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INDIAN BUILDINGS CONGRESS

Save Environment

Save Earth

O. P. Goel
Founder President, IBC &
Former Director General, CPWD

MESSAGE

It gives me immense pleasure that the IBC is organizing the next 27th Annual Convention and National Seminar on "Challenges & Innovations in Urban Planning & Development" at New Delhi on 13.07.2024 and 14.07.2024.

Urban Infrastructure is a major attribute of Construction Industry.

Construction Industry has taken a great leap in the new millennium. We have entered a new phase in the era of globalization and liberalization with new techniques, new concepts, new materials, and computer aided designs, highly sophisticated construction equipments and machinery, varieties of grades of cement, steel and other materials, which are revolutionizing the construction scenario in the country. We have an opportunity to realize our true potential by bringing in professionalism and global expertise in all areas of construction activities. I am glad all these aspects will be discussed in the technical sessions of the Seminar.

I extend by best wishes for the success of deliberations during the 27th Annual Convention and National Seminar.

(O. P. Goel)

CMD
NBCC (India) Limited

MESSAGE

Dear Members of the Indian Building Congress,

I extend my heartfelt congratulations to the Indian Building Congress (IBC) on the occasion of its 27th Annual National Seminar, scheduled for July 13-14, 2024, in New Delhi. The theme, "Challenges & Innovations in Urban Planning & Development," resonates profoundly with the evolving needs and aspirations of our urban landscapes. The dynamic evolution of our cities presents significant challenges for urban planners today. Rapid urbanization, population growth, environmental sustainability, and socio-economic disparities are reshaping our urban environments at an unprecedented pace. With the United Nations projecting that 68% of the world's population will reside in urban areas by 2050, the need for robust infrastructure, efficient public services, and adequate housing becomes increasingly urgent. This seminar provides a timely platform to explore viable solutions to these pressing issues.

The imperative of environmental sustainability cannot be overstated. Our cities account for over 70% of global CO2 emissions, necessitating the integration of green technologies, renewable energy, and eco-friendly building practices into urban planning processes. This approach not only mitigates environmental impact but also fosters healthier living environments for residents.

Technological advancements such as Geographic Information Systems (GIS), big data analytics, and artificial intelligence are revolutionizing urban planning by enabling informed decision-making, resource optimization, and accurate trend prediction.

Smart cities, leveraging IoT technologies, enhance the efficiency of urban services like traffic management, waste disposal, and energy distribution. Real-time data analytics and sensor integration improve urban governance and significantly elevate residents' quality of life.

The need to acknowledge the pivotal role of renewable energy in shaping sustainable infrastructure is the need of the hour. It is our responsibility to take initiatives to harness clean energy, ensuring a greener future. NBCC (India) Ltd. complements this effort by integrating renewable solutions into construction projects, enhancing energy efficiency, and reducing carbon footprints. Together, IBC and NBCC (India) Ltd. are instrumental in driving India towards energy independence and environmental stewardship, setting benchmarks in sustainable building practices for the Nation.

Engaging citizens in the planning process through participatory mapping, community workshops, and digital platforms ensures urban development meets community needs and fosters collaboration and ownership.

Effective urban planning is anchored in supportive policy frameworks and robust governance structures. Policies promoting sustainable development, innovation, and equitable resource distribution are essential. Regulatory frameworks should incentivize green building standards, smart infrastructure, and inclusive urban design.

Successful urban planning requires collaboration among diverse stakeholders—government bodies, private sectors, academia, and civil society. Multidisciplinary approaches harnessing expertise from various fields lead to more effective urban solutions. The 27th Annual National Seminar of the Indian Building Congress provides a vital forum for addressing these critical issues and exploring innovative solutions. NBCC has always remained committed to pioneering sustainable innovations and promoting inclusive urban planning practices that build resilient, livable, and equitable cities and will continue to do so in future too.

I commend the Indian Building Congress for its steadfast commitment to advancing urban planning and development. I am confident that this seminar will inspire fresh ideas, stimulate meaningful discussions, and significantly contribute to global urban planning advancements.

Best wishes for a successful seminar. I eagerly anticipate the transformative solutions that will emerge from this esteemed gathering.

K.P. Mahadevaswamy

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From President's Desk

India's built environment stands at the cusp of significant transformation. As the head of the Buildings Congress, I have witnessed the rapid urbanization and tremendous growth of our cities and infrastructure. This expansion, indicative of economic progress, brings a host of challenges, which we must address with urgency and foresight. Our cities grapple with overcrowded spaces, inadequate infrastructure, environmental degradation, and a strain on resources. Balancing the preservation of our cultural heritage with embracing modernity is delicate, often tipping unfavorably. The quality of life for millions hinges on our ability to navigate these complexities with wisdom and innovation.

To improve the outcomes of our built environment, a comprehensive approach is imperative. Sustainable planning and development must be prioritized, incorporating green building practices, renewable energy, and efficient resource management. Inclusive design is essential to ensure that infrastructure meets the needs of all citizens, including the elderly, differently-abled & economically disadvantaged, fostering a sense of community and shared prosperity. Technological integration, leveraging advancements in smart city technologies, data analytics, and construction methods, can optimize urban planning, enhance safety, and improve service delivery. Strengthening policy and governance through robust regulatory frameworks, encouraging public-private partnerships and ensuring transparent, accountable governance will drive holistic development. Investing in capacity building, education and training for architects, engineers, urban planners, and policymakers will equip them with the skills necessary to address contemporary challenges and innovate for the future.

This document delves into the intricacies of India's built environment, examining the current landscape, identifying pressing issues, and proposing actionable strategies for improvement. Our collective efforts in reimagining and reshaping our cities will not only enhance living conditions but also propel India towards a more sustainable and prosperous future. Let us embark on this journey with a shared vision and a commitment to creating spaces that are not just built, but built better.

(Maj. General Ashok Kumar, AVSM)
President, IBC &
Retd. Dir. General (Works), MES

Importance of Solar Trees in Urban Planning

Dr. K. M. Soni
Former ADG, CPWD, New Delhi

Energy generation from non-conventional resources has become a necessity in urban planning. Solar generation through rooftop solar panels has become common in the country both in government and private sectors however it is rarely possible to increase rooftop area for installation of solar panels due to high land cost and scarcity of land. Therefore, solar generation is also to be planned through solar trees which can be erected at suitable places in open areas where sunshine is available. Advantage of solar trees is that multiple solar panels can be erected in them to produce large power.

CPWD has erected large number of solar trees during the development of National Salt Satyagraha Memorial at Dandi, Gujarat during 2019.These solar trees were part of net energy plus campus of Dandi. Thus, solar trees help in achieving the goal of net zero or net plus campus, particularly when adequate rooftop is not available for solar power generation. The concept is more suited to urban areas due to limited open areas available and more and more high-rise structures coming up.

Net Zero and Net Plus Energy Buildings

A net zero energy building is a building with zero net energy consumption on annual basis i.e. the total amount of energy used by the building on an annual basis is produced through the renewable source in the building or site. Renewable energy sources are considered onsite or offsite. In onsite net zero buildings, generation of energy from renewable sources is at the site while in offsite net zero energy buildings, advantage of energy generated from renewable sources is considered from the outside of the site, the work of which can be clubbed in the project. Indira Paryavaran Bhawan, New Delhi was the first onsite net zero building in India, constructed by CPWD in 2014 in government sector.

Buildings or campuses that produce a surplus of energy over its consumption are called "Energy plus or net energy plus" buildings/campuses. National Salt Satyagraha Memorial at Dandiwas planned as net plus as it had large area with minimum building footprint by planning "Solar trees" in the campus.

National Salt Satyagraha Memorial, Dandi

The National Salt Satyagraha Memorial is planned near the location where salt law was broken in front of Saifee Villa, near Arabian Sea beach at Dandi. The memorial is constructed over 15-acre land, conceptualised and designed as fusion of modern and contemporary architecture and technology. It has an artificial lake with plan area of about 14000 sqm to symbolise the sea shore aspect of the "Salt Satyagraha", 24 narrative murals supported on granite monolith in natural shape and finish depicting various important events and stories from the historic Dandi March and life size sculptures of Mahatma Gandhi and the group of 80 fellow marchers. 40m high "A" shaped frame with two hands raised, up in the sky, holding at the top a salt crystal forming the canopy under which 5 metre high, the main statue of Mahatma Gandhi is its special feature, symbolising importance of salt.

From energy generation concept, 41 solar trees are the special features of the campus.

Solar Trees

A solar tree is a metallic structure on which solar power system is installed on a single column like a tree trunk. Advantage is that it can house many solar panels in various directions and also act as an artwork. These are planned in open areas like public places, parks, gardens and large campuses having open areas. A solar tree has also been depicted in Rajeev Chowk of Delhi for the public.

Forty-one solar trees have been installed in the campus for not only self-sufficiency in its energy requirements but also equal quantum of surplus energy for feeding into the grid. The peak power generation of the system is 144kW. Out of this, 90kW is planned as online system with net metering and other infrastructure, and 54kW offline system in two parts of 26kW and 28kW withbattery backup.

Design of Solar Trees

Forty-one solar trees having 12 leaves in each generating 182kWp have been installed. The main components of solar tree are foundation, trunk, branches and leaves. Typical elevations and plans are shown in Fig. 1.to 4.

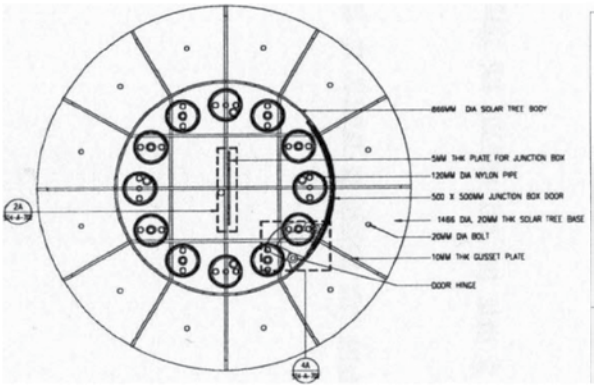

Fig. 1. Typical Front Elevation

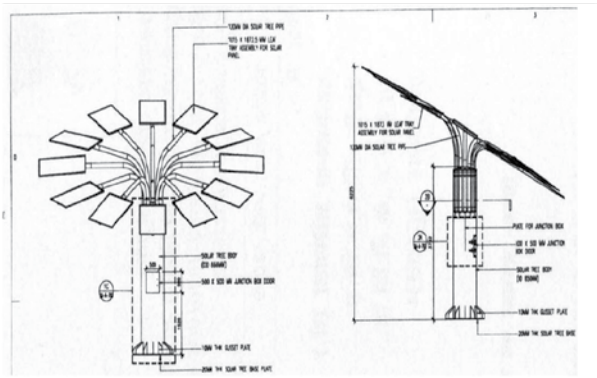

Fig. 2. Typical Side Elevation

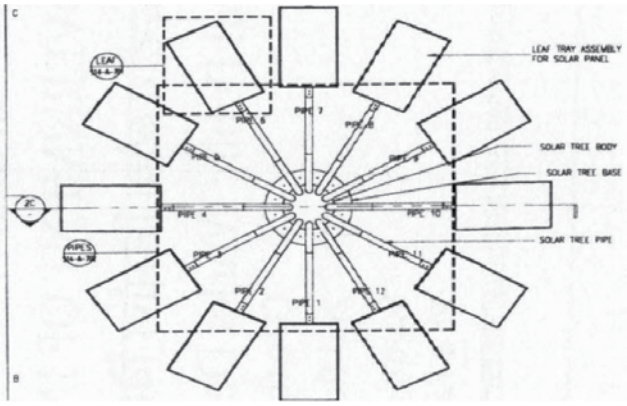

Fig. 3. Typical Plan without Leaves

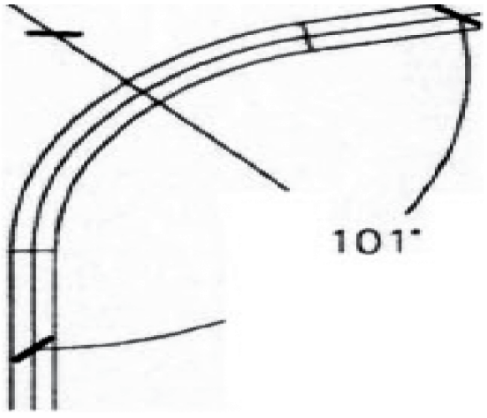

Fig. 4 Typical Plan with Leaves

Foundation of solar trees is to be cast as per the design requirements considering the soil characteristics. In Dandi, 200mm RCC raft was provided with 1500mmx1500mm RCC pedestal. Holding down bolts were placed in the pedestal for jointing base plate trunk of solar trees.

