



# SIR M. VISVESVARAYA INSTITUTE OF TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

## INFRA TODAY

MARCH 2021 | VOLUME 5 | ISSUE 1



## EXPLORING AYODHYA

THE STRUCTURAL GRANDEUR OF  
MODERN INDIA

SUPPORTED BY:

Prof. V. R. MANJUNATH, Principal

Mr. H. P. MAHENDRA BABU, Head

Ms. VYSHNAVI D. R., Assistant Professor

### DEPARTMENT NEWS

Milestones achieved by  
Staffs and Students.

### EXCITING ARTICLES

Insight and Ideas of the  
Writer.

### DEPARTMENT GALLERY

Vivid memories of the year



# DEPARTMENT OF CIVIL ENGINEERING

## VISION AND MISSION OF CIVIL ENGINEERING DEPARTMENT

### VISION

- To create competent, disciplined quality Engineers and administrators of global standards in Civil Engineering with capability of accepting new challenges.

### MISSION

- To impart quality education in civil engineering to raise satisfaction level of all stake holders.
- To serve society and the nation by providing professional civil engineering leadership to find solution to community, regional and global problems and accept new challenges in rapidly changing technology.
- To create competent professionals who are trained in the design, and development of civil engineering systems and contribute towards research & development activities.

## DEPARTMENT OF CIVIL ENGINEERING

### Program Educational Objectives (PEOs):

- Graduates will become leaders in the industries associated with civil engineering and become professional entrepreneurs. They will be experts working in public sector, private sector, and international organizations.
- Graduates will engage in continual learning by pursuing advanced degrees or additional educational opportunities through coursework, professional conferences and training, or participation in professional societies.
- Graduates will adapt to different roles and responsibilities in multidisciplinary environment by respecting professionalism and ethical practices. They will contribute to the well-being of the society and environment through responsible practice of engineering profession.



### **PROGRAM OUTCOMES (POS):**

The student graduating out of this program will have the,

**PO1-Engineering knowledge:** Apply the knowledge of mathematics, science, engineering Fundamentals and an engineering specialization to the solution of complex engineering problems in CIVIL Engineering.

**PO2-Problem analysis:** Identify, formulate, review research literature, and analyse complex Engineering problems in CIVIL Engineering reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PO3-Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes of CIVIL Engineering that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**PO4-Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments in CIVIL Engineering, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

**PO5-Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities in CIVIL Engineering with an understanding of the limitations.

**PO6-The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice in CIVIL Engineering.

**PO7-Environment and sustainability:** Understand the impact of the professional engineering solutions of CIVIL Engineering in societal and environmental contexts and demonstrate the knowledge of and need for sustainable development.

**PO8-Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**PO9-Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO10-Communication:** Communicate effectively on complex engineering activities with the Engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11-Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO12- Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

### **PROGRAM SPECIFIC OBJECTIVES (PSO'S):**

- Identify the broad context of civil engineering problems, including describing the problem Conditions, identifying possible contributing factors and generating alternative solution strategies.

03

- Undertake laboratory, field and other data collection efforts using commonly used Measurement techniques to support the study and solution of Civil Engineering problems.
- Employ mathematics, science and computing techniques in a systematic, comprehensive and rigorous manner to support the study and solution of civil engineering problems.
- Exhibit good teamwork skills and serve as effective member of multi-disciplinary project teams.

