Verma, President, IBC being welcomed



Sh. O.P. Goel, Founder President, IBC being welcomed



Sh Sanjay Pant, DDG (S) BIS being welcomed



Sh. Pranav Desai, V.P, R&D & head CDIC, NUVOCO being welcomed



Ms. Smidha Pathak, R&D Manager, CDIC, Nuvoco Corp. Ltd. being welcomed



Sh. V.R. Bansal, Hon. Secy., IBC being welcomed



Sh. Anant Kumar, EC members, IBC being welcomed



Sh. Himangshu Vais, M.D., Insta Power Ltd. being welcomed



Maj. Gen. Ashok Kumar, V. P. , IBC being welcomed



Sh. Rajiv Bansal, IAS being welcomed

## **IBC Delegation meets Shri Shailendra Sharma, Director General, CPWD**

A delegation of Indian Buildings Congress (IBC) consisting of Shri Vijay Singh Verma, President, IBC; Shri Anant Kumar, E-in-C, Delhi PWD and Executive Member, IBC and Shri V.R.Bansal, Honorary Secretary, IBC called upon Shri Shailendra Sharma, Director General, CPWD in his office at Nirman Bhawan on 03.10.2022. The Director General, CPWD warmly welcomed the IBC delegation.

President, IBC greeted the DG, Shri Shailendra Sharma by presenting him a Plant. President also presented him a set of IBC periodicals and briefed about the activities of IBC.

Sh. V.S. Verma then discussed about the decision of CPWD to withdraw from the Institutional Member of IBC. He stressed that CPWD is the founding member and an Institution with the maximum individual members of IBC who have been till date providing the core strength to IBC. He requested the DG to review the decision of withdrawal of CPWD from the Institutional membership of IBC. DG assured to get the matter looked into positively and promised his best possible efforts.

At the end, Honorary Secretary, IBC thanked the DG, CPWD for sparing their valuable time for IBC delegation and for their positive approach in various IBC activities.

## **IBC Delegation meets Lt. Gen. Harpal Singh, PVSM, AVSM, VSM, ADC, Engineer-in-Chief, MES**

A delegation of Indian Buildings Congress (IBC) consisting of Shri Vijay Singh Verma, President, IBC; Maj. Gen. Ashok Kumar, Vice President, IBC & Director General (W) E-in-C Branch, MES and Shri V.R. Bansal, Honorary Secretary, IBC paid a customary visit to Lt. Gen. Harpal Singh, PVSM, AVSM, VSM, ADC, Engineer-in-Chief, MES in his office at Kashmir House, New Delhi on 03.10.2022.

The E-in-C, MES offered a warm welcome to the IBC delegation. The President, IBC also felicitated the E-in-C by offering him a floral bouquet. A set of IBC periodicals was also presented to him by the President, IBC.

President briefed E-in-C, MES about the various activities undertaken by IBC and solicited his support in the strengthening the IBC. During the discussions, it was informed that MES is doing the important work in adoption of innovative technologies and IT enabled software e.g. cloud-computing etc. in designing planning and monitoring various projects from conception to completion stage.

It was discussed to explore the feasibility of MES & IBC coming together to organize a Seminar on cloud computing. The E-in-C personally assured the IBC of all possible help in the endeavor.

## **IBC Stall in 81<sup>st</sup> IRC Session at Lucknow**

Indian Buildings Congress (IBC) participated actively in 81<sup>st</sup> Annual Session of the Indian Roads Congress (IRC) held at Lucknow (Uttar Pradesh) between 8<sup>th</sup> to 11<sup>th</sup> October, 2022. IBC was allotted a complementary stall in the Exhibition by Uttar Pradesh PWD, where for dissemination of knowledge as well as recognizing the notable works by building professionals associated with Built Environment were displayed through various pictures including activities being undertaken by IBC, journey of IBC from inception to present day. IBC periodicals and selected IBC publications were also displayed and offered for sale.

IBC stall generated great interest amongst the visitors and there was a large foot-fall from delegates of the session who all showed their keen interest in the activities of IBC. Many professionals showed their willingness in taking membership of IBC as well as its publications. Eleven members submitted the form on the spot along with payment of membership fee.

The co-operation extended by the local officials of the Railways as well as UP Engineers Association is duly acknowledged.

## **Hony. Secy., IBC Meets Chief Works Manager (BW), Northern Railways**

Shri V.R. Bansal, Hony. Secretary, IBC called upon to Shri Rakesh Kumar, Chief Works Manager (CWM) Railways, Lucknow in his office on 08.10.2022 of activities. In the meeting, he briefed about the IBC. Shri Rakesh Kumar showed keen interest and offered his full support in the activities of IBC including membership drive. Shri V.R. Bansal thanked him for the support extended to the IBC team at Lucknow.

## **Hony. Secy., IBC Meets DRM (Lucknow), Northern Railways**

Shri V.R. Bansal also paid a courtesy visit to Shri S.K. Sapra, DRM, Northern Railways, Lucknow on 11.10.2022. Sh. Bansal presented Sh. Sapra a copy of the IBC periodicals and briefed him of the activities of the IBC. Shri Sapra informed that he was well aware about IBC and the work being done by it as he himself is a Life Member of IBC since long and has also presented a Paper in one of the Seminars of IBC. Shri Sapra assured to give full support to IBC activities and launch membership drive.

## Activities of State /Local Chapters

### Rajasthan State Chapter - Jaipur

#### Chapter Meeting

IBC Local Chapter Jaipur's meeting was held on 25.08.2022 at 11:00 AM in the Meeting Hall, Rajasthan Housing Board office under chairmanship of Sh. C. L. Verma, President, IBC Local Chapter Jaipur. Sh. K.C. Meena, Chief Engineer, Rajasthan Housing Board & Vice President, IBC and Sh. Chinhari Meena, Secretary



Meeting in Progress

PWD, Rajasthan also graced the occasion.

Following issues were deliberated in the meeting

1. To enhance the membership of IBC specially institutional membership of JDA, RSRDC, Builders, Practicing Architect and students / academicians of various engineering colleges of Jaipur
2. To send a request to competent authority to allot office accommodation for local center preferably at Rajasthan Housing Board.
3. To have regular interactive meetings / seminars especially at Engineering Colleges for the benefit of the students.

Meeting ended with vote of thanks by Sh. Nagesh Chand Sharma, Secretary, IBC Local Chapter Jaipur.

### Tripura State Chapter - Agartala

#### 16<sup>th</sup> Annual General Meeting

16<sup>th</sup> Annual State Conference of IBC Tripura Chapter was held on 4<sup>th</sup> Sept., 2022 (Sunday) at PWD Conference Hall, Netaji Chowmuhani, Agartala. The Annual Conference was divided into five different sessions.

In the 1<sup>st</sup> Session the usual business of AGM of State Chapter was transacted in the morning hours. Er. Saibak Kr. Nandi, Chairman, Indian Buildings

Congress, Tripura Chapter welcomed all the members and delivered his welcome address. In the AGM, minutes of 15<sup>th</sup> AGM held on 19<sup>th</sup> Sept., 2021 were confirmed, Annual Report for the year 2021-2022 was passed and the audit account for the year 2021-2022 were approved unanimously by the members present. In the AGM the existing Auditor M/s TK Saha & Co. was also reappointed for the financial year 2022-2023 at the existing rate of remuneration.

New Executive Committee for the year 2022-2023 was also constituted as per detailed below:-

Chairman-Er. MS Roy, CE (Retd.), ONGC; Vice Chairmen- Er. Rati Ranjan Debnath, EE, PWD, Er. Sibasish Bhattacharyya, Director (Retd.), JSS; Secretary- Er. Biswajit Das, EE, PWD; Asstt. Secretaries- Er. Nirmal Debnath, JE, PWD, Er. Abhijit Debroy; Asstt. Lecture, TIT; Treasurer- Er. Nayan Kr. Bhouamik; Asstt. Treasurer- Er. Bijoy Kr. Deb, JE, PWD and Executive Members-Er. Biswajit Ghosh, JE, PWD, Er. Supriya Datta, AE, PWD and Er. Dilip Pal, AE, PWD

In the meeting the members discussed the various issues for future betterment of IBC Tripura Chapter. AGM ended by presentation of Vote of thanks by Er. Rati Ranjan Debnath Vice Chairman, IBC Tripura Chapter.

#### Inaugural Session

In the 2<sup>nd</sup> Session, Shri Sushanta Choudhury, Hon'ble Minister for information & Cultural Affairs, Youth Affairs and Sports, PWD (DWS), Govt. of Tripura who was Chief Guest of the Session inaugurated the programme by lighting of ceremonial lamp. Welcome Address was delivered by Er. Biswajit Das, Secretary, IBC, Tripura Chapter.

In the programme, Presidential Address was delivered by Er. Saibak Kr. Nandi, former Chairman, IBC Tripura Chapter. Er. Shyamlal Bhaumik, Chief Engineer, PWD (DWS) delivered technical speech. IBC Souvenir was released by the Hon'ble Minister and other dignitaries on dais. Mementos were presented to the evaluators of skill development programme by the Hon'ble Minister. To mark the occasion mementos were also presented to the dignitaries on dais. The Inaugural ceremony was ended by recital of National Anthem.

## Technical Session

3<sup>rd</sup> Session was technical session which was Chaired by Er. R. Dasgupta, former CE, PWD. During the technical session, three papers were presented. 1<sup>st</sup> Paper was presented on “Jal Jeevan Mission” by Er. Biskash Ranjan Poddar, Team leader CPMU, PWD (DWS), former CE, PHED, West Bengal who deliberated in detail the functional household tap connection in relation to ‘Har Ghar Jal’. 2<sup>nd</sup> Paper was presented on “Quality Control in Construction” through power point presentation by Er. Ranjit Kr. Majumder, IAS (Retd.) and former Director Urban Development Deptt. Govt. of Tripura. 3<sup>rd</sup> Paper was presented through power point presentation on various construction machineries by Shri Amzad Hussain and Shri Kiran Batta from Schwing Stetter (India) Ltd. All three presentations contributed immensely in enhancing the knowledge of the stakeholders present in the Session.

## Valedictory Session

4<sup>th</sup> Session was Valedictory Function in which Er. Biswajit Das, Secretary, IBC Tripura Chapter delivered the Valedictory Speech. Presidential Address was delivered by Er Saibak Kr. Nandi, Er. Rati Ranjan Debnath, Vice Chairman, IBC Tripura Chapter summed up technical session and briefed the outcome of the seminar. Thereafter the handing and taking over of charge between old and new Executive Committee took place. The Valedictory Function ended by presenting the Vote of Thanks by Er. Sibasish Bhattacharyya, Vice Chairman IBC Tripura Chapter.