The trunk is made with metallic structure. In Dandi, it was made of 8mm thick MS plate bent to shape and jointed with arch welding to form circular member of 866mm outer dia. To avoid corrosion due to close vicinity to sea, multi-layer protective coatings were provided. However, trunk can also be made of stainless steel or other material as per the design.

Branches are made as per the sun availability, aestheticsand sun direction during most of the daytime considering ultimate requirement of the power generation. All the solar trees at Dandi had12 branches made in 316 grade stainless steel(SS) pipes of 114mm (OD) and 6mm wall thickness.

Each leaf has to comprise the solar PV panel as such it has to cater the load requirement and support entire load of the solar panel including self load and othe incidental loads. Further, the wiring is to be planned inside it. The leaves at Dandi project comprise of supporting frame in 316 grade SS sections, bottom cover with 2mm thick SS plate moulded to shape with and protrusions similar to natural leaves, connecting member with branch in 316 grade SS, PV module on top fixed on supporting frame and required wiring.

Various processes adopted in the Dandi project are also shown briefly in Fig. 5-8. Solar power generation from solar trees is more than the required electric power for the campus and as such excess power was fed into the grid. Thus, the campus became net energy plus campus.

Fig. 5. Erection of Trunk

(a)

(b)

(c)

Fig. 6. (a,b, c) Assembling, Cladding, and Wiring of Leaf

Fig. 7. Assembling Branches and Leaves

Fig. 8. A view of complete Solar Trees

Technical Specifications of Solar Module

Mono crystalline solar PV module of "Waaree" make were provided in Dandi campus however one can select solar PV modules fulfilling their requirements. Similarly, on-grid solar inverter can be selected. In Dandi, "Delta" make was provided. Off-grid solar inverter of "Consul Neowatt" was provided in Dandi project.

Solar Trees and Urban Planning

Solar trees are the necessity for the future to produce green solar energy. They can be erected in the parks, roads, highways, medians, bridges and even on columns of the buildings. Therefore, solar trees are going to play a very important role in the urban planning. Advantage is that unlike traditional solar panels, they are designed to mimic the natural form of trees, making them a visually aesthetic structure to merge in the urban landscape, simultaneously generating clean electricity.

In urban planning, town planners and architects have the option to choose required configuration of the solar trees. Various types of the configurations available at

present are (Mensour Almadhhachi, István Seres, István Farkas, 2022);

Multi-branch single stem (MBSS) is a simple structure consisting of a long column, looking like a tree stem and branches emerging at different heights, carrying solar modules at different surface angles and orientation according to the areas in which these trees are applied. This has design simplicity that is easy to develop, but considered among the least efficient designs in capturing solar radiation throughout the daytime due to the orientation of the solar module with different lengths of tree branches. It is used for powering fuel station in Budapest, Hungary (Fig. 9).

Fig.9. MBSS in Budapest

Fibonacci pattern solar tree

It is the most popular solar tree nowadays capturing sunlight with relatively high efficiency. This configuration (Fig. 10) produces more energy compared with traditional PV modules.

(a)

(b)

Fig. 10 (a, b) Fibonacci pattern Solar Tree

Spiralling phyllotaxy solar tree

Though innovative, symbolising natural plants, it is the most widespread forming large complex umbrella helping to capture sunlight in an extensive and efficient manner but consumes considerable space for its leaves and is expensive.

Fig. 11. Spiralling phyllotaxy Solar Tree

Hemispherical dome solar tree

It is special design covering daylight period to capture the sun's rays with the best efficiency, consisting of

modules that form a semi-spherical dome. Due to its shape, it is covered with the sun path during entire day period.

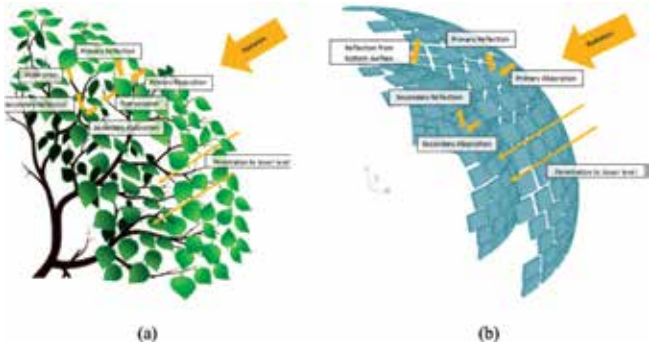

Fig. 12 Hemispherical dome Solar Tree

Three-dimensional geometric design

This configuration consists of a leg, the top of which, a solar panel is directed at a certain angle, and solar modules distributed on the branches symmetrically within specific inclination angles to enhance the capture of sunlight.

Fig. 13. Three-dimensional geometric design

Researchers and designers are developing beautiful engineering art forms of solar trees to match with their urban landscape. As such, various configurations are available and being adopted worldwide. Some of the shapes are given in the following:

Advantages of Solar Trees in Urban Planning

- Solar PV panels on solar trees can be designed beautifully which attract the tourist. They can also be designed with automatic sun tracking systems

that adjust the position of the panels throughout the day to maximise the capture of the sunlight.

- Solar trees maximise the land use as they occupy very less space compared to traditional solar panels while harnessing maximum solar energy.
- They can be provided in the parks, public places, open areas, roads, highways, buildings, bridges, other structures, airports, sides of railway lines etc.
- Due to beautiful design, they attract the tourists.
- Solar trees can also be erected in parks, gardens and agricultural farms without disrupting much of farming activities.
- Solar trees can generate large amount of solar power in the places of urban areas like India as a typical solar tree can generate 2 to 5 kW of power depending upon its size and the number of panels.

Conclusion

Solar trees, harnessing solar power through multiple PV modulesare now aesthetic expressions as well as structures for power generation through renewable sources. The concept of solar trees installed at National Salt Satyagraha memorial, and the world's largest solar tree producing approximately 11,500 W of electricity developed by the Central Mechanical Engineering Research Institute in 2020and installed in Durgapur having 35 solar PV modules with 330 W for each module in India are successful examples showing the future of solar trees in India.

It is expected that installation of solar trees will be taken up in all the urban areas initially as a part of compulsory planning at least in open public places and then in rural areas to harness source of green energy.

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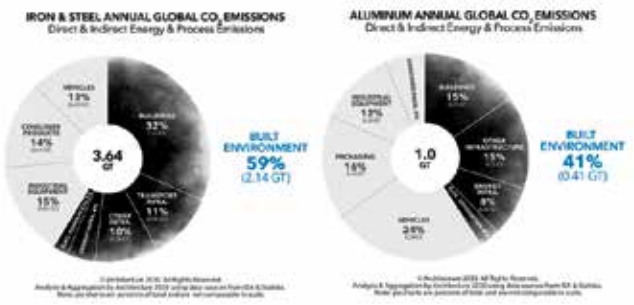
Climate Change Risks in Construction Industry

Usha Batra
Former SDG, CPWD

Among all industries, the built environment is the most significant contributor to GHG emissions, accountable for more than one third of global carbon emissions, one third of global resource use, and 40% of worldwide energy consumption. This includes emissions directly produced by the construction industry, during construction and operational phase of a building's lifespan. The operational phase of a building is responsible for substantial emissions, mainly due to heating, cooling and electricity consumption. Indirect emissions stem from energy-intensive production processes of extensively used raw materials like cement, steel, and glass and transporting these materials and equipment to construction sites. Concrete production alone accounts for approximately 8% of global CO2 emissions, surpassing global carbon emissions from aviation.



Moreover, construction industry significantly contributes to waste generation, responsible for 40% of global waste. Inefficient resource usage, design flaws, lack of recycling and reuse strategies result in considerable waste, often relegated to landfills, producing methane, a highly potent greenhouse gas i.e it affects climate change by contributing to increased warming.

Conversely, climate change substantially influences the operation and efficiency of the construction sector. With extreme weather events becoming more common, there's an increasing need for buildings which can withstand these conditions. This demands innovation of building more resilient structures. Governments worldwide are imposing stricter regulations on carbon emissions and energy efficiency in an effort to counteract climate change, thereby driving the industry towards 'green building' techniques. Increased awareness of climate change amongst consumers is shifting the industry towards buildings with lower environmental impacts and sustainable construction.

The construction industry is facing a two-pronged fight against climate change. It must accelerate its efforts to reduce or prevent greenhouse gas emissions to decelerate global warming while simultaneously adapting to increase resilience to climate impacts to avoid damaging impacts of climate change that are already occurring and will continue to occur even with strong mitigation efforts.

Some of the mitigation and adaption measures are as under :

1. **Green Building Practices** – Construction of energy-efficient buildings plays a crucial role in mitigating climate change. This includes using energy-efficient design and construction techniques, incorporating renewable energy sources, and using sustainable or recycled materials.
2. **Climate-resilient infrastructure** – Climate change increases the risk of extreme weather events, so necessitates need to design and build infrastructure that can withstand these challenges.
3. **Digital technology and innovation** – New technologies are being utilised to help reduce the environmental impact in construction industry. This includes using Building Information Modeling (BIM) for better planning, clash detection before start of construction, and resource management or artificial intelligence (AI) and machine learning to optimise building design for energy efficiency. Also, technologies like 3D printing and drones fitted with sensors can be harnessed to improve the efficiency and sustainability of construction projects.

4. **Lifecycle assessment** – It is critical to assess the direct and indirect environmental impact of buildings across their entire lifecycle, from extraction of raw materials to construction, operation and finally demolition or repurposing. This leads to a circular economy approach, where waste is minimised, and materials are reused or recycled wherever possible.

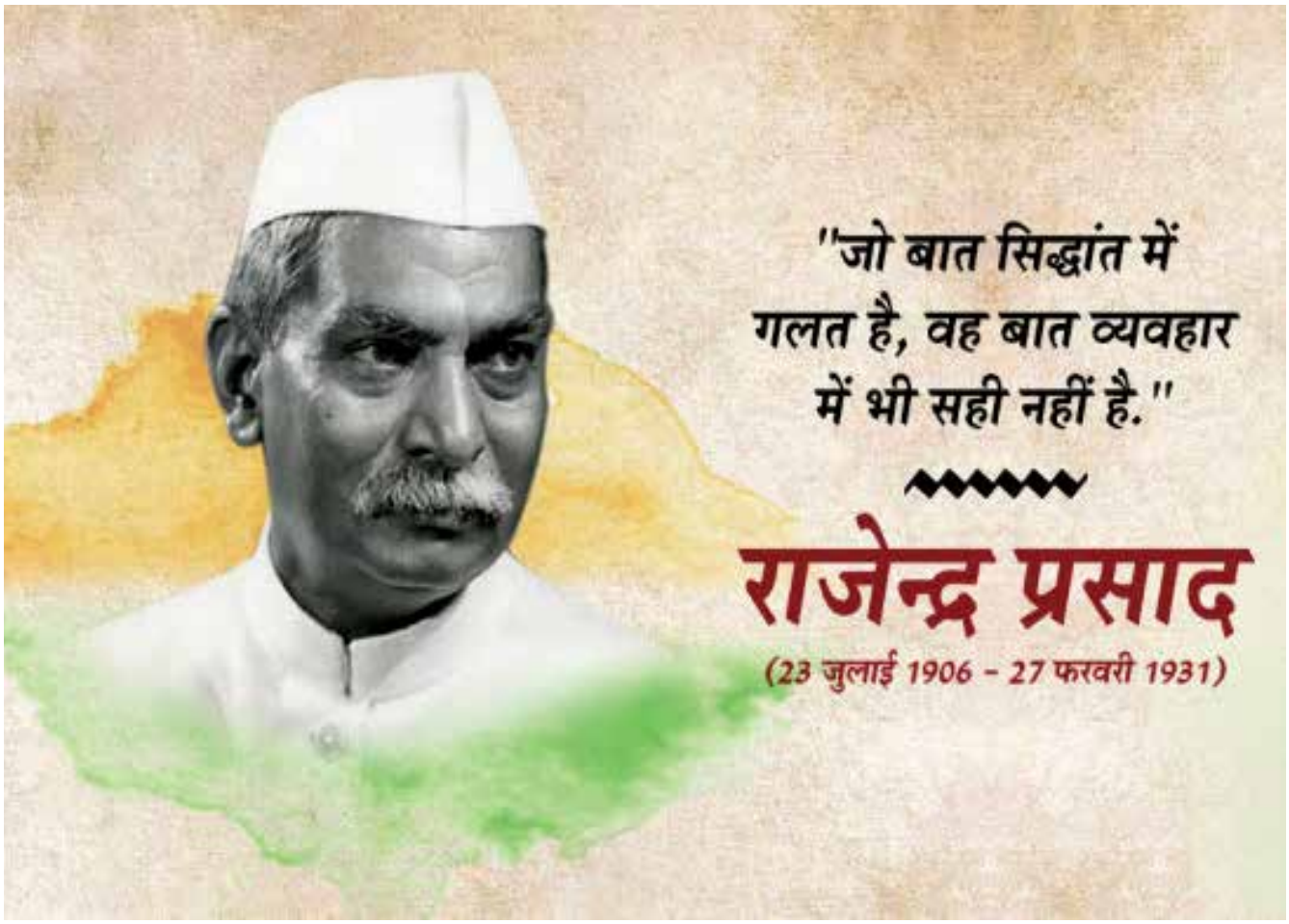
5. **Carbon offsetting** – Some companies are investing in carbon offset projects, which help to compensate for the emissions produced in the construction process. This might include investing in renewable energy projects or reforestation efforts.