## **DEPARTMENT NEWS**

- VI Semester B.E Civil Engineering students accompanied by two faculty members Dr S.Shivanna & Dr H. Ravikumar visited Jakkalamadugu Water Pumping Station near Chickaballapur on 29th February 2020.
- A Webinar on “Advanced Surveying: Application of RS & GIS, GPS, Total Station and LIDAR by Prof H.Narendra Kumar, Associate Professor, Department of Civil Engineering, SJBIT, Bangalore on 10th May 2020.
- A Webinar on “Honing skills outside classroom learning for Civil Engineers “ by Mr Pranav Pradeep Kumar, Graduate Research student, Zachry Dept of Civil Engg, Texas A & M University, Texas on 23rd May 2020.
- SDP on “Covid-19 Past, Present & Future” by Dr D Jagadeesh Kumar Assistant Professor, Department of Bio-Technology, Sir MVIT, Bangalore on 8th June 2020.
- The Department of Civil Engineering conducted a online Alumni meet on 8th August 2020 where around 25 alumni’s participated & interacted with all the staff members.
- SDP on Embodied Energy & Green Building by Dr Senthilkumar .R, Asst. Professor & Associate Dean (P&D), NIT Trichy on September 19, 2020.
- Student Development Program on Introduction to BIM by Mr Bharat Anand .H, Project Co-ordinator & BIM Specialist, Gleeds Consulting (I), Pvt. Ltd on December 5th 2020.
- A Webinar on Challenges In Construction of Tall Bridges in the NorthEast by Mr Sai Baba Ankala, Chief Engineer, Indian Railways on December 7th 2020.
- Student Development Program on Modern Surveying by Mrs. Veera Biradar, Managing Director, M/s Transheight Consultants Private Limited, Bengaluru on December 8th 2020.

## **STUDENTS NEWS**

- VIII Sem B.E Civil Engineering student Karthik Sagar .R was selected in the campus recruitment by DXCTechnology on 7th February 2020.
- VIII Sem B.E Civil Engineering student Vijay Kumar was selected in the campus recruitment by Amazon on 12th February 2020.
- VIII Sem B.E Civil Engineering student Syed Imdad was selected in the campus recruitment by RDC Concrete on 14th February 2020.



- **VIII Sem B.E Civil Engineering students Prajwal P Naik, P Sai Tejeswar Reddy, Ananth Kumar G and Manojkumar K presented a paper on “ Proposals and measures for improvement of functioning of Mekhri Circle Junction “in National Virtual Conference on Recent Trends in Civil Engineering (RTCE-2020) organized by Department of Civil Engineering, RGM College of Engineering & Technology, Nandyal, Kurnool,Andhra Pradesh on 10th September 2020.**
- **VIII Sem B.E Civil Engineering students Arjun.A, Karthick.M, M.J. Manoj kumar and Rakshan.N presented a paper on “Design of Sustainable Buildings” in National Virtual Conference on Recent Trends in Civil Engineering (RTCE-2020) organized by Department of Civil Engineering, RGM College of Engineering & Technology, Nandyal, Kurnool (Dt.), Andhra Pradesh, on 10th September 2020.**
- **VII Sem B.E Civil Engineering student Yashwanth K.S was selected in the Virtual campus recruitment by Accenture on 12thOctober 2020.**
- **VII Sem B.E Civil Engineering student Nikhil.B was selected in the campus recruitment by Square Yards on 16th March 2021.**

## **STAFF NEWS**

- **Dr H.Ravikumar, Associate Professor was a resource person during “Faculty Development Programme” organized by Rao Bahadur Engineering College, Ballari from 6th to 10th March 2020.**
- **The Student Project Proposal “Removal of Froth in Lakes Using A Probe has been approved by the Karnataka State Council for Science & Technology under Student Project Programme – 43rd Series with Students-Mr Ashish, Mr Goutham R.Gowda, Mr Mohammed Raihan & Mr Niraj .R under the Guides – Dr Shivanna S.,Associate Professor & Smt Vyshnavi D.R,Asst. Professor.**
- **Dr S.Shivanna, Associate Professor & Smt Vyshnavi D.R, Asst. Professor published a paper “Assessment of Water Quality & Eutrophication Status of Ulsoor Lake, Bangalore, Karnataka in International Journal of Advanced Scientific Research & Management,Volume 5, Issue 5, May 2020.**
- **Dr H.Ravikumar, Associate Professor participated and presented a paper on “Predicting Axial Load Capacity of Concrete Filled Steel Tubular Columns Based on Soft Computing tools, in the National conference on Structural, Architectural, Building & Automation in Sustainable Engineering organized by department of Civil Engg., Adithya Institute of Technology on 3 & 4 June 2020.**
- **Dr S.Shivanna, Associate Professor presented & authored the technical paper A GIS Based Morphometric Analysis of Vrishabhavathi River Basin, Bengaluru, Karnataka in the 4th International Conference on Advanced Research in Civil Engineering held virtually on the 10th & 11th of July, 2020 at Reva University, Bengaluru.**