## Cultural Function

In the 5<sup>th</sup> Session- the family get together cum cultural function was held. Many IBC members participated in the colourful cultural function. Opening song was sung by the group consisting of Er. Rama Das, Er. Ishita Das, Er. Gour Das, Er. Shubhra Sankar Laskar, Er. Biswajit Das, Er. Bhaskar Deb, Er. Aninda Kanchan Datta Roy, Er. Subhra Nandi and Er. Simitabha Chakraborty. The cultural function was followed by dinner.

## Chhattisgarh State Chapter -Raipur

### IBC’s Foundation Day Celebration

The Chattisgarh State Chapter celebrated the IBC’s foundation day on Sept 01, 2022. Shri S.K. Agarwal, Vice President, IBC was the Chief Guest. The function was attended by over 100 participants which included office bearers of the Chattisgarh State Chapter, Academicians & students from NIT Raipur, Engineers, Architects and Builders. On the occasion, a lecture on use of Plastic in Construction was delivered by Dr. Alok Sahu, Director

and Head, Central Institute of Plastic Engineering and Technology (CIPET), Raipur.

Dr. Sahu while briefing about the successful journey of CIPET, made a detailed presentation on use of Plastic in Construction. He informed about the characteristics of



Foundation Day  
Celebration

Lecture being Delivered by  
Dr. Alok Sahu, Director & Head, CIPET, Raipur

useful and non-useful plastic in Construction. While underlining the need of sustainable Built Environment by use of suitable plastic in construction for survival on this planet earth, he explained the factors which adversely affects the built environment. To conserve the major natural resources, he advocated the acceptability of plastic as construction material to avoid further degradation of environment, as plastic can be moulded in any size and shape. He also expressed that the initial cost of the plastic in construction is not much higher in comparison to conventional construction materials however, the life cycle cost is slightly higher.

## Capacity Building Workshop

Indian Buildings Congress, Chhattisgarh State Chapter, Raipur conducted capacity building workshop on “Day-Light Simulation for Energy Efficiency in Buildings” at conference hall of Golden Tower, Alumni Building, National Institute of Technology, Raipur on September 07, 2022 from 11 a.m. to 5 p.m. in association with Chhattisgarh State Renewable Energy Development Agency (CREDA), COA, ECBC, ISHRAE as the partner Organizations. Invitees included practicing Engineers, Architects, and Consultants. Sh. Jitendra Vyas, ECBE trainer from Indore was invited for this workshop. Sh. Rajesh B. Thakare, Hony. Secretary, IBC, CSC, welcomed Shri Jitendra Vyas to the workshop.



Training being imparted by Sh Jitendra Vyas from ECBC

In the first half Shri Jitendra Vyas spoke on the topic 'New Technology and Materials and their effect on day light simulation for energy efficient buildings, the need to upgrade the academic curriculum in line with the latest trends. He also emphasized the need for using new materials and the necessity of eliminating waste to economize the cost of construction as well as to preserve the natural resources and thereby, maintaining environmental balance by use of energy efficient buildings. In the second half Shri Jitendra Vyas imparted training by giving hands on software training to the participants. The views expressed by Shri Jitendra Vyas were appreciated by one and all present in the gathering.

### Engineers Day Celebration

Indian Buildings Congress, Chhattisgarh State Chapter, Raipur, celebrated the Engineers day on September 15, 2022 by garlanding the statue of Bharat Ratna Mokshagundam Visvesvaraya, the legendary engineer, situated at Mokshagundam Visvesvaraya Chowk, Civil Lines, Raipur. To mark the occasion, a blood donation camp was also organised by Indian Buildings Congress Chhattisgarh State Chapter along with PEWA, Raipur where about 40 fellow member donated blood.

In the evening for the celebration of Engineers Day about 400 engineers assembled in the Medical College auditorium, Raipur, invited by Chhattisgarh Joint Engineering Organisation. The chief guest of the Engineers Day function was Sh. Tamradhwaj Sahu, Cabinet Minister of State, Public Works Department, Government of Chhattisgarh. The function was presided over by Dr. Mukesh Kumar Verma, Vice Chancellor, Chhattisgarh State, Swami Vivekanand Technical University, Bhilai. In the function the Hon'ble Minister presented Chhattisgarh State Engineer of the year award to Sh. Rakesh Chaturvedi, IFS, CCF, Government of Chhattisgarh, and "Utkrushtha Engineer" award to Sh. Anil Tiwari, both members of Indian Buildings Congress, Chhattisgarh State Chapter for their contribution in Engineering field. The function was then followed by dinner. All the members of Indian Buildings Congress, Chhattisgarh State Chapter, Raipur congratulated the recipients of the award.

### Annual General Meeting

Annual General Meeting of Indian Buildings Congress, Chhattisgarh State Chapter, Raipur was held on September 25, 2022 at 7:00 PM at Conference Hall, NIT, Raipur campus. Shri Rajesh B. Thakare, Secretary welcomed all distinguished guests and members for their participation in Annual General Meeting. In the AGM the usual business was transacted. Sh. Shailendra

Sharma, Chairman and Sh. Ravindra Jataria, Vice Chairman expressed their gratitude and thanks to the members for their cooperation. The contribution of the full team of Indian Buildings Congress, Chhattisgarh State Chapter, Raipur and outstanding performance of the center was appreciated by Sh. S. K. Agarwal, Vice President, Sh. K.K. Verma, Sh. Alok Mahawar, Sh. Salil Rai Shrivastava, Executive Council Members, Indian Buildings Congress and other members of IBC.

During the Annual General Meeting, elections to elect the Office Bearers for the year 2022-23 of IBC Chhattisgarh State Chapter were held. The Election was



Election of Office Bearers for the year 2022-23 in progress



Office Bearers felicitated with Money Plant Sapling

presided over by Shri C. P. Sharma, Election officer.

Sh. Salil Rai Shrivastava, Chairman, Sh. Manoj Kumar Verma, Vice Chairman, Sh. S. K. Jain, Vice Chairman, Dr. Goverdhan Bhat, Secretary, Sh. Anil Tiwari, Joint Secretary, Sh. Dipak Shirke, Treasurer were elected unanimously for next tenure 2022-23. All the members of Indian Buildings Congress, Chhattisgarh State Chapter, Raipur congratulated the newly elected and felicitated them with a money plant saplings.



## National News

### Illegally Constructed Twin Towers at Noida Imploded to Rubbles

Illegally constructed Supertech Twin Towers, Noida (UP), the highest structure in India having a height of 102m and 95m respectively which were taller than the Qutub Minar (72.5m) were demolished on August 28, 2022 through impulsion.

Supertech was granted approval in 2005 by the New Okhla Industrial Development Authority (NOIDA) to build 14 towers with nine floors each, a shopping complex and a garden area. However, it revised its project in 2009 to include twin high-rise buildings — Apex (32 floors) and Ceyane (29 floors). Even though the NOIDA authority approved the new plan, the Emerald Court Owners Residents Welfare Association (RWA) moved to the Allahabad High Court in 2012 alleging it was an illegal construction. In 2014, the Allahabad High Court ruled that the towers were illegal and ordered demolition. The Noida Authority and Supertech approached the Supreme Court challenging this order. On August 31, 2021, the apex court upheld the ruling of the Allahabad High Court and ordered the demolition of the buildings. The Supreme Court found the construction of the twin towers in violation of the minimum distance requirement. It said the towers were built without complying with building regulations and fire safety norms. It further said the modification of the plan — removing the garden area to make way for the construction of Apex and Ceyane — was done without the consent of the flat owners, which violated the Uttar Pradesh Apartments Act, 2010. The top court, in August 2021, while ordering demolition of the illegally constructed towers, said it was built through “acts of collusion between the officers of NOIDA and company”, and sanctioned the prosecution of officials for violation of the Uttar Pradesh Industrial Area Development Act, 1976 and Uttar Pradesh Apartments Act, 2010.

Before carrying out the impulsion, the surrounding area of 500 metres radius was marked as an exclusion zone, where no human or animal was allowed except for the members of the team in charge of the demolition. Apart from this, the police, a team of the National Disaster Response Force, eight ambulances and four fire tenders were deployed at the site. Over 3700kg explosives were used to bring down the Twin Towers in pursuance of Supreme Court order. The explosives were triggered over nine seconds and then twin towers fell within

seconds. It took 12 seconds to raze the twin tower and the process of demolition was safe.

Even though the Court ordered the company to demolish the building at its own expense under the guidance of the Noida Authority within three months,



Twin Towers before demolition



Twin Tower being razed through implosion



Twin Tower after demolition

multiple delays resulted in setting the final date to August 28, 2022.

### India's Largest RCC Integral Bridge at GMCT-Thiruvananthapuram

India's largest RCC Integral Bridge at GMCT-Thiruvananthapuram, recently inaugurated, is a 256m long two-lane multi-span RCC Integral Road Bridge, which forms the life-line connectivity between Sree Chitra Tirunal Institute for Medical Sciences & Technology (CSTIMST) and Medical College Men's Hostels on the Kumarapuram-Medical

College Road near the Government Medical College, Thiruvananthapuram. This fly-over of completely cast-in-situ, state-of-the-art construction is first of its kind in India, with a total length of 356 m including approaches on either ends, aesthetically shaped superstructure with 13 spans, 14m to 19m high piers with a deck-width of 12.0m and 7.5m wide carriage way, between two free-standing abutments at the ends of the bridge. Unlike the conventional bridges, this is a no-joint bridge, without costly bearings over the supports and intermediate expansion joints, thus providing a durable, efficient structure with minimum maintenance requirements and costs.

This project was funded by Kerala Infrastructure Investment Fund Board (KIIFB) and implemented by Infrastructure Kerala Ltd. (INKEL), as the Phase-I part of Master plan for the holistic Development Project of Government Medical College, by the Government of Kerala.

This is a most economically designed bridge structure with a construction cost of 18 Crores, constructed within 18 months of working man-days, inspite of site-specific constraints and Covid-19 pandemic situation.

### Environment Friendly Mud Hotel in Karnataka's Chikmagalur City

This Mud Hotel Sunyata in Karnataka's Chikmagalur City harvests rain, has no ACs and runs on the sun. With an intent of reusing, reducing and recycling in all respects, Sunyata Hotel's construction, as well as its existence, are sustainable. Construction activity contributes to 30 percent of air pollution in India. The bricks have been made from the soil that was removed to level the ground. The ceilings are made of coconut shells and pot fillers instead of cement. The construction took place in the sunny months, so that solar panels could



Mud Hotel Sunyata

help power construction equipment. Interestingly, there is no ACs in this eco hotel. A PVC pipe runs 10 feet under the building and acts as a coolant pipe to cool down the rooms. The hotel owner personally ensured that not a single drop of water is wasted during construction. A 50,000 litre tank installed underground supplies drinking and cooking water to the premises and the waste water from bathrooms is purified and re-used for gardening. The hotel owner wants to ensure that even if the hotel is demolished in the future, it leaves no trash and becomes one with earth again.