6. **Government regulations and standards** – In many countries, new regulations and standards push the industry towards more sustainable practices.For instance, stricter energy codes require buildings to be more energy-efficient, and some nations are implementing carbon pricing or cap-and-trade systems that encourage lower emissions.

7. **Training and education** – Construction professionals are educated and trained in sustainable building practices. This includes architects, engineers, builders, contractors, and other industry workers.

From above we learn that Relationship between the construction industry and climate change is complex and multidimensional as construction sector is a significant contributor to climate change and is also impacted by it. With approximately 70% of the world's population expected to live in urban areas by 2050, environmental fallout due to increased construction activities is likely to worsen in the future.

Hence, construction industry requires urgent, large-scale action for climate change mitigation and adaptation. To achieve this, a collaborative effort is required from all stakeholders, including policymakers, construction companies, building professionals, and consumers.



Transformative Applications of AI in Enhancing Construction Safety and Quality: Case Studies from India

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Abstract

The construction industry crucial for societal progress, faces significant challenges in ensuring worker safety and maintaining high-quality standards. Artificial intelligence (AI) has emerged as a game-changer, offering numerous applications that can revolutionize construction project planning, execution, and monitoring. This paper delves into the transformative power of AI for enhancing construction safety and quality. AI technologies such as real-time monitoring, predictive analytics, and enhanced worker training are explored in-depth. Real-time monitoring uses AI-powered video analytics to detect unsafe behaviours and prevent accidents. Predictive analytics leverage historical data to anticipate safety risks and implement preventive measures. Enhanced worker training through AI-powered platforms provides personalized instruction and real-time feedback, improving competency and safety awareness. The paper highlights case studies from India, including Larsen & Toubro's use of AI for video analytics and IIT Delhi's AI-based structural health monitoring systems. While AI offers substantial benefits, challenges such as high initial investment, data privacy concerns and job displacement need to be addressed. By embracing AI technologies, the Indian construction industry can create a safer, more efficient and higher-quality future for its workforce and infrastructure.

Introduction

The construction industry is vital for a nation's infrastructure and economic development. However, it also presents inherent risks, leading to worker injuries and fatalities. According to the International Labour Organization (ILO), the construction sector accounts for a disproportionate share of work-related accidents and fatalities globally.[1] Ensuring quality standards throughout the construction process can be complex, leading to defects, rework, and project delays. Artificial intelligence (AI) has emerged as a powerful tool to address these concerns. AI encompasses a wide range of technologies that enable machines to simulate human cognitive functions such as learning, reasoning, and problem-solving. When applied to construction, AI can analyse vast amounts of data, identify patterns, and make predictions, leading to significant improvements in safety and quality. This paper explores the transformative applications of AI in construction safety and quality enhancement, focusing on real-time monitoring, predictive analytics, and enhanced worker training. We delve into the Indian context by incorporating recent case studies that showcase the potential of AI in improving construction practices. Finally, we discuss the limitations and future directions of AI implementation in construction safety and quality.

Literature Review

Several studies have explored the applications of AI in construction. For instance, AI-powered systems can continuously monitor construction sites, identifying potential hazards and risks in real-time.[2] This aligns with the use of AI for predictive analytics, leveraging historical data to anticipate safety risks and implement preventive measures[3]. Furthermore, AI can enhance worker training through personalized instruction and real-time feedback.[4]. Recent research delves into the use of AI-powered computer vision for automated defect detection in construction materials, significantly improving quality control[5]. Additionally, AI can optimize construction schedules and resource allocation, leading to increased efficiency and reduced project costs.[6]

Applications of AI in Construction Safety and Quality

Real-time Monitoring: AI-powered video analytics can be employed to continuously monitor construction sites. Cameras equipped with object recognition and facial recognition capabilities can detect unsafe behaviours like workers not wearing personal protective equipment (PPE) or entering restricted areas. Additionally, AI can analyses worker movements to identify potentially dangerous situations, such as fatigue or improper lifting techniques. This allows for immediate intervention, preventing accidents and fostering a safety-conscious work environment. [2]

Predictive Analytics: AI algorithms can analyse vast datasets of historical project data, including

accident reports, near misses, weather patterns, and equipment malfunctions. By identifying patterns and correlations, AI can predict situations with a high risk of accidents. For instance, the system might identify a correlation between high winds and increased crane accidents, prompting the implementation of stricter safety protocols during windy days. Similarly, AI can analyse historical data on material defects to predict which batches of materials are more likely to be faulty, enabling proactive quality control measures.

Enhanced Worker Training: AI-powered training platforms can personalize learning experiences for construction workers. These platforms can tailor training modules based on individual skill levels, identified through pre-assessments or real-time performance monitoring during simulations. The system can then focus on areas where workers need improvement, providing targeted training and real-time feedback during simulations or virtual reality exercises. This targeted approach can significantly improve worker competency and safety awareness, leading to a reduction in human error on construction sites.

Additional Applications: Beyond the three applications mentioned above, AI offers a range of other potential benefits for construction safety and quality. These include:

- **Automated Quality Control:** AI-powered robots can be deployed for automated inspection tasks, identifying defects in construction materials or workmanship with greater accuracy and consistency compared to manual inspections.
- **Construction Site Optimization:** AI algorithms can analyse data from sensors and cameras to optimize construction workflows, minimizing equipment downtime and streamlining material delivery processes.
- **Predictive Maintenance:** AI can analyse sensor data from equipment to predict potential malfunctions, enabling proactive maintenance and preventing costly breakdowns.

Case Studies: AI in Construction Safety and Quality (Indian Context)

- Larsen & Toubro (L&T): Larsen & Toubro (L&T) is a multinational engineering and construction conglomerate headquartered in Mumbai, India. Recognizing the potential of AI for safety improvement, L&T has implemented AI-powered video analytics at several of its construction sites. These systems utilize cameras equipped with object recognition and facial recognition capabilities to continuously monitor worker activity.[7] The implementation of AI has yielded positive results for L&T. A study by the company itself reported a 75% reduction in near misses and a 50% reduction in safety incidents at construction sites using AI video analytics. This significant decrease in safety hazards demonstrates the effectiveness of AI in proactively identifying and preventing accidents.
- **Indian Institute of Technology (IIT) Delhi:** The Indian Institute of Technology (IIT) Delhi is a premier engineering and technology institute in India. Researchers at IIT Delhi are at the forefront of developing innovative solutions for the construction industry, including AI-based structural health monitoring systems.[8] These systems utilize a network of sensors embedded within a structure to continuously collect data on various parameters such as strain, vibration, and temperature. The AI algorithms in these systems analyse the sensor data in real-time to identify any anomalies or deviations from the expected behaviour. This allows for early detection of potential structural issues such as cracks, foundation settlement, or corrosion. By identifying these issues early on, preventative measures can be taken to prevent catastrophic failures and ensure the safety of occupants and the surrounding environment.[10]

Limitations and Future Directions

While AI offers a multitude of benefits for construction safety and quality, there are some limitations to consider:

- **High Initial Investment:** Implementing AI technology in construction can be expensive. The costs associated with hardware, software, data infrastructure, and potential system integration can be significant hurdles for smaller companies.
  - **Potential Solutions:** Certain solutions are as below:-
  - **Phased Implementation:** Companies can adopt a phased approach, starting with pilot projects on specific aspects of safety or quality control. This allows for a gradual increase in investment and expertise, before full-scale deployment.
  - **Exploring Financing Option:.** Financial institutions and government agencies might offer loans, grants, or tax incentives to encourage AI adoption in construction, particularly for small and medium-sized enterprises (SMEs).
- **Data Privacy:** The use of AI in construction often involves collecting and analysing worker data,

such as video footage or sensor readings. This raises concerns about data privacy and potential misuse.

- Addressing Privacy Concerns.
- **Ethical Frameworks:** Establishing clear ethical guidelines and regulations for data collection, storage, and usage is crucial. These frameworks should ensure transparency, user consent, and data security.
- Data Anonymization Anonymizing data whenever possible can mitigate privacy risks while still allowing for effective AI analysis.

- **Focus on Human-AI Collaboration**
  - **Reskilling and Upskilling:** The construction industry needs to invest in reskilling and upskilling programs to equip workers with the necessary skills to work alongside AI effectively. This could involve training in areas like data analysis, AI system operation, and system maintenance.
  - **Focus on New Roles:** AI will likely create new job opportunities in areas like AI system design, data management, and human-AI collaboration expertise.
  - **Integration and Training:** Construction personnel need training to understand how AI systems work, interpret their outputs, and integrate them effectively into their workflows. This will require a cultural shift within the industry to embrace new technologies.
- **Future Advancements**
  - **More Sophisticated AI Models:** As AI research progresses, we can expect the development of even more sophisticated models with improved capabilities for pattern recognition, anomaly detection, and predictive analytics.
  - **Deeper Integration with IoT:** The construction industry is increasingly adopting Internet of Things (IoT) technologies. Deeper integration between AI and IoT will allow for real-time analysis of sensor data from various sources, leading to more comprehensive monitoring and insights.
  - **Human-AI Collaboration Research:** Continued research on how humans and AI can best collaborate will be crucial for maximizing the benefits of AI technology while minimizing potential drawbacks.

Conclusion

AI has the transformative potential to revolutionize construction safety and quality enhancement. The applications discussed in this paper, including real-time monitoring, predictive analytics, and enhanced worker training, offer significant opportunities to improve worker safety, reduce accidents, and ensure high-quality construction outcomes. Overcoming limitations through phased implementation, addressing data privacy concerns, and embracing human-AI collaboration are crucial steps to fully harness the power of AI. By proactively embracing AI technologies, the Indian construction industry can create a safer, more efficient, and higher-quality future for its workforce and infrastructure.