- **Dr.Ravi Kumar.H, Associate Professor, Smt Anitha J.,Asst.Prof, Smt Pradeepa S., Asst. Prof., & Smt N.Tamil Selvi., Asst.Prof. published a paper on “Experimental Investigation on Shear Behavior of RC Beams Without Shear Reinforcement in 4th International Conference on Advanced Research in Civil Engineering (ICARCE – 2020) 10th and 11th July 2020.**
- **Smt Pradeepa S., Asst. Prof., Smt Anitha J.,Asst.Prof, Smt Ramya N., Asst.Prof. & Smt N.Tamil Selvi., Asst.Prof. published a paper “Storm Water Drainage Effective Design and Usage in August 2020.**
- **Sri K.V.R Prasad, Associate Professor, Department of Civil Engineering, published a paper on “Proposals and measures for improvement of functioning of Mekhri Circle Junction “in National Virtual Conference on Recent Trends in Civil Engineering (RTCE-2020) organized by Department of Civil Engineering, RGM College of Engineering & Technology, Nandyal, Kurnool,Andhra Pradesh on 10th September 2020..**
- **Dr.Ravi Kumar.H, Associate Professor, Department of Civil Engineering, published a paper on “Design of Sustainable Buildings in National Virtual Conference on Recent Trends in Civil Engineering (RTCE-2020) organized by Department of Civil Engineering, RGM College of Engineering & Technology, Nandyal, Kurnool, Andhra Pradesh on 10th September 2020.**
- **Dr.Ravi Kumar.H, Associate Professor, Department of Civil Engineering, published a paper on “Studies on Prevention of Landslides” in National Virtual Conference on Recent Trends in Civil Engineering (RTCE-2020) organized by Department of Civil Engineering, RGM College of Engineering & Technology, Nandyal, Kurnool,Andhra Pradesh on 10th September 2020.**
- **Science Publishing Group, New York, USA has awarded a Certificate of Editorial Board Membership to Dr.Ravi Kumar.H, Associate Professor, Department of Civil Engineering in recognition of the Editorial Board Member in “American Journal of Civil Engineering.”**
- **Dr S.Shivanna, Associate Professor, Smt Vyshnavi D.R,Asst. Professor & Sriram Mustapure, Alumni published a paper “Morphometric Study of Bangalore Metropolitan City, Karnataka in the International Journal of Advanced Scientific Research & Management,Volume 5 Issue 10,October 2020.**





# BUILDING A BETTER FUTURE

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Every year on September 15, we celebrate Engineer's Day. On this day the Association of Consulting Civil Engineers (India) - ACCE (I) - gets in professionals to speak and analyze issues concerning civil engineering in India.

The growth of the civil engineering industry has been marvelous from old times till now. These accomplishments will continue growing to in the construction of residential, high rise, commercial complexes, malls, highways, waterways, railways, airports, tunnels, bridges, flyovers, metros, and many more. From building residential houses to building commercial apartments, from supply of drinking water to building reservoirs, construction of roads etc., contributions of civil engineers are extremely great. According to sources, the civil engineering industry is contributing to nearly 70 percent of Indian economy, either directly or indirectly.

In India there are nearly 6,047 institutions in engineering and technology. Around 150 institutions have cropped up of late and we get approximately 1.5 lakh civil engineering graduates from campuses each year. There is a huge demand for civil engineers, it is forecast that about three lakhs of them would be needed by 2022. It is very sad that the engineering profession is not regulated through passage of an Engineers' Bill in Parliament in India. In 2003, a Bill was drafted, to which ACCE(I) had largely contributed, but it got stuck in the bureaucratic disturbance.

If such type of bill would regulate the engineering community and create an effective path for engineering to be practiced. Now the Centre has taken up this issue, has entrusted the drafting of the Bill to AICTE and is currently being processed in MHRD. We are hopeful that the Bill would be enacted soon. If such bill is enacted, then it will regulate the profession and control on the quality issues. There needs to be a separate sub-committee to address the construction industry-related issues as the bill is a general one for the entire engineering community.