### Cement Free Breathable Eco-friendly Homes

The architect couple from Pune built cement-free homes that stay cool even when it's 38 degrees outside. These breathable eco-friendly houses don't need ACs or even fans. Shri Dhruvang Hingmire and Ms. Priyanka Gunjekar are not typical architects. The duo chose to build their career on India's ancient methods of construction houses and emphasise on using of locally sourced natural materials, as well as employment of local labour.

Three years ago, they started 'Building in Mud', which uses unconventional techniques to design and construct homes. So far, these graduates from Rachana Sansad Academy of Architectures, Mumbai have completed six projects. Three more are underway. Before taking up construction in hand, they do a recce of the area to understand what materials are available and where these can be procured and then, they identify the technology that can be used to incorporate in the building process. They try to steer clear of cement and stick to clay and lime. Lime plaster facilitates exchange of air through the walls and roof which helps cool a heated room. The couple does not polish it since it's a chemical heavy,



Cement Free Homes



irreversible process instead, they go for traditional oiling. It takes them about four months to complete the core structure and another 4-5 months to finish the interiors. In college, they were heavily influenced by architect Shri Malaksingh Gill who is known for designing houses from traditional and sustainable materials. They want their building to merge with the landscape around it.

## Desert Village Delivers Solar Harvest

Bhadla is India's biggest solar power generating park. At 6,000 hectares it is second, perhaps, only to the Gulmand solar park in China.

From an elevation, Bhadla is a sea of blue glass in the middle of an arid desertscape. As far as the eye can see, it is just the glistening blue against the near-cloudless sky, also quite blue. The blue grids on the ground are endless rows of silicon solar panels.

It is 220 km from Jodhpur, bakes at 50 degree Celsius through summers that seem to last forever. Very little grows on the land, just enough to feed some goats and sheep. About 10 years ago, the Bhadla panchayat almost did not exist on the map. Roads, water and other necessities were a far cry. For local people, the area was of little consequence.

Now, Bhadla is where the sun's strength is harnessed to generate 2,245MW of energy every day. This solar park is one of India's new success stories and a decisive step in diverting 40% of the country's energy consumption towards renewable sources. The Union Government



Sea of Blue in the Sand: - View of Bhadla Solar Park

has set a 500-Gi-gawatt production target and without Bhadla, that would not be possible.

The first phase-out of the four—that came about under the UPA government's Jawaharlal Nehru National Solar Mission (JNNSM) set a modest target of 70 MW. When the Modi government was elected to office in 2014, it revised the renewable energy generation target to 1-lakh-MW by 2022. The Centre has missed out

the target, but the total solar energy share has risen to 55,000MW out of the total power consumption of 3.95-lakh-MW in the country.

Bhadla is hot but also “the hot favourite for solar energy. The park now earns carbon credits of 5 million tonnes annually.” Subodh Agarwal, Managing Director (MD), Rajasthan Renewable Energy Corporation (RRECL), said. Beginning here was not easy, like many beginnings. “The area had no roads, water or electricity. The rough terrain did not make it easy either. It was a gradual, resolute approach that led to the opening of the first phase, the smallest of the four phases in the park”, Agarwal said.

When the projects were auctioned for the first phase, the tariffs they attracted were high at Rs 6.45 a unit, even though it had come down substantially from over Rs 17 when the first projects were installed prior to JNNSM in 2010. The high radiation and the highest number of sunny days in Bhadla encouraged power developers to offer lower rates to buyers (distribution companies or discoms). That's why it became the first park in the country to allow the lowest tariff of Rs 2.44 a unit, setting a new benchmark in the country,” Agarwal said.

As Bhadla started attracting developers, the Power Grid corporation too connected the park to the green corridor which connects to the national grid from where any state can draw energy from Bhadla. For example, Uttar Pradesh sources 750MW from the park through the network, while the rest of capacity is used by Rajasthan's power distributions. The park became the preferred mode of developing solar energy as it saved developers from the hassles of land acquisition, power evacuation bottlenecks and transmission handicaps.

The concentration of solar projects has attracted several other companies to set up plants outside the park. A senior official of the RRECL said that besides the 2,245MW in the park that has attracted investments of Rs 10,000 crore, projects with an additional capacity of 1500MW have come up outside the park. The development has fuelled a demand for land, contractors, vendors, material suppliers and several other ecosystem players.

“Bhadla is no longer a village. If you visit the place at night, the lights give you the impression that it is a city without noise and pollution. More than that, the park has changed the face of the area,” Sunil Bansal, president of Rajasthan Solar Association, said.

“The sleepy village is now a buzzing industrial hub. It has created employment for many, some have become engineering, procurement and construction

(EPC) contractors, vendors and project implementing partners, Bhadla created many EPC contractors who are ubiquitous across solar hubs in the country,” Bansal said.

The local people, who do not want to sell their land and would rather lease out, have also benefitted. Ramakant Jangid, an EPC contractor, said; “Ten years ago, a hectare used to cost Rs 2,500. Now, the price has gone up to Rs 2.5 lakh. Those who do not want to sell their land, lease it. From an acre of land, the annual income for a farmer used to be around Rs 5,000. But they are getting Rs 25,000.”

In recent years, robots are being used to clean the panels and that does not require water. But the technology is still unfit for panels mounted on uneven surfaces, so it is not widely used.

## India's First Indigenously Developed Hydrogen Fuel Cell Bus Launched

Dr. Jitendra Singh, Union Minister of State (Independent Charge) Science & Technology launched India's first indigenously developed Hydrogen Fuel Cell Bus in Pune on 21st August, 2022. The Hydrogen fuel cell bus is developed by the CSIR - Council of Scientific and Industrial Research and KPIT Limited. Kirtaney Pandit Information Technologies (KPIT) is an automotive & mobility ecosystem for making software-defined vehicles a reality company.

At the event, Shri Singh called Green hydrogen an excellent clean energy vector that enables deep decarbonization of difficult-to-abate emissions from the refining industry, fertiliser industry, steel industry, cement industry and also from the heavy commercial transportation sector. The minister informed the gathering that the fuel cell utilizes Hydrogen and Air to generate electricity to power the bus and the only effluent from the bus is water and could be the most environment friendly mode of transportation to date.

For instance, a single diesel bus plying on long-distance routes typically emits 100 tons of CO<sub>2</sub> annually and there are over a million such buses in India. Fuel Cell vehicles also give zero greenhouse gas emissions in stark contrast to diesel-powered heavy commercial vehicles which account for 12-14% CO<sub>2</sub> and particulate emissions.

He believes Hydrogen fuelled vehicles provide an excellent means to eliminate the on-road emissions from the heavy commercial transportation sector. Shri Singh further added that the high efficiency of fuel cell vehicles and the high energy density of hydrogen ensures that the operational costs in rupees per

kilometre for fuel cell trucks and buses are lower than diesel-powered vehicles and this could bring freight revolution in India.

Shri Singh says India can pole-vault from being a net importer of fossil energy to becoming a net exporter



Dr. Jitendra Singh, Union Minister of State (Independent Charge) Science & Technology launched Hydrogen fuel cell Bus

of clean hydrogen energy and thus, providing global leadership in hydrogen space by becoming a large green hydrogen producer and supplier of equipment for green hydrogen. He also lauded the Prime Minister's Hydrogen Vision in ensuring Atma Nirbhar means of affordable and accessible clean energy, meeting climate change goals, and creating new entrepreneurs and jobs. He also praised the prowess of Indian scientists and engineers as no less than the best in the world while also making it at much lower costs.

Fuel cells present the most attractive choice for energy conversion from hydrogen to electrical power, due to their high efficiency, low noise, and a limited number of moving parts. Fuel cells are of interest for both stationary and mobile power generation from hydrogen. Fuel cells are often considered as part of a vehicle propulsion system. Using a fuel cell to power an electrified power train including a battery and an electric motor is two to three times more efficient than using a combustion engine, although some of this benefit is related to the electrified power train (i.e., including regenerative braking). This means that significantly greater fuel economy is available using hydrogen in a fuel cell, compared to that of a hydrogen combustion engine.

Alongside mono-fuel hydrogen combustion, combustion engines in commercial vehicles have the potential to be converted to run on a hydrogen-diesel mix. This has been demonstrated in prototypes in the UK, where their CO<sub>2</sub> emissions have been reduced by up to 40% during normal driving conditions. This dual-fuel flexibility eliminates range anxiety as the vehicles can alternatively fill up only on diesel when no hydrogen refuelling is available. Relatively minor modifications are needed to the engines, as well as the

addition of hydrogen tanks at a compression of 350 bars. Trials are also underway to test the efficiency of the 100% conversion of a Volvo FH16 heavy-duty truck to use only hydrogen. The range is expected to be 300 km/17 kg; which means an efficiency better than a standard diesel engine (where the embodied energy of 1 gallon of gasoline is equal to 1 kilogram of hydrogen).

Compared to conventional fuels, if a low priced hydrogen fuel is used, significant fuel savings can be made via such a conversion. Combustion engines using hydrogen are of interest since the technology offers a less substantial change to the automotive industry, and potentially a lower up-front cost of the vehicle compared to fully electric or fuel cell alternatives.