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Challenges & Innovations in Urban Planning and Development

Praveen Nigam
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Pushpendra Dhama
Contract Expert M.P. PWD (B)

Abstract

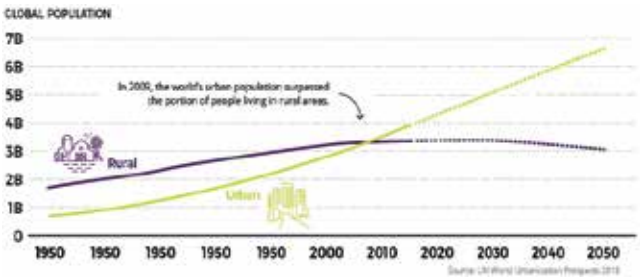
In the mosaic of humanity's collective ambition and endeavour, cities stand as towering monuments to progress and civilization. They are crucibles where cultures converge, economies thrive, and aspirations manifest into tangible realities. Yet, behind the gleaming facades and bustling streets lie intricate webs of challenges that define the urban landscape. Urban planning and development, the art and science of shaping cities, are confronted today with unprecedented complexities. As populations surge and urbanization accelerates, the pressures on infrastructure, housing, environment, and social equity intensify. The very systems designed to sustain urban life now strain under the weight of rapid expansion and evolving needs. In this exploration, we delve into the heart of these challenges, dissecting their origins, implications, and potential solutions. From the intricacies of sustainable development to the dynamics of inclusivity and resilience, each facet offers a lens through which we can comprehend the intricate tapestry of urban life. Join us as we navigate this labyrinth, uncovering the forces that shape our cities and the strategies that hold promise for a more harmonious and sustainable urban future. Together, we embark on a journey to understand not just the challenges, but the transformative potential inherent in the ongoing evolution of our urban landscapes.

Introduction

Urbanization is one of the defining trends of our time, with more than half of the world's population now residing in cities. This rapid growth presents both opportunities and formidable challenges for urban planners and developers tasked with shaping the future of our cities. At its core, urban planning and development encompass a multidimensional puzzle where economic, social, environmental, and infrastructural factors converge. The decisions made today about land use, transportation, housing, and public amenities reverberate through generations, influencing everything from quality of life to economic competitiveness. However, as cities expand and populations swell, they strain against finite resources and aging infrastructure. Issues such as housing affordability, transportation congestion, environmental sustainability, and social equity emerge as critical pressure points that demand innovative solutions. Moreover, the global context adds layers of complexity. Climate change necessitates resilient urban design, while technological advancements promise to revolutionize urban living but also challenge traditional planning paradigms. In this exploration, we delve deep into these challenges, examining their interconnected nature and exploring potential pathways forward. By understanding the complexities and dynamics of urban planning and development, we can forge a path towards more liveable, inclusive, and sustainable cities for future generations.Join us as we embark on a journey through the intricate landscape of urban challenges, seeking insights and strategies to navigate the complexities of urban planning and development in the 21st century.

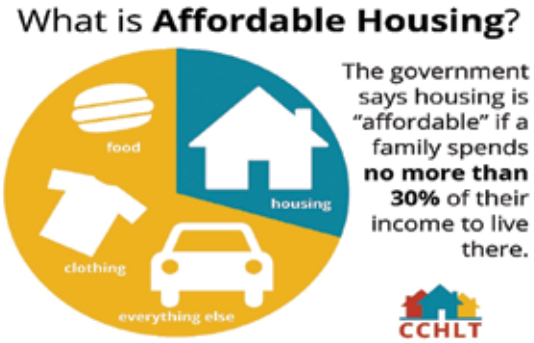
Population Growth and Urban Sprawl

- **Description:** Urban sprawl refers to the uncontrolled expansion of urban areas into the surrounding rural land, leading to a spread-out, car-dependent community.
- **Key Issues:**
  - **Infrastructure Strain:** As cities expand, the demand for infrastructure—such as roads, schools, and hospitals—grows, often outpacing the ability to supply these services.
  - **Environmental Impact:** Sprawl can lead to the loss of wildlife habitats, increased air and water pollution, and higher energy consumption.
  - **Economic Costs:** Sprawling cities require more resources to maintain, including longer commutes that increase transportation costs and decrease productivity.
- **Case Study:** Los Angeles, USA, is a classic example of urban sprawl, facing significant traffic congestion and air quality issues.



Affordable Housing

- **Description:** Affordable housing refers to housing units that are affordable by that section of society whose income is below the median household income.
- **Key Issues:**
  - **High Demand vs. Low Supply:** The gap between the growing demand for affordable housing and the slow rate of new construction leads to housing shortages.
  - **Economic Segregation:** High housing costs force lower-income residents to live in less desirable areas, often far from employment opportunities.
  - **Policy Challenges:** Zoning laws and land-use regulations can restrict the development of affordable housing.
- **Case Study:** Vancouver, Canada, has one of the most expensive real estate markets in the world, making affordable housing a significant challenge.



Environmental Sustainability

- **Description:** Ensuring that urban development does not compromise the ability of future generations to meet their needs.
- **Key Issues:**
  - **Resource Depletion:** Rapid urbanization can lead to the overuse of natural resources, such as water and energy.
  - **Pollution:** Increased industrial activities and vehicular emissions contribute to air, water, and soil pollution.
  - **Climate Change:** Urban areas are significant contributors to greenhouse gas emissions, exacerbating global warming.
- **Case Study:** Beijing, China, faces severe air pollution issues due to rapid industrialization and urbanization.

4. Infrastructure and Transportation

- **Description:** The physical and organizational structures needed for the operation of a society.
- **Key Issues:**
  - **Aging Infrastructure:** Many cities struggle with maintaining and upgrading outdated infrastructure.
  - **Traffic Congestion:** Increased vehicle usage leads to traffic jams, longer commutes, and higher pollution levels.

- **Public Transit:** Insufficient public transportation options can limit mobility and economic opportunities.

- **Case Study:** Mexico City, Mexico, faces chronic traffic congestion, significantly impacting daily life and economic productivity.

Social Inclusion and Equity

- **Description:** Ensuring all community members have equitable access to opportunities and resources.
- **Key Issues:**
  - **Gentrification:** Redevelopment of urban areas can displace long-term residents, particularly low-income and minority communities.
  - **Access to Services:** Disparities in access to healthcare, education, and employment opportunities can exacerbate social inequalities.
  - **Community Engagement:** Lack of involvement of marginalized groups in planning processes can lead to policies that do not address their needs.
- **Case Study:** Detroit, USA, faces significant challenges related to racial and economic segregation.

Technological Integration

- **Description:** Incorporating digital technologies to enhance urban living.
- Key Issues:
  - **Digital Divide:** Unequal access to technology can widen socioeconomic disparities.
  - **Privacy Concerns:** The use of surveillance and data collection technologies can lead to privacy infringements.
  - **Adaptation:** Integrating new technologies into existing urban systems can be complex and costly.
- **Case Study:** Songdo, South Korea, is a planned smart city that integrates numerous technological innovations but also faces challenges in balancing technology with human needs.

In-Depth Analysis of Innovations in Urban Planning and Development

Smart Cities

- **Innovation:** Deployment of sensors, data analytics, and IoT to improve urban management.
- **Benefits:**
  - **Efficiency:** Real-time data helps optimize traffic flow, reduce energy consumption, and enhance public safety.
  - **Citizen Engagement:** Mobile apps and platforms allow residents to report issues and participate in decision-making.
  - **Sustainability:** Smart technologies can help monitor and reduce environmental impacts.
- **Case Study:** Singapore's Smart Nation initiative leverages technology to improve urban living standards.

Sustainable Architecture

- **Innovation:** Designing buildings to minimize environmental impact.
- **Benefits:**
  - **Energy Efficiency:** Use of renewable energy sources and energy-efficient designs reduce carbon footprints.
  - **Health Benefits:** Sustainable buildings often provide better indoor air quality and natural lighting.
  - **Cost Savings:** Energy-efficient buildings can significantly reduce utility costs over time.
- **Case Study:** The Edge in Amsterdam, Netherlands, is one of the most sustainable office buildings in the world.

Mixed-Use Development

- **Innovation:** Creating spaces that combine residential, commercial, and recreational uses.
- **Benefits:**
  - **Reduced Commutes:** People can live, work, and play in the same area, reducing the need for transportation.
  - **Vibrant Communities:** Mixed-use areas tend to be more lively and socially engaging.

- **Economic Resilience:** Diverse land uses can help buffer against economic downturns in specific sectors.

- **Case Study:** The redevelopment of the King's Cross area in London has transformed it into a vibrant mixed-use neighbourhood.

Green Infrastructure

- **Innovation:** Using natural systems to provide urban services.
- **Benefits:**
  - **Flood Management:** Green roofs and permeable surfaces can help manage storm water.
  - **Urban Heat Island Mitigation:** Green spaces reduce urban temperatures.
  - **Biodiversity:** Green infrastructure supports urban wildlife and enhances ecological health.
- **Case Study:** New York City's High Line is a prime example of transforming abandoned infrastructure into a green public space.\

Public-Private Partnerships (PPPs)

- **Innovation:** Collaborations between government and private entities for urban development.
- **Benefits:**
  - **Resource Mobilization:** Leverages private capital and expertise for public projects.
  - **Efficiency:** Private sector involvement can lead to more efficient project execution and management.
  - **Innovation:** PPPs can introduce innovative approaches and technologies in urban development.
- **Case Study:** The Denver Union Station project in the USA is a successful PPP that revitalized the city's transportation hub.

Participatory Planning

- **Innovation:** Involving citizens in the urban planning process.
- **Benefits:**
  - **Social Equity:** Ensures that the needs and voices of all community members are considered.
  - **Transparency:** Increases trust in the planning process through open dialogue and collaboration.
  - **Community Ownership:** Greater involvement leads to stronger community support and stewardship of urban projects.
- **Case Study:** The participatory budgeting process in Porto Alegre, Brazil, has become a model for citizen engagement in municipal budgeting.

Conclusion

The field of urban planning and development is evolving to address the myriad challenges posed by rapid urbanization, environmental concerns, and social inequalities. By harnessing innovative solutions such as smart city technologies, sustainable design, and inclusive planning practices, cities can create more resilient, equitable, and vibrant urban environments. The successful integration of these innovations depends on collaborative efforts among governments, private sectors, and communities, ensuring that urban development meets the diverse needs of present and future generations.

Steel Concrete Composite High-Rise Building with Stepped Architecture for Earthquake Prone Areas

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Abstract

In structural engineering, steel-concrete composite structures are those types of structures where we use these two materials efficiently in the construction. They act as a single unit in which steel is effective on tension side and concrete is effective on compression side. In this paper, the proposed 22 storey high-rise building frame is made of structural steel columns and steel beams with concrete slab composite floors. Stepped Architecture is one of the ideal concepts of construction to stabilize any framed structure. The bottom portion should be much wider than the top portion of the structure in this concept. This concept is very suitable for high-rise buildings in earthquake prone areas. We will discuss about composite construction and stepped architecture concepts in detail and will show how we can apply both of these concepts in high-rise building to work efficiently. Purpose of this paper is to design and analyze a two dimensional building frame under high seismic zone without providing any extra seismic resisting system.

Introduction

We all know that 71% of earth surface is covered by water and remaining part is covered by land. Population of world is increasing day by day but our land of earth is limited. So it is not possible to built house for each and every individual person. In our modern days of civilization, construction of tall buildings is rapidly increasing where maximum person can live by using minimum space of land. This tall building is constructed not only for residential purpose but also can be used for commercial purpose or both. There is no such definition of tall or high-rise building. But as per IS Code RC buildings of height more than 50 m but less than 250 m can be treated as a tall building but this standard is not applicable for location of building near field of seismogenic fault.

Composite is that where two or more materials or units of different properties are combined together and these materials or units act as a single unit. Composite construction is widely used method in modern days of constructions. Scientists are doing research on this theory that how to develop more composite construction in different ways. Engineers are also adopting this technique in construction industries. Composite construction is widely used in building construction, aircraft and watercraft. There are some examples of composite construction like – Steel-Concrete composite deck, Wood-Plastic composite deck, Cement-Polymer composite etc. Composite constructions have some advantages like high strength, high stiffness, high seismic resistance, increased load carrying capacity, economic, lightweight and environment sustainability.

Most of the high-rise buildings have more tend to experience prolonged shaking than short buildings because they often have lower damping and body waves from earth rapidly travels through the ground compared to slower, more destructive wave. They are not safe enough to resist vibrations. Hence, tall buildings are not safe against earthquake. It has major chance to damage of properties and lots of life loss. Tall buildings are not safe even in Zone – II. For example, we can say about 2001 Bhuj earthquake where high-rise buildings of Ahmedabad city were damaged epicenter was 300 km away from it. To resist the affects of earthquake we have to apply some modern technologies by installing seismic isolation devices. These devices reduce the energy of structure and reduce forces acting on floors. These devices increase the stiffness of structures and also increase the capacity of structures to resist loads. There are so many devices those can be used as per the design like Synthetic Rubber Bearing or Lead Rubber Bearing, Fluid or Viscous Dampers, Visco-Elastic Damper, Rocker Roller etc. Sometimes we can use some design concept for earthquake resistance building like Shear Wall concept, Braced Frame concept etc.