ACCE(I) has also formed a task force with experienced and knowledgeable members of the Association from across the country. This will help tackle various issues which are creating problems for the industry. ACCE has also joined hands with similar organizations across the country and formed a national forum. The tasks assigned include holding lectures, workshops and seminars to create civil engineering awareness to members interacting with government, public and private organizations and publish and circulate material in all parts of the country. This will highlight the professional services provided by the civil engineering community. We have been insisting on civil engineering professionals being invited for all works in the planning, designing, managing and execution of engineering projects that matter in society

**- MUKARRAM AHMAD**

07



# SUSTAINABLE CITIES



## GREENING THE ECONOMY

Climate change is the current rapid warming of the Earth's climate caused by human activity. If left unchecked, it poses an unprecedented threat to human civilization and the ecosystems on this planet. Due to rapid urbanization and growing energy requirement, it is important that we shift urban development in a sustainable, resilient and low-carbon direction. The relationship between urban areas and sustainability has attracted increasing attention on the international political and economic agenda over the last few decades. With the advent of 21st century, over last 16-18 years, there has been an exodus of people moving to urban towns and cities, a phenomenon observed globally. This makes the cities not only extremely congested, but also very polluted and resource scarce.

Sustainable Consumption and Production aims to improve production processes and consumption practices to reduce resource consumption, waste generation and emissions across the full life cycle of processes and products and to establish and create green jobs for the population. United Nations Environment Program (UNEP) green jobs are defined as positions in agriculture, manufacturing, R&D, administrative, and service activities aimed at substantially preserving or restoring environmental quality.

Sustainable city is a city designed with consideration for social, economic, environmental impact and resilient habitat for existing populations, without compromising the ability of future generations to experience the same. Sustainable urban development is the way forward for cities to mitigate climate change as cities will be the epicenter of all the economic activities in the future. Cities are key systems for global economic growth but also drivers of environmental degradation, affecting the balance between humans and natural systems.

They consume two-thirds of the world's energy and account for 70% of global greenhouse gas emissions. Sustainable urban planning will help in delivering impactful development outcomes at large scale and with multiple global environmental benefits. Cost and Fuel / Energy consumption in vehicular transportation and urban services is significantly reduced and thus air pollution is also reduced with increase in heat waves development of green spaces, sustainable urban planning will help in tackling heat waves and heat pockets.





**"Being green is more than just buying 'eco'. It is an unshakable commitment to a sustainable lifestyle."**

**Jennifer Nini**

Land is spared for other purposes including agriculture, mitigating environmental challenges and maintaining eco-system. Strategic policy and investment decisions supporting the transition to a pathway of low-carbon, sustainable growth could lead to direct economic gains of US\$26 trillion by 2030. By 2030, ambitious action across these systems could generate over 65 million new low-carbon jobs. It will raise US\$2.8 trillion in carbon price revenues and fossil fuel subsidy savings to reinvest in public priorities, increase female employment and labor participation, and lead to higher global GDP growth. There will be increase in per capita income of countries.

Bangalore which is also known as "Garden City of India" is one of the most sustainable city in India. The city has around 333 green buildings and a total of 227.92 million sqm of green space that is certified by the IGBC -a wing of the Confederation of Indian Industries (CII). The city is leading the way in sustainable development in the country by introducing electric buses, CNG run automobiles and installing cycle and electric bike station throughout the city.

In the next thirty years we will see doubling of the urban population and infrastructure. About 75% of the population will be living in urban areas by 2050. The cost is minimal in comparison with the benefits. The benefits are huge in terms of economic activity, quality of life, the environment, and the overall success of a networked city and revenue returns. Therefore there is an urgent need to shift from fossil fuel based economy to renewable energy based economy to mitigate climate change, provide better lifestyle, education, health facilities etc.

**- MRITYUNJAY JHA**





# CENTRAL VISTA REDEVELOPMENT PROJECT

## A DREAM PROJECT !

Central Vista Redevelopment Project is a dream project of Narendra Modi - led NDA government at the Centre, which aims to redevelop a 3.2 km stretch called Central Vista that lies at the heart of Lutyens Delhi built by the Britishers in 1930s. This project involves demolishing and rebuilding several government buildings, including iconic landmarks, and constructing a new parliament at a total cost of Rs. 20,000 Crores. Out of this, around Rs. 1,000 Crores will be used for the construction of a new parliament building.