## आई.आई.टी. छात्रों द्वारा तैयार तकनीक से बनेगी सस्ती सोडियम आयन बैटरी

दिल्ली के दो विद्यार्थियों ने सोडियम आयन बैटरी की लागत को कम करने के साथ स्थानीय स्तर पर इसके निर्माण के लिए तकनीक तैयार की है। महंगी लीथियम आयन बैटरी के दौर में इन विद्यार्थियों के स्टार्टअप द्वारा इजाद की गई सोडियम आयन बैटरी 40 प्रतिशत तक सस्ती और लेड एसिड बैटरी की तुलना में 20 गुना ज्यादा लाइफ वाली होगी। इससे भारी-भरकम बैटरी से निजात मिल सकेगी।

विश्व में लीथियमय के मुकाबले सोडियम की मात्रा 300 गुना से ज्यादा है। कई मोबाइल कंपनियां सोडियम आयन बैटरी का प्रयोग करती हैं। यह काफी महंगी होती है। विशेषज्ञों के सामने सस्ती बैटरी लाने की चुनौती है। इसे स्वीकार करते हुए आई.आई.टी., दिल्ली के विद्यार्थी मोहित कुमार सिंह और जयश्री पाटी ने नवोन्मेष किया है। मोहित ने बताया, सोडियम आयन बैटरी को बना रही वैश्विक कंपनियों की तकनीक काफी महंगी है। उनकी बैटरी लीथियम आयन बैटरी के बराबर या उससे ज्यादा महंगी पड़ती है। हमारी तकनीक से बनी सोडियम आयन बैटरी के सस्ती होने का कारण यह है कि इस विधि से बैटरी का निर्माण स्थानीय स्तर पर छोटी फैक्ट्रियों में लेड एसिड बैटरी की तर्ज पर किया जा सकेगा। इससे लागत कम होने के साथ ही स्थानीय स्तर पर रोजगार सृजन भी होगा।

जयश्री ने बताया, 2023 के अंत तक इस तकनीक से बनी सस्ती सोडियम आयन बैटरी बाजार में उपलब्ध होने की उम्मीद है। पर्यावरण को प्रदूषित किए बिना सोडियम आयन बैटरी को जीरो वोल्ट तक डिस्चार्ज कर सकते हैं। यह रिचार्ज की जा सकने वाली बैटरी होती है जिसमें चार्जिंग व डिस्चार्जिंग के दौरान सोडियम आयन संचालन की आवश्यकता होती है। लीथियम आयन बैटरी के लिए लीथियम का खनन होने से



सोडियम आयन बैटरी की तकनीक के बारे में जानकारी देते मोहित कुमार सिंह व जयश्री पाटी

पर्यावरण को नुकसान होता है। नई तकनीक विकसित करने वाले मोहित कुमार सिंह और जयश्री पाटी ने बताया कि इस सोडियम आयन बैटरी की आयु ज्यादा होने से 'वेस्टेज' कम निकलेगा। इसके वेस्टेज को रीसाइकिल करना भी आसान होगा। साथ ही इस बैटरी के निर्माण में प्राकृतिक संसाधनों का कम से कम दोहन होगा, जिससे पर्यावरण को भी कम नुकसान होगा।

## स्वच्छता का सिरमौर इंदौर जॉचेगा पेड़-पौधों का स्वास्थ्य

देश के सबसे स्वच्छ शहर इंदौर में नगरीय निकाय नया प्रयोग करने जा रहा है। शहर में सड़कों के किनारे, डिवाइडर और शहरी उद्यान में लगे बीमार पौधों का इलाज अब ट्री एंबुलेंस करेगी। नगर निगम की टीम विशेषज्ञों और उपकरणों के साथ ट्री एंबुलेंस में तैनात रहेगी। यह न सिर्फ पेड़-पौधों को बचाने के लिए कटाई-छंटाई करेगी, बल्कि बीमार पौधों पर दवाई का छिड़काव भी करेगी। इंदौर नगर निगम के उद्यान विभाग ने ट्री एंबुलेंस बनाने में 'कबाड़ से जुगाड़' तकनीक का इस्तेमाल किया है। यानी वर्कशाप की अनुपयोगी वस्तुओं से ये एंबुलेंस बनाई गई है। निगम के उद्यान विभाग में अभी तक पौधों के रखरखाव के लिए तीन पंचवटी वाहन मौजूद थे। इनमें उद्यान विभाग के कर्मचारी पौधों की कटाई-छंटाई के उपकरण व उद्यानों और डिवाइडर में लगाए जाने वाले पौधे



ट्री एंबुलेंस

ही ले जाते थे, जबकि ट्री एंबुलेंस में पानी की दो टंकियां, दवा व तरल खाद के लिए विशेष रूप से प्रबंध किया गया है। पंप के माध्यम से दवा का छिड़काव किया जाएगा।

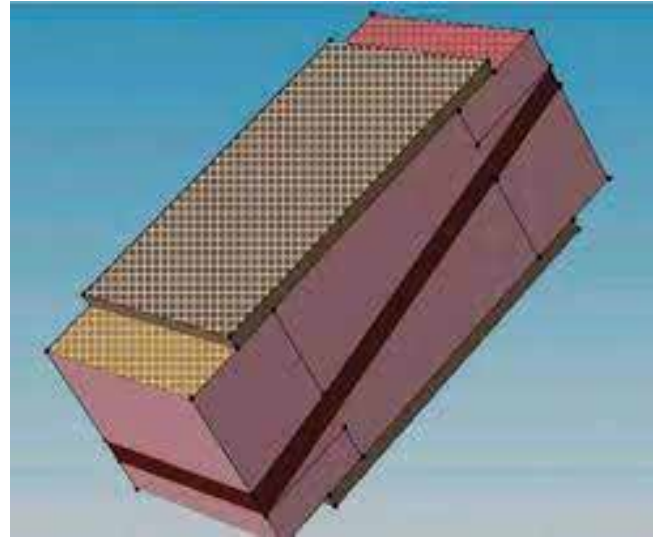
ट्री एंबुलेंस में हर प्रकार का कटर रखा गया है। बड़ी टहनी काटने के लिए अलग कटर व छोटे पौधों की बडिंग करने के लिए अलग उपकरण रहेगा। ढाई फीट गहरा गड्ढा करने के लिए वाहन में एक 'डिगिंग मशीन' भी है। गैंती-फावड़े भी रखे गए हैं। एंबुलेंस में रखे पानी, दवा और खाद के टैंक से पाइप के माध्यम से 50 मीटर दूर तक लगे पौधों तक सेवा दी जा सकेगी। साथ ही 25 फीट ऊंचाई तक पेड़ों पर दवा का छिड़काव किया जा सकेगा। शहर में कई स्थानों पर पेड़ों में दीमक लग जाती है, जिससे वे जल्द गिर जाते हैं। निगम ऐसे पेड़ों का उपचार करेगा। ट्री एंबुलेंस आम लोगों के घरों व उद्यानों में लगे पेड़-पौधों के उपचार के लिए भी फोन काल पर उपलब्ध रहेगी। इसके लिए न्यूनतम शुल्क देना होगा।

### छोटे होंगे मेमोरी कार्ड व पेनड्राइव - बढ़ेगी क्षमता एवं घटेगा ई-प्रदूषण

नाखून के आकार वाली इलेक्ट्रॉनिक चिप आने वाले दिनों में और छोटी हो जाएंगी। इनका आकार घटेगा तो पेनड्राइव, हार्ड डिस्क, मेमोरी कार्ड जैसे इलेक्ट्रॉनिक गैजेट (उपकरण) भी छोटे हो जाएंगे। यह संभव होगा सीमास (कांप्लीमेंट्री मेटल आक्साइड सेमी कंडक्टर) नाम के नए सर्किट से जो न केवल रैम (रैंडम एक्सेस मेमोरी) और रोम (रीड ओनली मेमोरी) का आकार घटाएगा बल्कि उनकी क्षमता भी बढ़ा देगा। इस सर्किट को डिजाइन किया है, मदनमोहन मालवीय प्रौद्योगिकी विश्वविद्यालय (एमएमयूटी) के इलेक्ट्रॉनिक और कम्प्युनिकेशन इंजीनियरिंग विभाग में शोधार्थी रहे डा. विमल कुमार मिश्रा ने। भारतीय प्रौद्योगिकी संस्थान (आई.आई.टी.) कानपुर और



डा. विमल कुमार मिश्रा



शोध के दौरान डा. विमल कुमार मिश्रा द्वारा तैयार किया सीमास सर्किट

आई.आई.टी., इंदौर की प्रयोगशालाओं में इस सर्किट का सफल परीक्षण हो चुका है। भारत सरकार के पेटेंट कार्यालय ने भी डा. विमल द्वारा किए गए नवोन्मेष की नवीनता और उपयोगिता को देखते हुए इसे प्रमाण पत्र जारी कर दिया है। वर्तमान में नोएडा के जेपी इंस्टीट्यूट आफ टेक्नोलाजी के इलेक्ट्रॉनिक्स एंड कम्प्युनिकेशन विभाग में सहायक आचार्य के पद पर कार्यरत डा. विमल के मुताबिक नए सर्किट के प्रयोग से जो चिप बनेंगे, वह आकार में छोटे होंगे। इनका आकार छोटा होने से इलेक्ट्रॉनिक गैजेट में ऊर्जा का अपव्यय कम होगा, जिससे उनकी कार्यावधि बढ़ जाएगी। सर्किट के प्रयोग से रैम व रोम की गति में 10 से 15 प्रतिशत की वृद्धि हो जाएगी, जिससे कम समय में हम ज्यादा डाटा प्राप्त कर सकेंगे। शोध के दौरान इस सर्किट की गति सामान्य सर्किट की तुलना में काफी तेज पाई गई है। कम जगह में ज्यादा भंडारण क्षमता की वजह से इस सर्किट के प्रयोग से तैयार गैजेट की लागत में भी 20 से 30 प्रतिशत की कमी आएगी। यह शोध यू.के. के इंटरनेशनल जर्नल आफ इलेक्ट्रॉनिक्स और ईसीएस जर्नल आफ सालिड स्टेट साइंस एंड टेक्नोलाजी, अमेरिका के जर्नल आफ नैनो इलेक्ट्रॉनिक्स एंड आप्टो इलेक्ट्रॉनिक्स व जर्मनी के सिलिकान जर्नल में प्रकाशित हुआ है। ऐसे सफल शोध से अंतरराष्ट्रीय स्तर पर देश और विश्वविद्यालय का मान-सम्मान बढ़ता है। छात्रों को प्रेरणा भी मिलती है।

### केले के अवशिष्ट से अब किसान बना सकेंगे जैविक खाद

केले की खेती करने वाले किसान इसके फल के साथ थंब (तना) से जैविक खाद बना कर इसका उपयोग खेती में कर सकेंगे। इससे उन्हें अतिरिक्त आय होगी। साथ ही सड़क

किनारे फेंके गए केले के अवशेष से होने वाली बदबू से भी लोगों को राहत मिलेगी व पर्यावरण सुरक्षित रहेगा। खाद के प्रयोग में अच्छी सफलता मिलने के बाद बिहार के समस्तीपुर स्थित डा. राजेंद्र प्रसाद केंद्रीय कृषि विश्वविद्यालय, पूसा इसके प्रति किसानों को जागरूक कर प्रशिक्षण दे रहा है।