There is a lot of research on the best shapes for earthquake resistance buildings. Buildings can be irregular or asymmetrical in shape. Some shapes those have been found to perform well in earthquake include Triangular shape, Rectangular shape, Dome shape, Stepped shape etc. In this paper, we will focus on stepped shape with no extra seismic resistant mechanism.

Steel Concrete Composite

Steel-Concrete composite is one of the most widely used among all composite structures. This type of composite slab is generally used in bridges and multi-storey buildings. Because of composite action, it has higher stiffness, higher strength, higher span to depth

ratio, lower deflection than traditional steel or concrete. Concrete is strong in compression where steel is strong in tension. Therefore, it is proven that steel-concrete composite enhances the structural performance.

Composite deck is a combination of the compressive strength of concrete with the tensile strength of steel to improve the design efficiency and potentially reduce the volume of material necessary to cover a given area. A profiled sheet of metal supported by steel joist or beam is the shuttering cum reinforcement. Then fresh concrete is poured on top of this sheet and it becomes a composite deck. The advantage of using composite deck is the increased strength of the floor without adding any extra weight.

Due to high load carrying capacity, larger span, high diaphragm action, easy installation process, minimal wastage and good safety for workers composite deck is proposed by the designers now-a-days.

Earthquake Resistant Building

Releases of energy due to movement of tectonic plates huge damages occur in the structures like tall buildings, bridges etc. The tall buildings are more flexible than the short buildings so it has more chances to damage by earthquake. This is so destructive that is enough to kill lot of people and massive loss of economy. Hence, seismic analysis is very much needful for tall buildings. In our country, we have all four seismic zones i.e. Zone 2 to Zone 5. This analysis is followed by IS codes and depends on earthquake zones, soil strata, type of structure, seismic weight of building, ground acceleration etc. Effects of design earthquake loads applied on structures can be considered in different analysis method such as equivalent static method, response spectrum method etc. Various methods of earthquake resisting systems are also applied like shear wall, core wall, braced frame, base isolation, different types of dampers etc.

Our Case Study

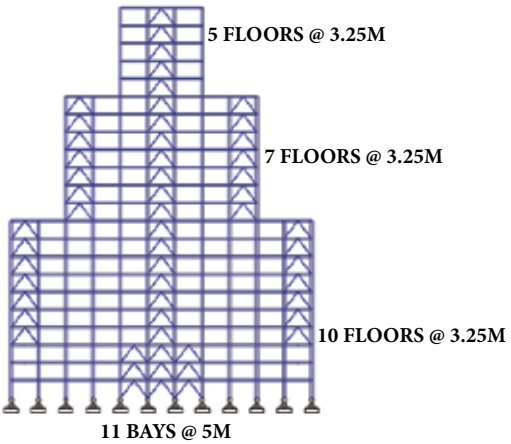
Only steel or concrete buildings both have drawback in wind and earthquake respectively. According to our study to improve the properties of tall buildings we should use steel concrete composite. A study says that composite systems are over 25% lighter than concrete construction. In high-rise building seismic reaction affects horizontally and tortionally. In general bracing and shear wall are to be designed for stiffness because bracing and shear wall aim to dissipate this poor seismic behavior.

According to the study, we noticed that storey displacement is more in symmetrical building, so we propose to design different architectural concept that is horizontally or vertically irregular in shape. Triangular or pyramidal shape is more prominent for earthquake resistant building. So in this case we design a building which is cascade shape or also we can say this type of architecture is stepped architecture. All over the world we can see the concept of stepped architecture. Shenye Tairan Building (Shenzhen City, China) and Aspern J4 (Vienna, Austria) are the examples of among stepped architecture.

STAAD-PRO software is used for seismic analysis of buildings. The result shows that bracings are much more efficient than shear wall in reducing lateral displacement of frame as drift and horizontal deflection are much less than shear wall. Column axial forces are more in braced frame than shear wall and column & beam moment is less than shear wall. CCTV Headquaters (Beijing, China) and Hearst Building (New York City, USA) are the best example of tall building with bracing.

Description of Structure

In this paper, a 22-storey residential two dimensional building frame is considered which is to be designed under seismic loading. The building shape has three steps. The first step is constructed from the Ground floor to 10th floor and also has 11 bays with distance of 5 m each. The second step is designed from 11th floor to 17th floor. We reduce two bays from all sides of the frames of second step and also has 7 bays with distance of 5 m each. Similarly, the third step again we reduce two more bays from all sides of frames. This third step is 18th floor to top of the building frame. Each floor height of this building is 3.25 m.



The building is made of steel-concrete composite by using wide flange steel beam & column sections (UB/WPB) and steel bracing sections (SHS/RHS). Consider the building is located at Zone IV in India. From IS 1893 (Part-1):2016, Table-3 we get Seismic zone factor Z is 0.24. The response reduction factor R is 4. Importance factor I is 1.2 as per IS code. The soil strata of construction site is assumed as medium

stiff. For this design horizontal seismic co-efficient is calculated Ah as 0.036. We provided damping 5% on this building frame. The dead load is considered as 5 kN/sq.m including its self weight for all floors. The live load is considered as 4 kN/sq.m from 1st floor to 5th floor and 3 kN/sq.m from 6th floor to 10th floor on the first step. On the second and final steps we considered live load 2.5 kN/sq.m. The nodal load is 67.5 kN for all nodes at the edge of the building. Water tank load is considered at the roof of each step. The seismic load is acting towards horizontal direction on the building frame. We have analyzed the model by response spectrum method. The set of load combinations involving seismic effects are as follows:

i) DL + LL

ii) DL + LL + EQL

iii) DL + LL – EQL

iv) 1.5 (DL + LL)

v) 1.2 (DL + LL + EQL)

vi) 1.2 (DL + LL - EQL)

Temperature stress analysis should also be carried out and proper structural arrangements for releasing the temperature stress must be implemented in the main structure.

The building is then suitably designed in STAAD Pro software using response spectrum method. We can see the mass participation factors of our building frame in the following table which is given below:

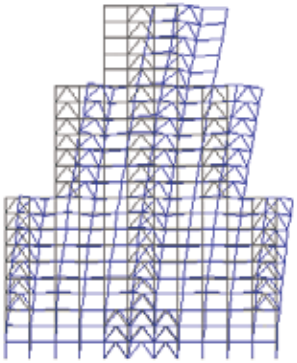
Mass Participation Factors

	MASS PARTICIPATION FACTORS IN PERCENT						BASE SHEAR IN KN		
MODE	X	Y	Z	SUMM-X	SUMM-Y	SUMM-Z	X	Y	Z
1	58.77	0.00	0.00	58.765	0.000	0.000	435.69	0.00	0.00
2	22.67	0.00	0.00	81.434	0.000	0.000	399.63	0.00	0.00
3	7.30	0.00	0.00	88.737	0.000	0.000	241.95	0.00	0.00
4	6.71	0.00	0.00	95.443	0.000	0.000	239.35	0.00	0.00
5	0.00	50.40	0.00	95.443	50.401	0.000	0.00	0.00	0.00
6	0.00	0.02	0.00	95.445	50.420	0.000	0.08	0.00	0.00
					TOTAL SRSS	SHEAR	682.34	0.00	0.00
					TOTAL 10PCT	SHEAR	682.34	0.00	0.00
					TOTAL ABS	SHEAR	1317.19	0.00	0.00
					TOTAL CSM	SHEAR	682.34	0.00	0.00
					TOTAL CQC	SHEAR	694.34	0.00	0.00

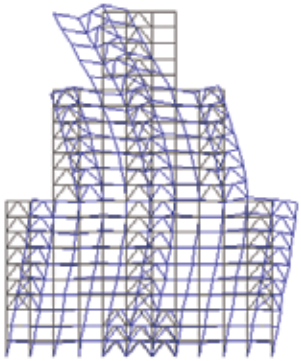
Fundamental Time Periods and Modal Base Actions

MODAL BASE ACTIONS FORCES IN KN LENGTH IN METE

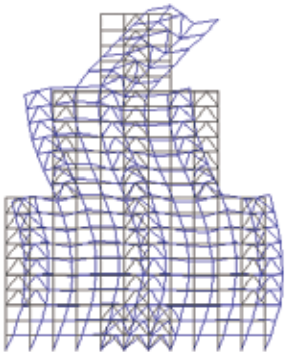
MODE	PERIOD	FX	FY	FZ	MOMENTS ARE ABOUT THE ORIGIN MX	MY	MZ
1	2.624	435.69	0.11	0.00	0.00	0.00	-19826.53
2	1.104	399.63	-0.36	0.00	0.00	0.00	-4361.20
3	0.587	241.95	-0.35	0.00	0.00	0.00	-1387.85
4	0.411	239.85	1.67	0.00	0.00	0.00	-935.67
5	0.330	0.00	-0.91	0.00	0.00	0.00	-24.92
6	0.302	0.08	-0.23	0.00	0.00	0.00	117.98



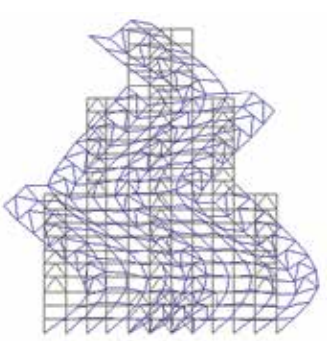
MODE SHAPE : 1



MODE SHAPE : 2



MODE SHAPE : 3



MODE SHAPE : 4

Deflection

Floor Levels	Tip Horizontal Deflection (mm)	Height /500 MM	Remarks
Above 10th floor	25	65	DL+LL+EQL
Above 17th floor	46	110	DL+LL+EQL
Above 22nd floor	65	143	DL+LL+EQL

Conclusion

We designed and analyzed the building for seismic zone – IV by response spectrum method. Without any special seismic resistant systems like – Shear wall, Damper bracings etc. this design is totally safe implementing stepped architecture design considerations with stability bracings.

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IBC News

Training Programs

Training Program on Quality, Safety, Health & Environment Aspects in Construction

One day Executive Training Program for Building Professionals on **"Quality, Safety, Health & Environment Aspects in Construction"** was held on January 29, 2024 at Seminar Hall of IBC HQ, R.K.Puram, New Delhi.

More than 20 professionals of various organizations such as RITES; HP PWD; Delhi PWD; Govt. of Sikkim; NBCC; CPWD; MES and some Private participants attended the Training Program.

Sh. P. Bhagat CE, Central Vista delivering the lecture

Sh. C.S. Mital delivering the lecture

Group Photo with Participants

Certificate Distribution

Training Program on Planning, Design, Installation, Operation and Maintenance Management of HVAC System in Buildings

Institute for Training of Building Professionals (ITBP) in collaboration with Indian Society of Heating, Refrigerating and Air Conditioning Engineers (ISHRAE) under the aegis of Indian Buildings Congress (IBC) organized two days Executive Development Program on **"Planning, Design, Installation, Operation and Maintenance Management of HVAC System in Buildings"** on April 29-30, 2024 at IBC HQ, Kama Koti Marg, Sector VI, R.K. Purma, New Delhi.

Shri Gaurav Vasudev, Mechanical Engineer; Ms. Samta Bajaj, Consultant; Shri Ajay Raj, BE, Mechanical, IGBC AP; Shri Kapil Mehrotra, HVAC Professional; Shri S.K. Choudhury, MD, Blowtech Air Devices Pvt. Ltd;

Sapling being presented to Sh. Pradeep Dua by Maj. Gen. Ashok Kumar, President, IBC & Shri D.S. Sachdev, Director, ITBP

Shri J.K. Choudhary, CE (Retd.), CPWD delivered the lecture during the Training Programme.

Sh Gaurav Vasudev delivering the lecture

More than 27 professionals of various organizations such as Nagaland, (Housing) PWD; Ladakh PWD (R&B); MP PWD; HP PWD; Haryana, PWD (B&R); RITES Ltd.; MES; and SMS India Pvt. Ltd. attended the Training Program.