In 2019, the central government announced the redevelopment project to give a new identity to the 'power corridor' of India. The plan anticipates the construction of a new parliament, prime-minister and vice-president's residences along with 10 building blocks that will accommodate all government ministries and departments. According to redevelopment plan, North and South Blocks will be converted into museums.

This project is estimated to be completed by 2024, is being executed by the Union Ministry of Housing and Urban Affairs.

The Centre wants to restructure because the current parliament building is very old which was constructed by Britishers, poses structural safety concerns, according to the Union Ministry of Housing and Urban Affairs said. It is highly stressed and the quality of amenities it offers has considerably deteriorated over the years, the ministry said.

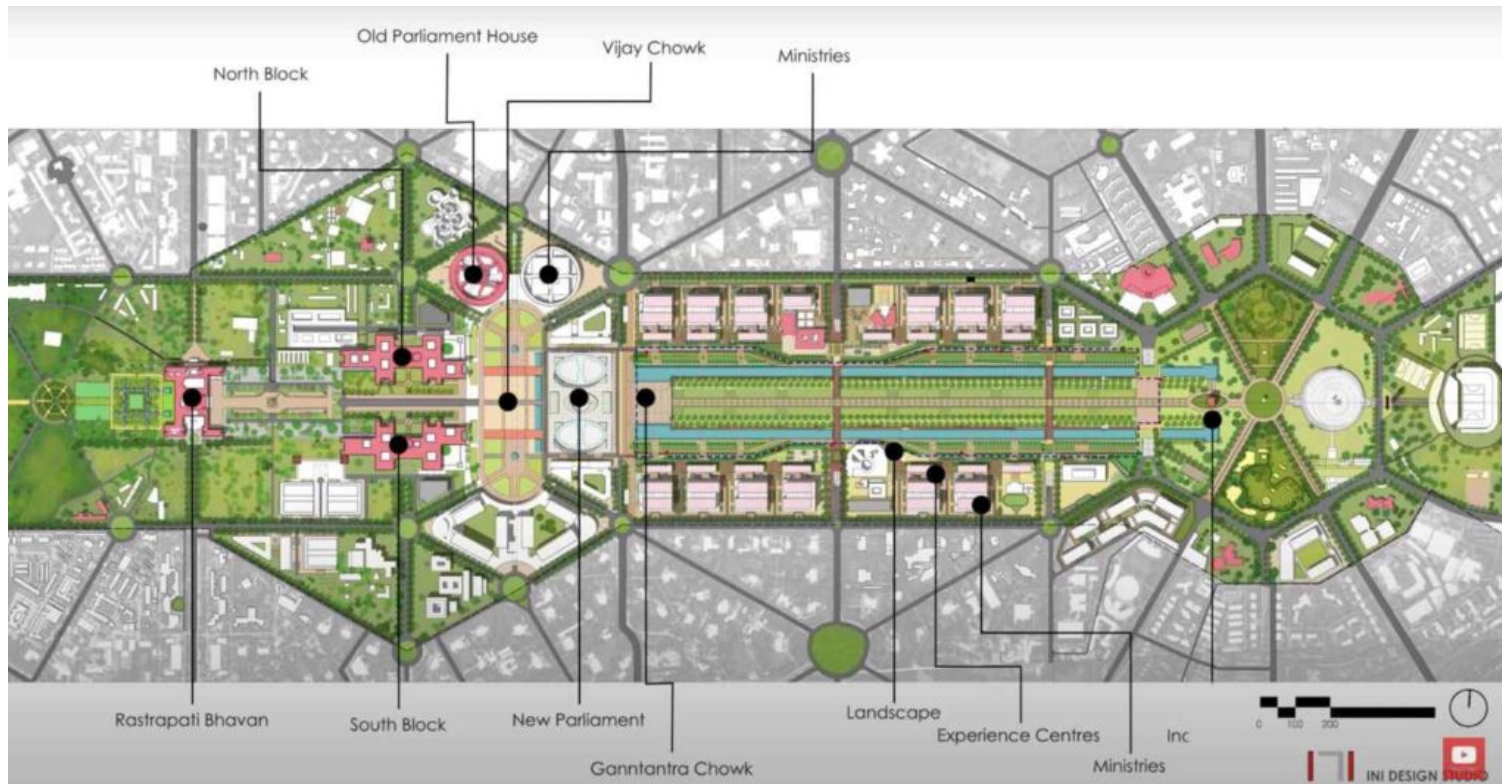
In September, Tata Projects won the bid to construct the new Parliament for Rs 861.90 crores. It beat L&T's bid of Rs 865 cores. The designers were finalised in October 2019 by the government. Ahmedabad-based architecture company HCP Design was chosen to design the building.