केले के थंब से बनाई जा रही वर्मी कंपोस्ट

इसके लिए मशीन भी लगाई गई है। करीब 250 किसानों को प्रशिक्षण दिया जा चुका है। अधिकतर किसान इसे अपना रहे हैं। कृषि अवशेष का बेहतर इस्तेमाल हो सके इसके लिए डा. राजेंद्र प्रसाद केंद्रीय कृषि विश्वविद्यालय काम कर रहा है। केले के अवशेष पर पांच साल पहले काम शुरु हुआ। इसकी जिम्मेदारी कुलपति ने डा. एस.के. सिंह (प्रोफेसर प्लांट पैथोलॉजी एवं सह निदेशक अनुसंधान) को दी। कृषि विश्वविद्यालय ने अनुसंधान के तहत केले के थंब से लगभग 50 टन वर्मी कंपोस्ट तैयार की। इसमें 35 प्रतिशत गोबर डाला गया। इसकी गुणवत्ता का परीक्षण केले और पपीते में दो साल तक किया गया। इसमें इन फसलों की उपज में 15-20 प्रतिशत की वृद्धि मिली। रोग एवं कीड़ों में भी कमी देखी गई। इस वर्मी कंपोस्ट में पोटाश की मात्रा (1.34 से 2.44 प्रतिशत) अधिक है। पोटाश पौधों के लिए रोग एवं कीड़ों से लड़ने में सहायक होता है। इन खेतों में रासायनिक उर्वरक 40 प्रतिशत कम इस्तेमाल किया गया।

एक हेक्टेयर केले की खेती से जो थंब बचता है, उससे करीब सात से 10 हजार लीटर रस निकाला जा सकता है। इसे तरल उर्वरक के रूप में प्रयोग किया जा सकता है। 50 मिली लीटर रस को प्रति लीटर पानी में घोलकर छिड़काव किया जाता है। शोधकर्ता डा. एस. के. सिंह ने बताया कि थंब के वर्मी कंपोस्ट व रस में नाइट्रोजन फास्फोरस, पोटाष व जिंक सहित अन्य तत्व पाए जाते हैं। केले के थंब से रेशा निकालने के दौरान जो रस मिलता है, उसे अलग एकत्र किया जा सकता है। रेशा निकालने वाली मशीन 50 हजार से लेकर डेढ़ लाख रुपये में आती है।

मोतिहारी के किसान श्री पवन कुमार केले के थंब से तरल व ठोस खाद बनाने का काम कर रहे हैं। उन्होंने बताया कि वे 10 रुपये लीटर तरल और 12 रुपये प्रति किलो ठोस खाद की ब्रिकी कर रहे हैं। जिले में कई किसान अब गेहूं और गन्ने की फसल में केले के अवशेष से बनी तरल व ठोस जैविक खाद का इस्तेमाल कर रहे हैं। केले के अपशिष्ट को खेत से बाहर करने में किसान को काफी रुपये खर्च करने पड़ते हैं। खेत या सड़क किनारे सड़ने के चलते यह पर्यावरण के लिए नुकसानदायक भी होता है। इसी को ध्यान में रखते हुए इसके अपशिष्ट प्रबंधन पर काम कराया गया।



केले के थंब का रस

### प्रदूषण नहीं, समाधान बनेगी पराली

जालंधर में युवाओं व उद्यमियों की टीम ने कृषि अवशेष (पराली व अन्य) से कोयला बनाने की तकनीक विकसित करके पराली संकट के समाधान में बड़ी सफलता हासिल की है। यह तकनीक वैज्ञानिक एवं औद्योगिक अनुसंधान परिषद (सीएसआइआर) और राष्ट्रीय जैव ऊर्जा संस्थान के विशेषज्ञों के सहयोग से विकसित की गई है। 10 वर्ष के शोध के बाद राष्ट्रीय जैव ऊर्जा संस्थान के सहयोग से जालंधर में यह मशीन स्थापित की गई है। राष्ट्रीय ताप विद्युत निगम (एनटीपीसी) ने भी इसमें रुचि दिखाई है। उसके विशेषज्ञों ने मशीन की तकनीक को सराहा है। तकनीक विकसित करने वाली टीम का नेतृत्व कर रहे उद्योगपति अजय पलटा ने बताया कि पांच वर्ष पहले उन्होंने इस विधि से कोयला बनाना शुरु कर दिया था, लेकिन उस समय कुछ कमियां रह गई थीं। फिर उन्होंने इसे बेहतर किया। इसमें कृषि अवशेष के साथ पत्तों का उपयोग भी किया जा सकता है।

सीएसआइआर से संबन्धित नेशनल फिजिकल लैबोरेटरी ने इस तकनीक से बने कोयले की टेस्टिंग कर ली है। 30 फीट चौड़े व 50 फीट लंबे इस प्लांट के जरिये प्रतिदिन 10 टन कृषि अवशेष से कोयला बनाया जा सकता है। जरूरत

के हिसाब से मशीन को विस्तार भी दिया जा सकता है। बठिंडा के लहरा मोहब्बत थर्मल प्लांट के सेवानिवृत्त चीफ इंजीनियर डीपी गर्ग का कहना है कि यह प्रोजेक्ट एनटीपीसी के निर्देशन में संचालित हो रहा है। पंजाब में आने वाले समय में ऐसे कई प्लांट लगेंगे। रुपनगर थर्मल प्लांट के पूर्व डेस्क कंट्रोलर सुखदेव सिंह कहते हैं कि छोटे थर्मल पावर प्लांट के लिए यह कोयला कारगर साबित होगा। इससे प्रदूषण तो कम होगा ही किसानों की आय भी बढ़ेगी। तकनीक तैयार करने वाले अजय, गोविंद, साहिल, योगेश मरवाहा व राहुल सहगल ने दावा किया है कि यह कृषि अवशेष से बिना नमी के कोयला बनाने वाली विश्व की पहली तकनीक है।

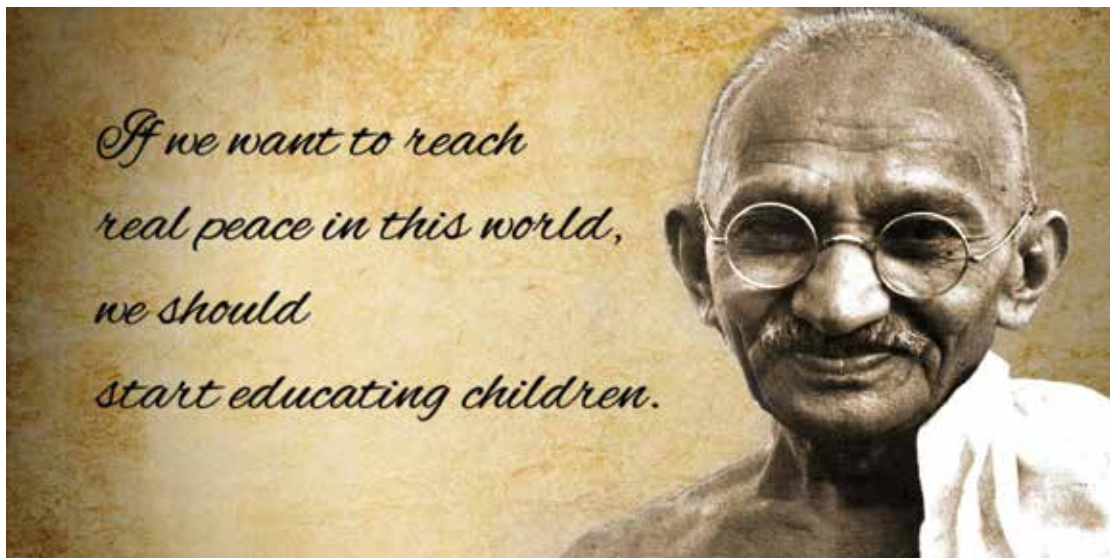
नवीन और नवीकरणीय ऊर्जा मंत्रालय के कपूरथला स्थित शोध केंद्र में कार्यरत विज्ञानी अनिल शर्मा का कहना है कि



पराली निर्मित कोयला

उन्होंने इस मशीन की कार्यप्रणाली का अध्ययन किया है। यह मशीन नमी रहित कोयला तैयार करती है। यह इसकी सबसे बड़ी विशेषता है, जबकि खदान से निकले कोयले में काफी नमी होती है। नेशनल फिजिकल लैबोरेटरी, नई दिल्ली के मुख्य विज्ञानी संजय धकाटे का कहना है कि कृषि अवशेष से तैयार होने वाला कोयला नमी रहित होने के कारण कम प्रदूषण फैलाता है। हमें ऐसे कोयले के इस्तेमाल को ज्यादा से ज्यादा प्रोत्साहित करना चाहिए। नई तकनीक से एक टन कृषि अवशेष से करीब तीन क्विंटल कोयला बनता है। साधारण कोयला बाजार में करीब 30 रुपये प्रति किलो तक उपलब्ध है। एक टन कृषि अवशेष खरीदने में करीब 2,000 रुपये खर्च आता है। इसके अतिरिक्त प्रति टन 500 रुपये की एलपीजी की खपत होती है। मेहनताने पर करीब 1000 रुपये खर्च होते हैं। इस तरह एक टन कृषि अवशेष से 300 किलो कोयला बनाने पर करीब 3,500 रुपये खर्च आता है। यह कोयला करीब 12 रुपये प्रति किलोग्राम तक पड़ेगा।

पराली से कोयला तैयार करने के लिए सबसे पहले पराली को मशीन के जरिये छोटे-छोटे टुकड़ों में काटा जाता है, ये टुकड़े मशीन के पहले चैंबर में पहुंचते हैं, इसमें एलपीजी की मदद से इन्हें हीट देकर सुखाया जाता है, सुखाने के बाद इस सामग्री को दूसरे चैंबर में डाला जाता है, यहां इसे लंबे समय तक निर्धारित तापमान में रखा जाता है, इस दौरान पराली का 70 प्रतिशत हिस्सा नष्ट हो जाता है, पराली व कृषि अवशेष में मौजूद कार्बन के जलने से पैदा हुई गैस के प्रभाव से शेष 30 प्रतिशत हिस्सा 20 घंटे की प्रक्रिया के बाद कोयले में परिवर्तित हो जाता है, कोयले को वही हल्के तापमान में सूखने को छोड़ दिया जाता है, इसके बाद तैयार कोयला चूरे के रूप में बाहर निकाला जाता है, इसे जरूरत के अनुसार गेंद या ईट के आकार में ढाल लिया जाता है या चूरे के रूप में ही इस्तेमाल किया जाता है।



## International News

### Gateshead Millennium Bridge – An Architectural Engineering Master Piece

The Gateshead Millennium Bridge is a pedestrian and cyclist tilt bridge spanning the River Tyne in England between Gateshead's Quays arts quarter on the south bank, and the Quayside of Newcastle upon Tyne on the north bank. The award-winning structure was conceived and designed by architects Wilkinson Eyre and structural engineers Gifford. The bridge is sometimes referred to as the "Blinking Eye Bridge" or the "Winking Eye Bridge" due to its shape and its tilting method. In terms of height, the Gateshead Millennium Bridge is slightly shorter than the neighbouring Tyne Bridge, and stands as the sixteenth tallest structure in the city.