Ms. Samta Bajaj delivering the lecture

Two days Training Program on Planning, Design and Installation of Plumbing & Allied System in Building

Two days Executive Development Training Program on **"Planning, Design and Installation of Plumbing & Allied System in Building"** was held on June 28-29, 2024 in collaboration with M/s MKG Consultants at Seminar Hall of IBC HQ, R.K.Puram, New Delhi.

Maj. Gen. Ashok Kumar, President, IBC delivering the Welcome Address

More than 50 participants & Professionals of various organizations such as Uttarakhand PWD; Telangana PWD; Ladakh PWD; BSBCC, Patna; HP PWD; MP PWD; Mizoram PWD; Tripura PWD; DDA and some Private participants attended the Training Program.

View of Audience

Certificate Distribution

Corrigendum

In the Preliminary Publication Vol. 32, Number -2, 2023, the following correction are made:

1. On page No. 70 the name of author shall be read as Shri Snehal Patel, Environmentalist, M/s. Susha Founders & Engineers, Surat.
2. On page No. 110 the designation of Dr. C. Velan shall be read as CMD, Capitaland

Inconvenience caused is sincerely regretted.

Other Technical Activities

Technical Lecture on Rapid Construction with Precast Hybrid Technology and Geo Thermal Energy towards Net Zero

The Technical Lecture on "Rapid Construction with Precast Hybrid Technology" and Geo Thermal Energy towards Net Zero was held in Seminar Hall, IBC HQ Building, Kama Koti Marg, Sector VI, R.K. Puram, New Delhi on 30th March, 2024 which was attended by several high-ranking dignitaries. The dignitaries on the dais were welcomed with potted plant sapling.

Shri O.P. Goel Founder President, IBC delivering the Welcome Address

The lecture started with the welcome address by Shri O.P. Goel, Founder President, IBC. In his welcome address, Shri O.P. Goel thanked the President, Maj. Gen. Ashok Kumar, AVSM (Retd.) for organizing this lecture. He welcomed Shri Anil Kumar Seth, Managing Director, Supercast Technologies Pvt. Ltd. for accepting the invitation and sparing his time to deliver the lecture on this new evolving topic. Shri Seth has executed many projects using factory made building products including Hi-tech construction technology.

He welcomed Shri Arijit Ghosh, Managing Director, S.A.P. Automations (India) Pvt. Ltd. who has specialization in Geothermal and Hybridization.

He mentioned that the topic 'Rapid Construction with Precast Hybrid Technology' and Geo Thermal Energy towards Net Zero chosen by the President for the Technical Lecture is new and very much relevant. He welcomed all the dignitaries on the dais and participants who has come to attend the Lecture. He felt indebted to Shri Rajeev Kumar Gupta, Honorary Secretary, IBC for giving him an opportunity to deliver the welcome address.

First lecture was delivered by Shri Anil Kumar Seth, who made his presentation on the topic 'Rapid Construction with Precast Hybrid Technology'. In his presentation, he explained the disadvantages of Cast in situ concrete like Poor surface quality, Poor quality control, Lack of adequate cover to bars, Improper consolidation & honey combing, Chemical attack and internal durability problems, Cracking due to vegetation, Fatigue Cracking etc.

He mentioned the basic concept of factory made construction. It means that structural elements of building are manufactured in a controlled environment of factory. The casting/fabrication of structural elements is carried out using machines and molds under strict quality control & supervision by experts. The building elements thus produced are transported on site and assembled/erected to build desired structure. Like conventional structures, all kind of architectural features & elements can be created using this technique. The immediate advantage is best quality work with 30-to-35%-time reduction and ± 10% cost of conventional construction. In case of large projects, cost is lesser to cast in situ. He explained the Comparison of Factory-made building technology with Conventional Technology. At the end he mentioned following elements for Future construction work of Buildings.

- Hybrid steel and precast concept of buildings for fast and superior construction.
- Insulation to maintain normal temperature inside shelters under external extreme climate.
- Water flow to be maintained in buildings of extreme climate.
- Solar system for electricity.
- Oxygen level inside to be maintained.
- Light weight roof protection for safety against shelling.
- Portable/openable structures for PDs/CPs.

To mark the occasion, IBC memento was presented to Shri Anil Kumar Seth by Shri O.P. Goel Founder President, IBC

Memento being presented to Shri Anil Kumar Seth by Shri O.P. Goel

Second Lecture was delivered by Shri Arijit Ghosh, Managing Director, S.A.P. Automations (India) Pvt. Ltd. on the topic "Geo Thermal Energy towards Net Zero". Green buildings will have no meaning unless it's Net Zero. Geothermal is one such technology that takes us closer to NET ZERO. In his presentation he informed that India is on its way to Net Zero Buildings by 2070. He explained the definition of Net Zero in detail. He mentioned that there are multiple definitions of Net Zero Energy Buildings : -

- Autonomous Zero Energy Buildings - all demand are met by on-site generation, no external network connections.
- Net-zero site energy - local generation completely offsets on-site demand, demand and supply are not temporally matched but balance over a year.
- Net-zero source energy - local generation completely offsets primary energy demands, demand and supply are not temporally matched but balance over a year.
- Lifecycle net-zero energy buildings - local generation completely offsets primary energy demands AND embodied energy, demand and supply are not temporally matched but balance over the lifetime of the building.

To mark the occasion, IBC memento was presented to Shri Arijit Ghosh by Shri O.P. Goel Founder President, IBC.

Memento being presented to Shri Arijit Ghosh by Shri O.P. Goel

Shri V.R. Bansal, Former CE, MCD & Past Honorary Secretary, IBC proposed the Vote of Thanks. First of all he thanked Shri O.P. Goel, Founder President, IBC. He thanked Shri Anil Kumar Seth for delivering the lecture on the topic 'Rapid Construction with Precast Hybrid Technology' which is very much relevant. He thanked to Shri Arijit Ghosh who spoke on Geo Thermal Energy. His presentation was appreciated by the members present in the hall. He thanked all the participants for sparing their valuable time to attend the lecture. At the end, he thanked to Shri Rajeev Kumar Gupta, Honorary Secretary, IBC for organizing the lecture.

Shri V.R. Bansal, Past Hony. Secy. presenting the Vote of Thanks

View of Audience

IBC Delegation meets CMD, NBCC (India) Limited

IBC delegation comprising of Maj. Gen. Ashok Kumar AVSM (Retd.) President, IBC; Shri V.R. Bansal, Honorary Secretary, IBC and Shri Vijay Kumar Choudhary, Honorary Treasurer, IBC met Shri K.P. Mahadevaswamy, Chairman and Managing Director, NBCC (India) Limited on 26.06.2024 in his chamber at NBCC Bhawan, Lodhi Road, New Delhi.

Shri K.P. Mahadevaswamy, CMD, NBCC being welcomed by IBC delegates

The CMD, NBCC warmly welcomed the IBC delegation. He was felicitated by the delegation by offering hima floral bouquet. The delegation thanked him for sparing his valuable time for the IBC delegation. He was briefed about the technical activities of the IBC. The delegation presented him with two IBC publications; Preliminary publication -June 2023 and IBC Journal, June 2023 which were released during the 26th Annual Convention and National Seminar, held in June 2023 at AP Shinde Symposium Hall, NASC Complex, New Delhi, and extended him a personal invitation for the 27th Annual Convention to be held on 13th-14th July 2024 at Maneckshaw Centre, New Delhi.

The delegation solicited the continued support of NBCC inall technical activities of IBC and also expressed that their association and participation in the activitiesof IBC could enhance the cause of the Built Environment. Shri Mahadevaswamy assured that NBCC will continueto extend its wholehearted support to IBC.

Activities of State/Local Chapters

Bihar State Chapter – Patna

Managing Committee Meeting for 2024-2025

The Managing Committee Meeting of IBC Bihar State Chapter for the year 2024-2025 was held on Dec., 12, 2023 at the office of IBC Bihar State Chapter, Patna. At the meeting, Er. Sudhanshu Shekhar Rai, E-in-C, BCD Govt. of Bihar, was elected as Chairman of IBC Bihar State Chapter. He was welcomed by Er. D.K. Baxi, Hony. Secretary of IBC Bihar State Chapter.

Er. Sudhanshu Shekhar Rai, Chairman of IBC Bihar State Chapter being welcomed by Er. D.K. Baxi, Hony. Secretary of IBC Bihar State Chapter

The Managing Committee of IBC Bihar State Chapter was constituted with Er. Sudhanshu Shekhar Rai, E-in-C, BCD Govt. of Bihar as Chairman and Shri D. K. Baxi as Honorary Secretary, IBC Bihar State Chapter, Patna; Er. Vinod Chaudhary, SE, BCD as Treasurer.

West Bengal State Chapter – Kolkata

Annual General Meeting of State Chapter

Annual General Meeting (AGM) of West Bengal IBC State Chapter, Kolkata was held on 22nd December, 2023 at Commune, 7 B Chowrianghee Terrace, Gokhale Road, Kolkata. AGM was attended by good number of members. Shri N. Dhar, Convenor, Board of Scrutinizers declared the results of election of Managing Committee.

Annual General Meeting of West Bengal in Progress

The Managing Committee of IBC West Bengal State Chapter for the year 2024 - 25 was constituted with Shri B.K. Dam, as Chairman; Shri Bipul Chakraborty, Former SE, Housing Department as Honorary Secretary; Shri Supriya Dutta, Former Executive Engineer, PWD as Treasurer including other members as intimated by Shri B.K. Dam vide email dtd. Feb. 3, 2024.

Kota Local IBC Chapter

1st Technical visit by IBC Members

IBC members visited Construction site of Tunnel on NH-148 N Delhi-Mumbai Express Highway on 7.01.2024.

The cost of 8.3 Km long Express Way 8 lane Project is Rs. 1008.88

Core. The Project consists of 2 Nos Tunnels 4 lanes each for up and down traffic. Both tunnels are interconnected at Nine places for escape in case of emergency. Date of Commencement of this project was July 5, 2021 and date of Completion is Dec. 4, 2024. Work is still in progress. Length of Tunnel will be 3.650 Km on each side. Construction Agency is Dilip Buildcon Private Limited. This Express way is under Bharat mala Project. Defect liability period of project is 10 years. New Technology has been used in excavation of tunnel, lining of tunnel pathway, drain & construction of pavement.

Around 18 members of IBC Kota Chapter including Chairman - Sh. Suresh Kumar Bairwa, Former Addl. Chief Engineer, PWD Rajasthan; Vice Chairman- Sh. Virendra Kumar Porwal, Executive Engineer PWD; Treasurer- Sh. Ashok Kumar Sanadhya, Executive Engineer PWD & other members of Kota Chapter were present during the technical visit.

Photographs during Tunnel Visit

2nd Technical visit by IBC Members

IBC Kota Local Chapter organized a technical visit of under construction project of Medical College cum Multispecialty Hospital, Melkheri, Baran on dated 23.06.2024. The Project Director, RSRDC, Sh. Manoj Mathur and his team welcomed all the members in traditional manner and explained the project details in brief. The overall cost of the project is Rs. 148.97 crores and the different construction works of the buildings are in Progress.

Around 26 members of IBC Kota Chapter including Chairman - Sh. Suresh Kumar Bairwa, Retd. ACE, PWD; Honorary Secretary - Sh. Hemant Kumar Sharma, Ex.En., PWD; Treasurer - Sh. Ashok Kumar Sanadhya, Ex.En., PWD & other members of Kota Chapter were present during the technical visit.

Manipur State Chapter, Imphal

Seminar on "Retrofitting of Structures"

A special seminar on "Retrofitting of Structures" was organized by Manipur State Chapter and Tripura State Chapter of IBC in association with Institution of Engineers (India), Manipur Chapter on Feb. 10, 2024 at Govt. Polytechnic Auditorium, Takyel, Imphal under the Chairmanship of Er. Loktongbam Swamikanta Singh, FIE, Addl. Chief Engineer, PHE, Govt. of Manipur.