The new Parliament Building Complex will spread over 64,500 square meter in triangular shape, it is to be much bigger than the existing Parliament building and



will be able to house 1,224 members of Parliament. The Lok Sabha chamber will have a seating capacity of 888 MP's while the Rajya Sabha chamber will have 384 MP's seating capacity. All MP's will have separate office in the building. The new Parliament building will also have a grand Constitution Hall showcasing India's democratic heritage and it will also showcase the original copy of the Constitution..

There will be a visitor's gallery digitally displaying India's democratic heritage. The new Parliament building will be equipped with the latest digital interfaces as a step towards creating paperless offices.



## PROPOSED MASTER PLAN.

A monitoring committee having members from the Lok Sabha Secretariat, the Ministry of Housing and Urban Affairs, the CPWD, the NDMC and architect/designer of the project are monitoring the construction work. The NDA government has been facing opposition from several quarters for going ahead with this project amid the raging COVID-19 pandemic. The opposition leaders urged the government to scrap the project and divert the funds to efforts dealing with COVID-19 crisis. .

At the same time, conservationists said that the revamp will meddle with the history of the current building, which was designed by Edwin Lutyens. The 1927 building will be a lost heritage, they said. The environmentalists claim that this project negatively affects the environment. They have appealed to halt the project until pandemic is over

- RITHUSHREE C

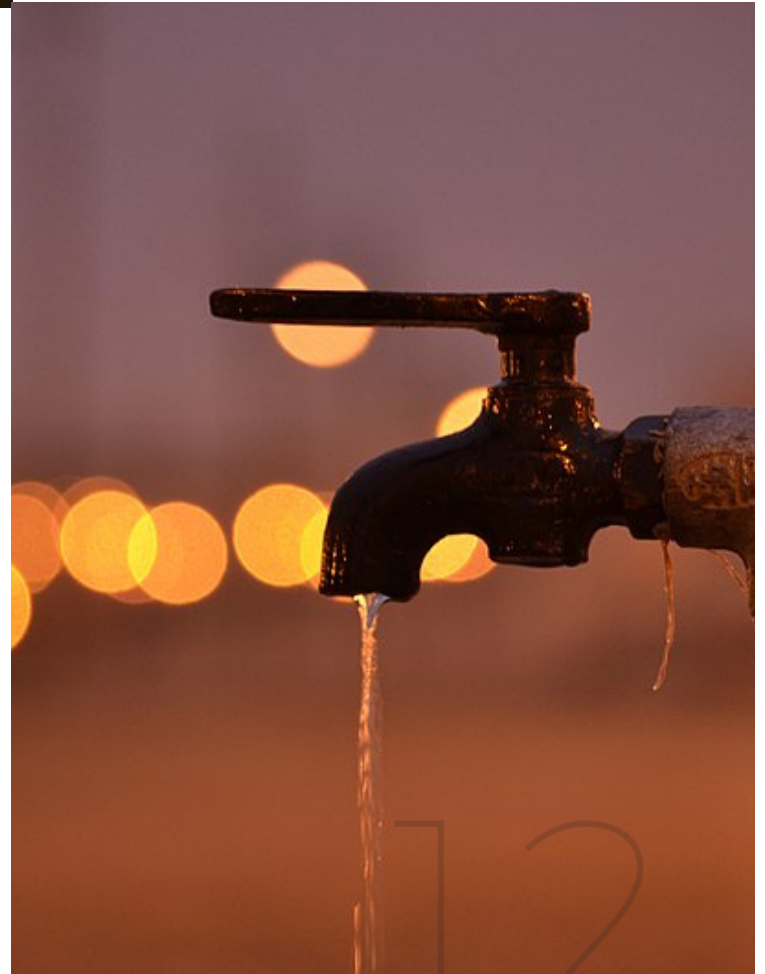


# IS THE GOLDEN AGE OF WATER OVER?

**C**limate change, human activity, and a growing population are significantly increasing the chances of a global water crisis, analysts warn. Billions of People Lack Water. Clean freshwater is an essential ingredient for a healthy human life, but 1.1 billion people lack access to water and 2.7 billion experience water scarcity at least one month a year. By 2025, two-thirds of the world's population may be facing water shortages. the UN predicts a 40 percent water deficit worldwide by 2030.