Gateshead Millennium Bridge

The bridge was lifted into place in one piece by the Asian Hercules II, one of the world's largest floating cranes, on 20 November 2000. It was opened to the public on 17 September 2001, and was dedicated by Queen Elizabeth II on 7 May 2002. The bridge is essentially two graceful curves, one forming the deck and the other supporting it, spanning between two islands running parallel to the quaysides. These pivot around their common springing points to allow shipping to pass beneath, using an innovative rotational movement similar to that of a slowly opening eyelid. The parabolic curves of the deck extend the 105m crossing distance to around 120m, giving enough extra length to provide the required clearance above the water. Visually elegant when static and in motion, the bridge offers a great spectacle during its opening operation – both during the day and by night.

Six 45 cm diameter Hydraulic rams (three on each side, each powered by a 55 kW electric motor) rotate

the bridge back on large bearings to allow small ships and boats (up to 25 m tall) to pass underneath. The bridge takes as little as 4.5 minutes to rotate through the full 40° from closed to open, depending on wind. The bridge has operated reliably since construction, opening to allow river traffic to pass. It also opens periodically for sightseers and for major events such as the Northumbrian Water University Boat Race and the Cutty Sark Tall Ships' Race. One of the principal requirements for opening the bridge is to allow access to HMS Calliope where Royal Navy patrol boat HMS Example is based.

The construction of the bridge won the architects Wilkinson Eyre the 2002 Royal Institute of British Architects (RIBA) Stirling Prize and won Gifford the 2003 IStructE Supreme Award. In winning the Stirling Prize, Wilkinson Eyre became the first, and so far the only, firm of architects to retain British architecture's most prestigious prize — they won the 2001 prize for the Magna Science Adventure Centre. In 2005, the bridge received the Outstanding Structure Award[ from International Association for Bridge and Structural Engineering (IABSE).

### Germany Introduces World's First Hydrogen-Powered Trains

Germany inaugurated the world's first hydrogen-powered train on August 24, 2022. With this initiative, the government is opening the door for more environmentally friendly travel, said a report from CNN. The route in Bremervorde, Lower Saxony, will be solely served by 14 Coradia iLint trains, powered by fuel-cell propulsion technology, the report further said. "Emission free mobility is one of the most important goals for ensuring a sustainable future," said Henri Poupart-Lafarge, Alstom's CEO, in a statement.

Five of these 14 trains have made their debut on August 24, 2022. They will progressively replace the route's 15 diesel trains by the end of the year. Just one kilogramme of hydrogen fuel is equivalent to



Hydrogen-Powered Train

approximately 4.5 kilogrammes of diesel fuel. These hydrogen-powered trains have replaced diesel trains on the 100km (60 mile) railway that connects the cities of Cuxhaven, Bremerhaven, Bremervoerde, and Buxtehude near Hamburg. The project also includes the Elbe-Weser Railways and Transport Business (EVB), which will be responsible to run the trains, and the gas and engineering company Linde. The trains emit no pollution and produce little noise, emitting just steam and evaporated water. They have a 1,000-kilometre (621-mile) range, which means they may operate on the network for a full day on a single tank of hydrogen, reported CNN. A hydrogen filling station has already been installed along the route. The trains may reach speeds up to 140 kmph (87mph).

### A Bridge as thin as Paper, No Piers, No Cables

It is the Dadong River iron Cable bridge located in Wulong Chongqing. The total length of the bridge is 245 meters, width 3.8m. The Vertical distance of the bridge deck from valley floors is up to 300meters. It has no piers.

There are no cable-stayed cables. Only four sets of ropes provide horizontal pulling. It can carry a 45-ton truck. Look out from a far only to see it hanging in the air. The bridge deck is as thin as a piece of paper. In fact, it is



Dadong River Bridge



Dadong River Bridge Carrying Heavy Vehicle

because of the need to build high-speed transportation materials since the existence of this chain bridge. The transport distance of the construction vehicle is greatly reduced. Shortened construction period.

### Solatube Skylights System

This dome shape structure that can deliver sunlight to rooms that may not naturally get light is a radical innovation. The roof mounted dome is actually a Fresnel lens shaped to maximize light to intake it captures sunlight and redirects it within the building through special tubes. The tubes are made of the world's most reflective material that reflects 99.7% of natural light. It can also be bent to carry light to any dark room up to 3 ft (9m) from the light collector. The opening of the ceiling has a diffuser that distributes the light into the room. The system maintains the colour of natural light while cutting out ultraviolet and infrared light. Due to small size it can be installed pretty much anywhere. As the system uses renewable sunlight energy it saves power and electricity. On a sunny day, one 10inch (25cm) solar tube gives the same amount of light as three 100-watt bulbs that enough to illuminate a 200 sq.ft. room saving upto to 30% in energy costs. The system is leakproof because of the dome like shape that helps prevent water from collecting on top. It requires no structural reframing and can be installed in 2 hours while classic solatube work only during the daylight an



View of Skylights from Top of Roof



Fixing Arrangement of Skylights in Roof



innovative design includes an integrated solar panel. This collects sun energy during the day to power a nightlight. An embedded sensor automatically triggers smart dusk to dawn night lighting. The soft glow mimics moonlight which means you don't have to turn on the lights at night to navigate hallways and stairs. Since Solatube uses natural light instead of electricity it reduces the harmful effects of artificial lights. It also increases daily exposure to natural light which have its own proven health benefits.

The use of Solatube daylighting devices in different building typologies is fast becoming a trend in the construction industry. Besides being a source of natural daylight, it provides a form of 'healthy' daylight to residents in a building space. In other words, the glare or heat associated with the sun's rays is filtered off unlike the traditional skylights which contribute to heat gain and glare and result in eye strain and the fading off of soft furnishings. There are still innovations in the lighting industry which is a positive sign that better solutions will come up. Solatube day lighting devices are cheaper to procure and install compared to traditional skylights even though they deliver equal light output. They help to keep insulation in residential buildings. This is a useful device for residential buildings located in cold climatic regions. The maintenance costs that accrue from usage of Solatube daylighting devices are very low. This is hugely due to the fact that they are designs that come as one piece and have impact resistant properties. Possible extensions of the project can happen based on the form of tubular daylighting devices.

Most likely, there will be better adaptive forms of tubular daylighting devices in the nearest future which will give rise to a wide range of discussions on the concept of sustainable buildings. For instance, user control over the amount of light channeled through the Solatube daylighting device can be worked upon towards ensuring maximum visual satisfaction.



Section of Skylight

Most residential buildings in Lagos, Nigeria tend not to have daylight solutions for spaces located deeply within the house and therefore have to rely on artificial forms of light like the electric lights. Hence, developing tubular daylighting devices for such houses will not only make them sustainable or energy-efficient but also a comfortable place for their occupants to live and work in.

Ref: International Journal of Scientific & Engineering Research Vol. 9, Issue 1, January-2018 ISSN 2229-5518.

## Longest Padma Bridge of Bangladesh Inaugurated

Bangladesh PM Sheikh Hasina on 25<sup>th</sup> June, 2022 inaugurated the long-awaited Padma Bridge, the country's biggest development project since its birth in 1971, that is expected to give the nation's development index a big boost and connect India directly to Dhaka, through road, rail and ports. The nearly 6.2 km road-rail four-lane bridge over the mighty Padma river is expected to directly impact the lives of at least 30 million people in the country, according to the government's estimates.



Padma Bridge

The inauguration of the Padma Bridge carries a lot of significance as the structure was built entirely with domestic financing. The distance of Dhaka from the Indian border at Benapole by road will now be reduced by 70 km and travel time by 4.30 hours besides reduction in use of fuel and air pollution. It will also reduce the Kolkata-Dhaka train journey time by half and will economise the cost of transportation. The Padma Bridge connecting India, Nepal, China, Myanmar, Singapore and Thailand, will be a major link of the Trans Asian Highway Network (TAHN). Of the THAN's 16 road routes, three run through Bangladesh. The rail link will connect another two routes.

# Common Central Secretariat

Gopal Varshney

Chief Engineer, Central Vista Project Zone - 1, CPWD

## A Brief History

The Central Vista was designed to be the administrative centre for India. Drawings done by the Architects of Central Vista – Edwin Lutyens and Herbert Baker – show that the area was originally imagined with administrative buildings on either side of King’s Way (now Kartavya Path) in a symmetrical layout. These buildings had internal courtyards and were to be the “living centre of administration” - meant to house all the administrative offices of the Government of British India. This design was never fully realized and only the North and South Blocks were built as administrative offices at the time.

Post-Independence, the imperial buildings were unhesitatingly appropriated by the people of India as the seat of their government. The most important Ministries of the government were housed in the North and South blocks. Due to a rapidly growing population and changes in governance, these buildings were soon packed to capacity and stressed for space. In response, more buildings (the Bhavans) were built along Rajpath to accommodate the immediate pressing needs for office space.

## Central Secretariat Today

Today, the North and South blocks, and the various bhavans along the Rajpath house the administrative offices of the Government of India. These buildings, however, accommodate only twenty-two out of fifty-one Ministries of the Government and a considerable sum is spent annually on rented spaces outside the Central Vista for the rest. In some cases, the same Ministry offices are split between different buildings – at Central Vista and outside of it. This hampers the efficiency of administration and increases operational costs and energy usage.

Moreover, with growing occupancy and rapid technological advancements, the administrative buildings themselves became cramped, difficult to maintain, expensive to operate and environmentally unsustainable. In these buildings, the quality of office spaces became inconducive to efficient working.

The existing buildings also make very inefficient use

of land. Some military barracks (hutments), originally built as temporary structures during World War II, continue to be used as repurposed offices. These are spread across approximately 90 acres of precious land in the heart of New Delhi.

## Common Central Secretariat

The proposed Common Central Secretariat consolidates all the Ministries at the Central Vista and provides modern, efficient and flexible workspaces with state-of-the-art infrastructure and facilities to improve productivity and efficiency of Government administration. The layout comprises of 10 office buildings and a Central Conference Centre. All buildings will be connected by an underground loop Metro for connectivity to each other and to the existing Blue & Yellow Line at Central Secretariat Metro Station and by an overground shuttle to the city’s bus network, making the Central Secretariat a fully transit-oriented development.

These buildings will house office facilities for all the Ministries, and subordinate and attached offices of the Government of India. The office buildings follow a clear and rational scheme of planning. Work halls are open-plan spaces that overlook a central courtyard and other office spaces are located along the periphery.

At the four corners of the rectangular plan are cores – incorporating building services and amenities such as creche, toilets, gymnasiums etc. Facilities such as a café are located on the ground floor and spill over into the shaded courtyard in the form of outdoor seating.