At the outset, Er. Loktongbam Swamikanta Singh in his welcome address, briefed about the background of this special programme. He mentioned that this programme was organized with the efforts of Er. C. Debnath, Vice president, IBC & Past President, IEI. He welcomed the Chief Guest Er. Ng. Basanta Kumar Singh, Principal, Govt. Polytechnic Institute, Imphal; Special Guest Er. M.S. Roy, FIE, Chairman, IBC Tripura Chapter; the Guest of Honour Er. C. Debnath, Vice President IBC & Past President, IEI and other delegates of IBC Tripura Chapter in the seminar.

Er. M.S. Roy, Chairman, IBC, Tripura Chapter in his speech, detailed about the activities of IBC Tripura Chapter & appealed for continuing such type of joint venture programme in future also by these two chapters and also involving IBC Manipur Chapter.

Er. C. Debnath, Vice President IBC, speaking on the occasion mentioned about the activities of IBC HQ and its Chapters. He urged the engineers to become member of IBC and requested the IBC Manipur Chapter to conduct technical activities regularly. He told a special programme will be initiated shortly on "Infrastructure development in North Eastern Region of India" with the involvement of IBC chapters in all 8 N.E. Sates.

Er. Ng. Basanta Kumar Singh, Chief Guest, Principal, Govt. Polytechnic Institute, Imphal delivered the inaugural speech. The session ended with vote of thanks delivered by Dr. Th. Subhas Chandra Singh, MIE, Hony. Secretary, IEI, Manipur State Chapter.

In the second session there were two presentations on the topic "Retrofitting of Structures" delivered by Er. R.K. Majumdar, FIE, IAS (Retd.), Director, Urban Dev. Deptt., Tripura & Past Chairman, IBC Tripura Chapter & IEI, Tripura State Chapter and Dr. Th. Kiranbala Devi, MIE, Associate Professor, Civil Engg. Deptt. MIT, Imphal. At the end, there was lively discussion by the participants.

The third session started with discussion on activity of IBC Manipur Chapter. Er. C. Debnath, Vice President, IBC briefed about IBC and appealed to all to take membership of IBC.

To oversee the activity of Manipur State Chapter of IBC, an adhoc committee of five members was formed with Er. M. Lokendro Singh, Retd. CE, PWD as Chairman; Er. Khoiyangbam Jagadish, SE, RED as Hony. Secretary; Er. Loitam Dinesh Singh, Sr. Manager, NPCC Ltd. as Treasurer; Er. L. Swamikanta Singh Retd. Addl.CE, PHE and Er. Haobam Bhushan Singh Retd. Engineer, PHE as Managing Committee Members.

This proposal is being sent to President, IBC HQ for his approval.

Sikkim State Chapter-Gangtok

In order to increase outreach of IBC, efforts to revive State Chapter of Sikkim were initiated by Shri C. Debnath, Vice President, IBC during his visit the State on 29 Feb., 2024.

An Adhoc Committee under chairmanship of Er. Praveen Kr. Pradhan, PCE cum Secretary Bldg. & Housing and Hony. Secreary - Er. Doniv Rai, Addl. Chief Architect, PWD, was constituted with following members on February 29, 2024.

Treasurer - Er. Phurba Bhutia, SE (N/E) Bldg. & Housing, Managing Committee Members – Er. Anil Chetri, SE(S/W) Bldg. & Housing, Er. Binay Lama, EE(C), Energy & Power Deptt.

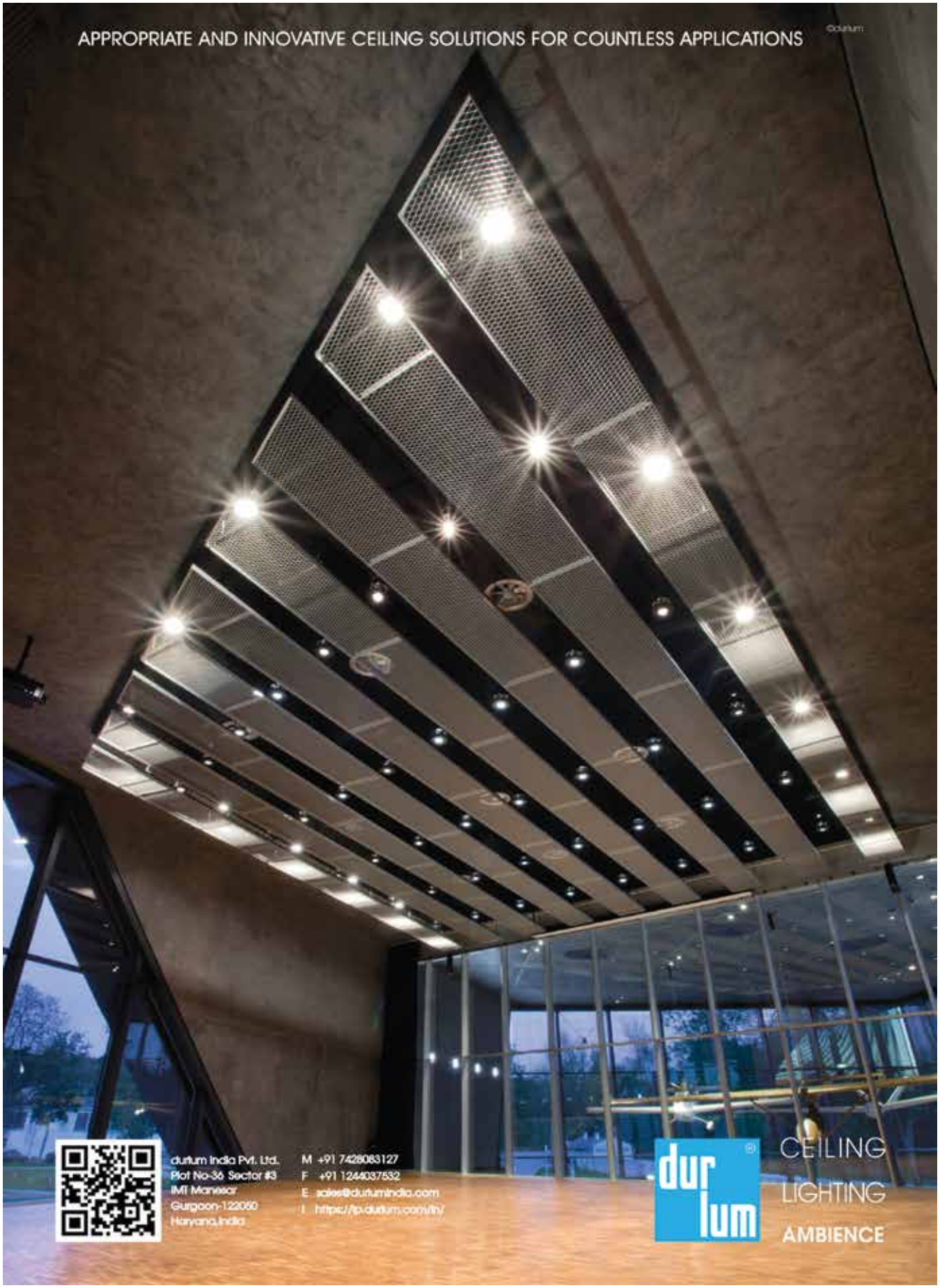
The committee will make efforts for increasing membership of IBC to reach the minimum threshold required for formation of the Chapter.

Uttar Pradesh State Chapter - Lucknow

Inauguration of Uttar Pradesh State Chapter Lucknow

The Indian Buildings Congress, Uttar Pradesh State Chapter Lucknow was inaugurated on 19th March 2024 at Office of the Engineer – in – Chief, PWD Complex, Lucknow by Er. C. Debnath, Vice President, IBC.

An Adhoc Committee under chairmanship of Er. V.K. Srivastava was constituted with Er. Ashish Yadav, Executive Engineer; UP Irrigation Department as Hony. Secretary; Er. C.K. Mangalam as Treasurer and Er. Ajeet Krishana Singh, Er. Atul Kumar Maurya as Managing Committee Members.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IBC welcomes the following New Individual & Institutional Members enrolled during to 30/09/2023 to 25/04/2024

Individual Members:

S.No.	M.No.	Name	Qualification	Designation	Department	City	State
	ML-9727	Ms. Sneha Gurjar	B.Arch.	Director	CEM Engineers	NEW DELHI	Delhi
	ML-9728	Shri Markanday Shahi	B.E. (Civil)			PATNA	Bihar
	ML-9729	Prof. Jitendra Kumar Sharma	Ph.D	Professor & Head	Civil Petroleum & Petrochemical Deptt.	KOTA	Rajasthan
	ML-9730	Ms. Pooja Jain	B.Tech (Civil)	Junior Engineer	Rajasthan PWD	KOTA	Rajasthan
	OM-9731	Shri Yogesh Chandra	B.E. (Civil)	Senior Engineer (Civil)	BABAG	SIWAN	Bihar
	ML-9732	Ms. Swati Sisodiya	B.Tech. (Civil)	Junior Engineer	Rajasthan PWD	KOTA	Rajasthan
	ML-9733	Shri Abhay Kumar	B.E. (Civil), MBA (Mkt.)	Director	Technourban Infraventures Pvt. Ltd.	PATNA	Bihar
	OM-9734	Shri Jadeja	B.Tech.(Civil)	Managing Director	Majoth Associates (OPC) Pvt. Ltd.		Gujarat
	ML-9735	Shri Rishi Kesh Singh	M.Tech.(Strct.)	Manager (Structure)	Adani	LUCKNOW	Uttar Pradesh
	ML-9736	Shri Prakash Makhijani	B.E. (Civil Hons.), AMIS	Former Jt. Dir. Gen. (Contracts)	MES	BANGALORE	Karnataka
	ML-9737	Ms. Anumanda Sumer	B.E. (Civil)	Assistant Executive Engineer	Meghalaya PWD	JOWAI	Meghalaya
	ML-9738	Shri Raj Modi	Master in Civil Engg.	Founder	RD Consultancy & Construction	AHMEDABAD	Gujarat
	ML-9739	Shri Joydeep Sengupta	M.Arch.	Director	MES	PORT BLAIR	Andaman & Nicobar
	ML-9740	Shri Bapan Debnath	M.Tech. (Civil)	Building Planner Grade-I	Urban Local Body Approved, Agt		Tripura
	ML-9741	Shri H.P. Zothankhuma	B.Tech. (Civil)	Superintending Engineer	Mizoram PWD	AIZAWL	Mizoram
	ML-9742	Shri Hrangthanga Zote	B.E. (Civil), M.E. (Strct.)	Chief Engineer (Bldgs & Other Deptt.)	Mizoram PWD	AIZAWL	Mizoram
	OM-9743	Shri Chandana Barumatary	B.E. (Civil)	Superintending Engineer	Assam PWD	GUWAHATI	Assam
	OM-9744	Shri R. Lalthlamuani	B.Tech. (Civil)	Junior Engineer	Mizoram PWD	AIZAWL	Mizoram
	ML-9745	Shri C. Hendo Sumao	B.E. (Civil)	Superintending Engineer	Nagaland PWD (Housing)	DIMAPUR	Nagaland
	ML-9746	Shri Lhouvilie Yhor	B.Arch.	Addl. Chief Architect	Nagaland PWD	KOHIMA	Nagaland
	OM-9747	Shri C. Lalchhuanawmi	B.Tech. (Civil)	SDO	Mizoram PWD		Mizoram
	ML-9748	Shri Nghaka Zoram	B.Arch.	Executive Engineer	Mizoram PWD		Mizoram
	ML-9749	Shri David Sapzova	B.E. (Civil)	Chief Engineer (Plg.)	Mizoram PWD	AIZAWL	Mizoram
	OM-9750	Shri Lalzemsiama Jacob	B.E. (Civil)	Junior Engineer	Mizoram PWD	AIZAWL	Mizoram
	OM-9751	Shri Lalenikawli Hrahsel	B.Tech. (Civil)	Junior Engineer	Mizoram PWD	AIZAWL	Mizoram
	ML-9752	Shri Mustafa AliAhmed	B.E. (Civil)	Former Dy. Secy.	Assam PWD (B&H)	GUWAHATI	Assam
	ML-9753	Ms. Olemchila. I Yaden	B.E. (Civil)	Executive Engineer	Nagaland PWD	KOHIMA	Nagaland
	OM-9754	Shri Lalremsangi	B.Tech. (Civil)	Junior Engineer	Mizoram PWD	AIZAWL	Mizoram
	OM-9755	Shri Vanlalruatfela	M.E. (Strct. Engg.)	Junior Engineer	Mizoram PWD	AIZAWL	Mizoram
	ML-9756	Shri Lalawmpuii	M.Arch.	Superintending Archirect	Mizoram PWD	AIZAWL	Mizoram
	OM-9757	Shri Rozampuia	M.Tech.	Engineer, PHD Scholar	NIT, Mizoram		Mizoram
	ML-9758	Shri Lalruatsanga	B.Tech. (Civil)	Junior Engineer	Mizoram PWD	AIZAWL	Mizoram
	ML-9759	Shri Lalrinkima Hnamte	B.E. (Civil)	Engineer-in-Chief	Mizoram PWD	AIZAWL	Mizoram
	ML-9760	Shri Lalhruaitluanga Ralte	B.Arch, M.C.P	Assistant Professor	Mizoram University	AIZAWL	Mizoram
	ML-9761	Shri Evangeline Lalrinmawil	M.Tech. (Strct. Engg.)	SDO	Mizoram PWD	AIZAWL	Mizoram
	ML-9762	Shri Lalruatdika	B.E. (Civil)	Junior Engineer	Mizoram PWD	AIZAWL	Mizoram
	ML-9763	Shri Lalchhuana	B.Tech. (Civil)	Superintending Engineer	Mizoram PWD	AIZAWL	Mizoram
	ML-9764	Shri Zosangluaia	B.Tech. (Civil)	SDO	Mizoram PWD	AIZAWL	Mizoram
	ML-9765	Shri Ramnunmawia Christopher	B.Tech.	Junior Engineer	Mizoram PWD	AIZAWL	Mizoram

	ML-9766	Shri K. Luaiminthanga	B.Tech. (Civil)	Excutive Engineer (P)	Mizoram PWD	AIZAWL	Mizoram
	ML-9767	Shri Lalzarzoliana	B.E. (Civil)	Executive Engineer (M)	Mizoram PWD	AIZAWL	Mizoram
	ML-9768	Shri Lalchhandami	M.Arch.	Chief Architect	Mizoram PWD	AIZAWL	Mizoram
	ML-9769	Shri Sylvia Romawizuali	M.Arch.	Assistant Professor	Mizoram University	AIZAWL	Mizoram
	ML-9770	Shri Lalngaisanga	B.E. (Civil)	Sr. Executive Engineer	Mizoram PWD	AIZAWL	Mizoram
	ML-9771	Shri Lalrinzuava Ralte	B.Arch.	Practicing Architect	Catalyst Architecture	AIZAWL	Mizoram
	ML-9772	Shri Romalsawma	B.E. (Civil)	Sr. SDO	Mizoram PWD	AIZAWL	Mizoram
	ML-9773	Shri K. Nikato Assumi	B.E. (Civil)	Superintending Engineer	Nagaland PWD	DIMAPUR	Nagaland
	ML-9774	Shri Chengato Kath	B.E. (Civil)	Executive Engineer	Nagaland PWD	KOHIMA	Nagaland
	ML-9775	Shri Lalramzuava	B.E. (Civil)	Sr. Executive Engineer	Mizoram PWD	AIZAWL	Mizoram
	ML-9776	Shri Thrimhokiu R.Yimchunkger	B.Tech. (Civil)	SDO	Nagaland PWD	KOHIMA	Nagaland
	ML-9777	Shri Hozheto Shiku	B.E. (Civil)	Chief Engineer	Nagaland PWD	KOHIMA	Nagaland
	ML-9778	Shri Pukroneizo Kera	B.E. (Civil)	Engineer-in-Chief	Nagaland PWD	KOHIMA	Nagaland
	ML-9779	Shri Sadrak Kath	B.E. (Civil)	SDO	Nagaland PWD	KOHIMA	Nagaland
	ML-9780	Shri Joseph L.Thungo	M.Tech.	SDO	Nagaland PWD	KOHIMA	Nagaland
	ML-9781	Ms. Kahuli Sema	B.E. (Civil)	Former E-in-C	Nagaland PWD	DIMAPUR	Nagaland
	ML-9782	Ms. Moanrao Longkumer	B.Tech.	Superintending Engineer	Nagaland PWD	DIMAPUR	Nagaland
	ML-9783	Shri Kehomong Yimchunger	B.Tech. (Civil)	SDO	Nagaland PWD	KOHIMA	Nagaland
	ML-9784	Ms. Avila	B.Tech. (Civil)	Junior Engineer	Nagaland PWD	KOHIMA	Nagaland
	ML-9785	Shri Bhupendra Chandra Sarma	B.E. (Civil Engg.)	Spl. Chief Engineer (Bldg)	Assam PWD (Bldg & NH)		Assam
	ML-9786	Shri Arjun Chandra Mandal	M.E. (Civil)	Superintending Engineer	Assam PWD	GUWAHATI	Assam
	ML-9787	Dr. Amal Barman	M.Arch., Ph.D	Dy. Architect	Assam PWD (Buildings)	GUWAHATI	Assam
	ML-9788	Shri Mahendra Mohan Das	B.E. (Civil)	Superintending Engineer & i/c CE	Assam PWD (Buildings)	GUWAHATI	Assam
	ML-9789	Shri Hiren Das	B.E. (Civil)	Addl. Chief Engineer	Assam PWD (B & NH)	GUWAHATI	Assam
	OM-9790	Shri Hadi Ahmed	M.E. (Water Resource)	Assistant Engineer	Assam PWD (Buildings)	GUWAHATI	Assam
	OM-9791	Shri Partha Choudhury	M.E. (Geotechnical Engg.)	Assistant Engineer	Assam PWD	GUWAHATI	Assam
	OM-9792	Shri Bhimlal Konwar	B.E., M.E. (Geotechnical Engg.)	Assistant Engineer (Civil)	Assam PWD	GUWAHATI	Assam
	OM-9793	Ms. Madhusmita Das	B.Tech. (Civil)	Assistant Engineer	Assam PWD (Buildings)	GUWAHATI	Assam
	OM-9794	Ms. Dikshita Baishya	B.Tech. (Civil)	Assistant Engineer	Assam PWD (Buildings)	GUWAHATI	Assam
	OM-9795	Ms. Nandita Bordoloi	B.Tech. (Civil)	Assistant Engineer	Assam PWD (Buildings)	GUWAHATI	Assam
	ML-9796	Shri Jignesh R. Bhuriya	B.E. (Civil)	Assistant Engineer	R & B	GANDHINAGAR	Gujarat
	ML-9797	Shri Rajankumar Jayantilal Patel	M.Tech. (Strct.), M. Plan (Urban Planner)				Gujarat
	ML-9798	Shri Sampat Rangnath Mandlik	M.Tech. (Transporation)	Executive Engineer	Maharashtra PWD	THANE (W)	Maharashtra
	ML-9799	Shri Vikas Nivrutti Pimpalkar	DCE, B.E. (Civil), LL.B	Sub Divisional Engineer	Maharashtra PWD	PUNE	Maharashtra
	ML-9800	Shri V.N. Krishna Murthy	B.E., MBA, MIE, KES	Executive Engineer	Karnataka PWD	BENGALORE	Karnataka
	ML-9801	Shri T.A. Sathyanarayana Rao	B.E.	Executive Engineer	Karnataka PWD	BENGALORE	Karnataka
	ML-9802	Shri S.V. Surendranath	B.E. (Civil)	Executive Engineer	Karnataka PWD	BANGALORE	Karnataka
	ML-9803	Shri Tugu Byabang	B.E. (Civil)	Executive Engineer	Arunachal Pradesh PWD	PAPUM PARE	Arunachal Pradesh
	ML-9804	ShriTaniyokTaga	B.E., MBA	Superintending Engineer	Arunachal Pradesh PWD		Arunachal Pradesh
	ML-9805	Shri Karbak Gambi	B.Tech. (Civil)	Executive Engineer	Rural Works Department	ITANAGAR	Arunachal Pradesh

	ML-9806	Shri Sahil Sharma	B.Tech.(Civil)	Senior Manager (B.D.)	AVS Inno Infra Global Pvt. Ltd.	NEW DELHI	Delhi
	ML-9807	Shri Shailendra Kumar	B.Sc (Engg.)	Chief Engineer	Road Construction Department	PATNA	Bihar
	ML-9808	Shri Nitish Pathak	B.E. (Civil Engg.)	Executive Engineer	MES	KARNAL	Haryana
	ML-9809	Shri Vijay Shankar Mishra	M.Tech. (Energy Studies)	Director	MES		Gujarat
	ML-9810	Shri Sanjay Mathur	Ph.D, ME (Strct.), B.E. (Civil)	Assistant Director	Technical Education, Rajasthan	JAIPUR	Rajasthan
	ML-9811	Shri Neeraj Saxena	B.E. (Civil), M.e. (Civil), MBA	Engineer-in-Chief	Vigillence Department	PATNA	Bihar
	ML-9812	Shri G.D. Kumara	B.E., MSc. Engg, Ph.D	Executive Engineer	Karnataka PWD	BANGALORE	Karnataka
	ML-9813	Shri M. Narayan	B.E. (Civil), MIE	Former Chief Engineer	Karnataka PWD	DHARWAD	Karnataka
	ML-9814	Shri Ghasi Ram Regar	M.Tech. Civil	Principal	Govt. Polytechnic College	JAIPUR	Rajasthan
	ML-9815	Shri Rymbai Sakanica	B.Tech. (Civil)	Asstt. Executive Engineer	Meghalaya PWD (R&B)	SHILLONG	Meghalaya
	ML-9816	Shri Shitkmen Lytep	B.E. (Civil)	Executive Engineer	Meghalaya PWD (Roads)	SHILLONG	Meghalaya
	ML-9817	Shri H.S. Basaiawmoit	B.Tech. (Civil)	Assistant Chief Engineer	Meghalaya PWD	SHILLONG	Meghalaya
	ML-9818	Shri Gromyko K. Marak	B.E. (Civil)	Secretary	Meghalaya PWD (R&B)		Meghalaya
	ML-9819	Prof. Needhi Kotoky	Ph.D in Strct. Engg.	Assistant Professor	Civil Engineering Department, NIT Maghalaya	SHILLONG	Meghalaya
	ML-9820	Shri Thongni Beda	B.Sc. Civil Engg.	Addl.Chief Engineer	Meghalaya PWD (Roads)	SHILLONG	Meghalaya
	OM-9821	Shri Hopeful Syiemiong	Ph.D (Civil Engg., Strct.)	Assistant Executive Engineer	Meghalaya PWD (Roads)	SHILLONG	Meghalaya
	ML-9822	Shri Manroibha Nongkynrih	B.E. (Civil)	Executive Engineer	Meghalaya PWD (Building)	SHILLONG	Meghalaya
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From Editor-in-Chief Desk

Shortage and Excess of water in Delhi

The State of Delhi experienced unprecedented hot weather in the month of June, 2024 and also, suffered shortage of drinking water. Extremely hot weather coupled with shortage of drinking water caused tremendous difficulty to the people of Delhi. On the contrary the first few showers of the monsoon in the last week of June caused extensive water logging in Delhi and surrounding areas.

On the day it rained heavily, there was water in everywhere and the drainage system in the city collapsed. Commuters were stuck up in traffic for the long term hours and the entire traffic was thrown out of gear due to unprecedented water logging. The major reason for this appears to be Multiplicity of Agencies for maintenance of drainage system in Delhi and lack of coordination between these agencies. The Govt. should come out with some viable solution for proper cooperation among these agencies so that the people in Delhi get relief from frequent water logging.

The problem of shortage of water supply was further compounded by lack of mutual co-operation between the State involved as stakeholder. Thus, it is desirable that they come forward on basis of Mutual co-operation philosophy to solve the problem on long term basis.

Though rainwater harvesting is given specific emphasis in planning and approval of projects, however, the need of hour is to formulate specific guidelines for their maintenance so that such systems meet the envisaged objectives.

There is need to plug loopholes in the water supply system and also the timely maintenance of water distribution system pipeline. Efficient management of water supply system and the drainage system is the new challenge facing the professionals in the Built Environment and specific attention needs to be given to these aspects.

IBC can help for comprehensive planning to find solution of drainage problems and water conservation.

(K.B. Rajoria)

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