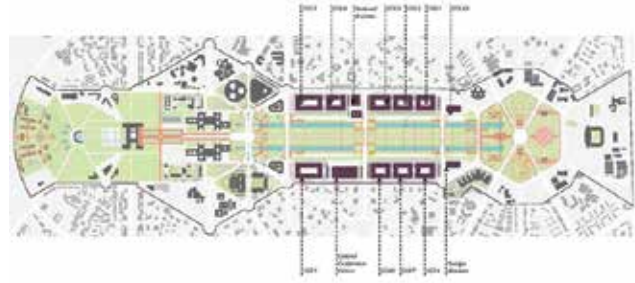
The design also proposes a Central Conference Centre as a part of the layout. This facility will provide centralized conferencing and meeting areas for larger gatherings – reducing unnecessary delays, costs, and emissions due to travel.

The new development is designed with green building features such as maximising natural light inside the building, integrated air-conditioning for each building, rainwater harvesting systems, consolidated plumbing systems designed as independent components and Integrated Building Management System (IBMS).

The buildings of the Common Central Secretariat are

respectful in material and form to the historic buildings of the Central Vista, including the North and South blocks and the present Parliament building. The two-tone sandstone on the exterior facades complements the historic context, while the facades facing the courtyard make use of modern materials to maximise efficiency and natural sunlight. All the buildings at the Central Vista are designed to be mindful of the Vista's original layout and the public nature of the central space. The Common Central Secretariat is planned to ensure that it does not hamper public spaces along the Central Vista; the height of the buildings does not exceed that of the India Gate; and the buildings do not hamper the view from Rajpath.

The tenders for first 3 nos. CCS buildings having a total built up area of 4,46,954 sqm with 2 basements+G+7 floors have been awarded to M/s Larsen and Toubro Ltd. amounting to Rs. 3,142 Cr. with date of completion as January 2024. The upcoming 3 nos. CCS buildings on completion will be housing ministries currently located in Nirman Bhawan, Udyog Bhawan, Shastri Bhawan and Krishi Bhawan along with all their subordinate departments, attached offices etc. with an approx. strength of around 18,000 employees, i.e., 6,000 employees per CCS building. The buildings have 2 common huge basements housing all services viz substation, HVAC plant, STP, WTP, solid waste management, fire fighting systems with water tanks for entire building. The basement will also provide parking facilities for 1,864 four wheelers & 1,382 two-wheeler parking along with provision for charging of EV vehicles. The buildings are fully air conditioned with access control systems, BMS controlled services along with facilities like gym, creche, yoga, music room, centralized café, multipurpose hall etc.



Common Central Secretariat Layout



Office Building: Typical Floor Plan



Office Building: Courtyard



Office Building



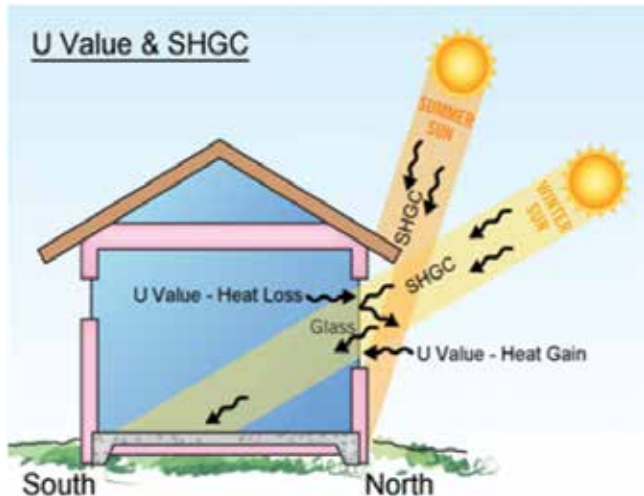
Drawing of the Central Vista as proposed by the architects Lutyens and Baker

# Appropriate Glass Selection for Buildings

Usha Batra

Former Special DG, CPWD

Buildings across the world create tremendous environmental impact. Construction of new buildings generates large amount of solid waste, and also disturbs the natural habitat and vegetation. Globally, buildings are responsible for approximately 40% of the total energy use.



Glass plays a significant role in constructing and designing Green buildings which have great potential (40-60%) in saving energy through use of appropriate glass. Glass also enhances the aesthetics of a structure, improves its design, improves thermal performance and even creates a comfortable environment for the occupants. All the above benefits can only be achieved by selecting the right type of glass and in the right place. Glass is selected to achieve the perfect blend of aesthetics and economics, finesse and function. A varied range of high-performance and energy-efficient glasses reflect or absorb heat but allow light inside a building. Different colours of glass have different U-value, SHGC and VLT.

Glass is considered green material as it is made of mainly non-polluting raw materials & is recyclable. Glass is compatible with almost every building material. Glass in buildings substantially reduces the need for artificial lighting and makes the interiors well lit, airy and more open. From design, appearance, thermal performance and comfort to simple aesthetics, selecting the right type of glass is thus inevitably important.

Key factors that play an important role in selecting the right type of glass, are as follows.

- U-Value
- Solar Factor (SF)/Solar Heat Gain Coefficient (SHGC)
- VLT

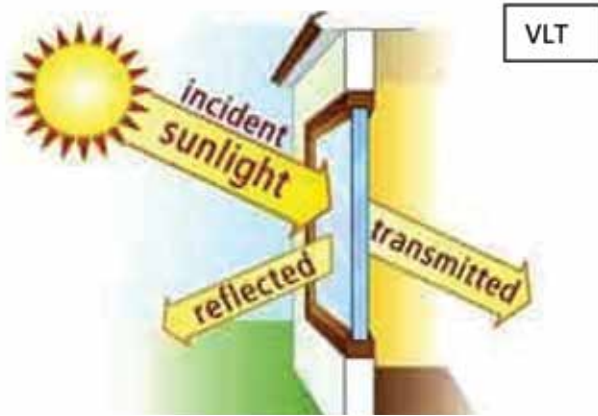
**U-Value** : One of the most important factor to pay attention while deciding glass for new windows is the U-Value. A window's U-Value, also described as U-Factor, measures the rate by which the window transfers non-solar heat. In short, it provides a measurable indication of the quality of insulation the window provides. The U-Value /rating is reflected as a number between 0.20 and 1.20. The lower the U-Value means the glass will transfer less heat, meaning your home/ building will be better insulated.

**Solar Heat Gain Coefficient (SHGC)** : Another important factor is the Solar Heat Gain Coefficient (or SHGC). Windows that have a high SHGC, allow a greater amount of solar radiation to be transmitted, absorbed and eventually released inside the house. This essentially translates that such glass units cause your home or building to heat up quicker. SHGC reflects how much solar heat gets inside the home/ building once it has reached the glass. The SHGC Value /rating is measured between 0 and 1. The lower SHGC ratings means the glass allows less solar heat to enter the home/ building.

The SHGC and U-ratings share an interesting relationship in that they share a relative correlation. Windows with higher SHGC ratings will have higher U-ratings as well.

**Visible Light Transmittance (VLT)** : The proportion of light transmitted by window/glazing is specified as the Visible Light Transmittance (VLT). Different colours of glass have different VLT. Poor window design can reduce the amount of daylight entering your home/ building.

While the VLT rating varies between 0 and 1, most double glazed windows and high performance glasses rate between 0.3 and 0.7, which means that between 30% and 70% of the available light passes through the window. The illustration above shows you how the view changes, as the amount of light getting through the window changes.



The higher the VLT value, the better it is as more light will get through the window.

A simple way to consider this is:

Low VLT = too dark inside = lights on = higher energy bills.

High VLT = brighter inside + better views outside.

All the three factors need to be considered very carefully to get the desired results of light and energy efficiency.

## Data Updation of Members

IBC is undertaking an exercise for updation of the data of its Members. The data available in the records of IBC is being sent in a prescribed format through email to each member for confirmation and for making changes if any wherever required. All members are therefore, requested to quickly respond to the emails being sent to them for updation of their records and co-operate in updation of data.

## Congratulations



IBC is proud to Congratulate its Vice President Er. Chinmay Debnath, FIE on being elected as the President of The Institution of Engineers (India), a largest multi-disciplinary body of Engineers in the Country since 1920. Born on 1<sup>st</sup> March, 1961, Shri Debnath is a Graduate in Civil Engineering and a former Superintending Engineer, Tripura PWD. Prior to his election as President, IEI, he was Chairman of its Tripura State Centre. Shri Debnath is an active life member of IBC, IRC and many more professional organisations. Earlier he was also council member of IRC and Chairman of Indian Engineers Federation.



IBC is proud to Congratulate its Governing Council Member Shri Sandeep B. Vasava on being elected as the President of Indian Roads Congress, an Apex body of Highway Engineers in the Country since 1934. Born on 15<sup>th</sup> February, 1968, Shri Vasava is a Graduate in Civil Engineering. At present Shri Vasava is Secretary of Roads and Building Department, Government of Gujarat.

# Bamboo: A Versatile & Sustainable Material to Combat Climate Change

Dr. Madhura Yadav

Professor & Dean, Manipal University Jaipur, Rajasthan

## Introduction

The coming decade of 2020-2030 is declared as an environmental restoration decade by the UN. Therefore, it is of crucial importance to adopt sustainable development goals. India supplies a large percentage of the bamboo forests to the world. Approximately, 123 species in 23 genera are located here (Kaur PJ, 2018). More than 39% of the entire region under bamboo is out there within the North Eastern states, which is additionally the chief in availability of dense bamboos, in green sound culms and number of green sound weight. Results show that green sound bamboos are obtained in abundance in Arunachal Pradesh (26660 lakhs), then by Assam (20460 lakhs), Manipur (20350 lakhs) and Mizoram (19530 lakhs) (Baksey, 2013). India has the capability of becoming the world climate leader in a single decade while expanding its economy and bamboo offers that opportunity. This is an area that can be explored by the country. Concrete and steel being the default building material in the country are responsible for 17% of the global emissions and bamboo can change that to almost half and can boost the carbon credit at the same time. The growth of bamboo sector will also help prevent deforestation, create jobs, and help increase in the farmer's income as well.

## Properties of Bamboo

As a construction material, bamboo has a solid fiber and its compressive strength is twice more in comparison with concrete and its tensile strength is almost equal to steel. Experimental studies have shown that the ultimate tensile strength of bamboo and mild steel varies between 140N/mm<sup>2</sup>- 280N/mm<sup>2</sup> (Sutharsan, et al., 2020). Findings show that full-growth of bamboo during cultivation depends on the species and it obtains its hardwood like properties (i.e. hardness, strength, stability) as compared to the growing years of hardwood which takes (50-100) years to mature completely.

Characteristics of bamboo alters due to the large-scale variety of genera families and species. It is a 'grass' that is hollow-stemmed, firm, woody, enduring, and perennial

in nature. Due to a peculiar rhizome-dependent process, bamboos are one of the most rapid-growing plants and their growth is three-times more rapid than a few other plant species. Some bamboo species could reach their final length of between 20 to 30 m high in a few weeks and with a growth-speed of 50 cm every day throughout the season while other species are ascertained to rise skyward as fast as 8 inches in a day. It belongs to the family of the true grass called 'Poaceae' and is the greatest family member of the Poaceae, with about 91 genera and greater than 1000 species. Bamboos are a sustainable and extremely adaptable resource with multipurpose uses, traditionally associated with Southeast Asia and South America region for finest suited cultivating environment.

## Use of Bamboo in Housing

Since, in the North Eastern region, approachability is a huge issue, people construct with locally available materials to the greatest extent, like- Mizo houses, Adi Gallong houses, and Riang houses which uses bamboo as the principal material for construction. These are classic houses on hills that are built on stilts made of bamboo and have woven mats of bamboo for walls. In Bihar, Bengal, and Orissa, houses built on the river planes with bamboo are found in rural and tribal areas. Reinforcement material in lime surki flat slabs were made of bamboo, whereas mats of splits or flattened bamboo was used for the walls. Conventional dwelling houses in Central India, has walls that made of broad bamboo mats layered with mud plaster with broad bamboos used for vertical support. The roof of these houses was made from purlins of bamboo and layering of country tile or dried grass with wooden trusses. In the desert areas, bamboos are used as reinforcement in boundary walls and in the principal roof structures (Manjunath, 2015). It is also used for walls in a wattle and daub system in South India, accompanied by compounded mud layering or plastering and pitched roofs in village areas whereas in cities, it was used mainly in roofs for both flat lime surki and pitched roofs.

Traditional materials are being reformed and treated to escalate their strength and durability and one such material is bamboo. In contest of this research, regarding how sustainable bamboo is as a construction material, it can be said that bamboo is a functional rated composite plant with a brief regenerative growth cycle which makes it a green material for construction.

Even though the construction industry in recent years has known the potentials of bamboo in varied constructional works, the bigger question remains is how sustainable is the bamboo material? Bamboo is an exceptional building material. It is a sustainable material that requires very less energy to nurture, restrains soil erosion, supplies biofuel, extends wildlife refuge, and manufactures a wholesome food source for both humans and wildlife. It offers crucial restoration from the consequences of global climate change by producing oxygen a lot more than other species of plants and traps high quantities of CO<sub>2</sub>. The primary harvesting often takes 3 to 5 years, considerably quicker than wood forests which usually want twenty-five years. It produces twelve times more green building material than wood and provides a great variety of functional commercial items for eco-friendly daily use along with shelter and transportation, thus, decreasing the rate of timber consumption. Additionally, bamboo roots help in restraining erosion as it creates barrier for water which the developed countries use as a defensive component for their agricultural crops and villages from washing constantly. (Atanda, 2015)

### Uses of Bamboo other than Housing

Bamboo can also be used for decorative items, furniture, source of food, clothing, and construction. Bamboo shoots are a significant source of food from a plant's source. Consumption comes in many forms. Potentially to be used in numerous different dishes every where due to its unique nutritional profile. Various regions of the world have shown edible species, such are consumed in a variety of ways. Most studies show that bamboo shoots are very good nutrition storage facilities. They contain a lot of protein and low-fat content and high fiber content. They are reliable resources of nutritional content, including potassium, a heart-healthy mineral and vitamin C found in fermenting shoots. It can be carefully incorporated in the diet using different recipes or dry powder form in an unconventional industry. Regarding the food safety of bamboo shoots, it can be handled by appropriate processing techniques, while preserving the nutrients.

Due to their antibacterial properties, bamboo textiles are frequently used to create T-shirts, underwear, socks, and other products of a similar nature. Bamboo fibers are also widely utilized in performance clothes due to their ability to wick away moisture. The best quality bamboo cloth is produced using non-cellulose extraction techniques. Instead, crushed bamboo wood fibers are treated with a natural enzyme before being washed and spun into yarn.

### Opportunities

Other than being sustainably beneficial to the environment, one of the advantages of bamboo is that it is a lightweight, versatile, and sturdy material which makes it easier to transport and handle on site, unlike other materials that requires cranes and other heavy machinery. It is a cost-efficient building material that is readily available for construction in the areas where it's cultivated. Bamboo is a perennial evergreen grass that grows and stays green all year round and one of the important attributes of this material is its rapid growth rate, making it a self-renewing resource of nature. Its shock absorption quality makes it a great alternative construction choice for earthquake resistant buildings. The buildings that will be made of bamboo can act as storage mechanisms for atmospheric CO<sub>2</sub>, hence, can become a solution for the climate crisis as well. Every acre of bamboo that is being used for production saves at least 10 acres of trees from being cut. And this is a very significant number. Planting bamboo along watershed helps in flood mitigation as it absorbs a large amount of water. Promoting the bamboo in construction industry has a huge potential for generation of employment.

### Challenges

Due to bamboo's high starch content, if the levels of sap or humidity are high, this plant is rather vulnerable to natural elements. Insects, fungus, rot, and fire may easily take advantage of harvested bamboo if it's not cut, treated, and stored correctly. Although it is the positive property of bamboo to be water-resistant, being a natural material composed of organic elements this can still be vulnerable to excessive moisture. The molds that have been built on the wet surfaces will accumulate over time and that should cause the degradation of the bamboo. Bamboo does not contain cross fibers and is, consequently, not designed to bear weight width wise, except for the points at the nodes. Bamboo is prone to splitting, especially when standard construction fasteners, such as bolts, screws, and nails, are inserted.

## Conclusion

Bamboo being a natural resource has immense possibilities as an artefact in housing industry. Its structural attributes like seismic resistant, high tensile and compressive strength etc. models it distinct. Bamboo is being slowly recognized as a renewable, fast-growing & economic staple that may replace the contemporary materials, if treated carefully. It encourages the economic expansion and conserves natural woods resources to guard our ecological environment by providing a replacement of wood.

Bamboo can help us earn carbon credits and in boosting the economy of the country. PWD, Maharashtra has accepted bamboo as a construction material and SSR rates are available for bamboo components which is a step towards sustainable development goals for the building industry. Increase in the cultivation and use of this sustainable material can help solve unemployment issues in the country by providing jobs to the local artisans and rural poor. Hence, we need more production centers to come up with innovative and

better ideas. And at the same time, we need to increase the awareness regarding this material which has been neglected in the construction industry until now. Mass timber is now the cutting edge in USA and Europe as it reduces the construction time by prefabricated modules off-site. The same can be developed in India too.

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## Obituary



Shri R.K. Mina, Former E-in-C; MCD and former Vice President, IBC left for his heavenly abode on Sept. 15, 2022. He was Life Member of Indian Buildings Congress for last many years. Indian Buildings Congress deeply mourns the sad demise of Shri Mina and prays to the Almighty to grant “Sadgati” to the departed noble soul.



Prof. (Er.) O.P. Gupta, VSM, Former Chief Engineer, MCD; Permanent Invitee of Governing Council of IBC left for his heavenly abode on Sept. 4, 2022. He was Life Member of Indian Buildings Congress for last many years. Indian Buildings Congress deeply mourns the sad demise of Prof. Gupta and prays to the Almighty to grant “Sadgati” to the departed noble soul.



**IBC Welcomes the following New Members enrolled during 02/07/2022 to 1/10/2022**  
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S.No.	M.No.	Name	Qualification	Designation	Department	City	State
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2	ML-9477	Ms. Deepanjali Malla	B.Tech (Civil Engg.)	Assistant Executive Engineer	Odisha PWD		Odisha
3	ML-9478	Shri Jignesh Ravajibhai Kunjadiya	Diploma in Civil Engineering	Owner	Regency Designers	RAJKOT	Gujarat
4	ML-9479	Shri Parth Bharatbhai Sojitra	B.E. (Civil), Master of Valution	Owner	Regency Designers	RAJKOT	Gujarat
5	ML-9480	Shri Yashraaj Singh	M.Tech. (Structures)	Design Engineer	BMSF Design Consultants	GURGAON	Haryana
6	ML-9481	Ms. Gursharan Jeet Kaur	Ph.D, M.Tech. (Urban Planning), B.Arch.	Assistant General Manager	Engineers India Limited	DELHI	Delhi
7	ML-9482	Shri Channveerayya	AMIE (Civil Engg.), MBA (HRM)	Junior Engineer (Civil)	BSNL	KALABURAGI	Karnataka
8	ML-9483	Shri Budhan Singh	B.E. (Civil)	Former Superintending Engineer (Civil)	GPWD	NOIDA	Uttar Pradesh
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12	ML-9487	Shri Arundev Venkumahanti	B.Tech. (Civil Engg.)	Additional Chief Engineer	WAPCOS Ltd.	RAIPUR	Chhattisgarh
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16	ML-9491	Shri Rohan Singh Parihar	B.E. (Civil), M.Tech. (Struct.)	Engineer (Civil & PH)	WAPCOS Ltd.	BHILAI	Chhattisgarh

## From Editor-in-Chief Desk

### Building Collapses

The issue regarding poor quality of construction was reviewed by IBC and various precautionary measures required have been documented in two write-ups. Both the write-ups have already been widely circulated.

Another very important issue is collapse of old buildings and buildings under construction. In fact everyday there are reports in news papers, where-in it is mentioned that on account of collapse of a building, some people died or injured. These unfortunate people could either be residents of building, passers by on adjoining streets, workers engaged in construction or maintenance of building. By and large, they belong to poor class and human misery can be well understood. Some measures are taken by concerned authorities but that is not enough. It is necessary to look into this important issue by engineers, municipal authorities, fire departments, police department etc. and solutions should be found.

Times of India dated 10/10/2022, had three reports concerning collapse of building; two of present and one of past.

- i. A four year old girl died and nine people were injured after a double storey house collapsed in Lahori Gate area of Central Delhi. The Delhi Fire Services, Delhi Police and National Disaster Response Force took action for rescue.
- ii. Two persons died after a fall of workers at I.G.I. Construction site. There were two layers of scaffolding and upper layer was being shifted to lower layer. The platform on which labourers were standing collapsed and they fell on concrete floor. These labours may not be wearing protective gears.
- iii. Some time back there was a fire in double-storeyed monumental building Natural History Museum. Invaluable specimens damaged during fire, were restored. Details of loss were not reported in this news paper.

In our country, every now and then, there is collapse of building already occupied or accident at building construction site. Hundreds of people died in these accidents. Relief measures are taken after the accident. But preventive measures are never initiated nor reported. Why loss of life of a human being is not taken seriously? Only concerned agencies can respond on remedial measures initiated and solution found for avoiding recurrence of such incidences.

The broad guidelines need to be framed by the concern authorities and training programmes of concerned official need to be organized.

Let us initiate a change, the change for betterment and for saving human lives.



(K.B. Rajoria)



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