Cape Town is facing 'day zero' when the city's taps will be shut off. South Africa's Cape Town, for example, could become the world's first major city to run out of water. Much of the city's water flows from neighbouring Lesotho, and the next water crisis could be looming there. South Africa has been plagued by a prolonged drought for three years. Another African nation feeling the heat of water scarcity is Kenya. Several towns across the country, including the capital Nairobi, are facing acute water shortages. The South African city plans to shut off the taps to 4 million people. But it's just one of many cities in the world facing a future with too little water.

Some residents in towns have not received water through their taps in months and are resorting to buying from vendors at high prices.



Population growth and a record drought, perhaps exacerbated by climate change, is sparking one of the world's most dramatic urban water crises, as South African leaders warn that residents are increasingly likely to face "Day Zero." When Day Zero arrives, how do we make water accessible and prevent anarchy?" says Helen Zille, former Cape Town mayor and the current premier of South Africa's Western Cape province, in a guest newspaper column published earlier this winter.

This is the current scenario in the whole world as published by the UN: 844 million people lack basic drinking water access, more than 1 of every 10 people on the planet. Women and girls spend an estimated 200 million hours hauling water every day.

Every day, more than 800 children under age 5 die from diarrheas attributed to poor water and sanitation. We can take steps to manage our way through this global crisis and ensure a sustainable water future for everyone. But we need to confront the realities that I've shared with you today, head on, and begin to deal with them now. The nexus of water and energy and food will define our quality of life in this century. It already is. Ultimately, water will be limiting in all respects, unless learn to do more with a lot less, and to reuse and reuse more and more, and to manage our way to a sustainable water future.

We can't squeeze water from a planet but we can manage our way through this crisis to ensure a sustainable water future.

**- KUMAR ANKIT**



**"When the well  
is dry, we know  
the worth of  
water."**

**- Benjamin Franklin**

13



# SOLAR PAVEMENT



As we know, pavement is one of the main components of roads, as the essential global transportation infrastructures, that can potentially generate a substantial amount of energy. Energy issue has been a concern for researchers and industries. In this regard, the efficient use of renewable energy is considered the key to solving the energy problem and promoting the sustainable development of the society. Among the renewable energy resources, solar energy is an abundant and maybe eternally renewable energy source that generates 1027 KW energy from the sunshine.

Solar energy can be harnessed by the implementation of solar heating, solar photovoltaic, solar thermal electricity, solar architecture, and artificial photosynthesis.

It was estimated that road surfaces absorb a great deal of solar radiation during summer, approximately up to 40MJ/m<sup>2</sup> per day, thus, producing high temperatures in the pavement structure. Moreover, in big cities, roads and streets cover up to 40% of the total inhabited area and, due to the heat island

phenomenon, temperatures at city centers may be higher by 3oC during the day and by 10oC at night related to suburbs.

Solar power generation has emerged as one of the most rapidly growing renewable sources of electricity. Solar power generation has several advantages over other forms of electricity generation like reduction in dependence of fossil fuels, environmental advantages, modularity & scalability etc.

Solar pavement structure consists of road surface layer, electronics layer, and base plate layer. Thermal Collector Pavement, Electrical Collector pavement, and Thermoelectric Generator Pavement are three types of solar pavement systems.

Solar roads could put an end to India's electricity woes. But, to make these technically and financially viable, there is a long list of challenges to overcome—ranging from indigenous solar system development to infrastructure and investment.



" People don't want to do that (build houses or offices) near a nuclear power plant. So, there's quite a big keep-out zone, and when you factor the keep-out zone into account, the solar panels put on that area would typically generate more power than that nuclear power plant."

**- Elon Musk**

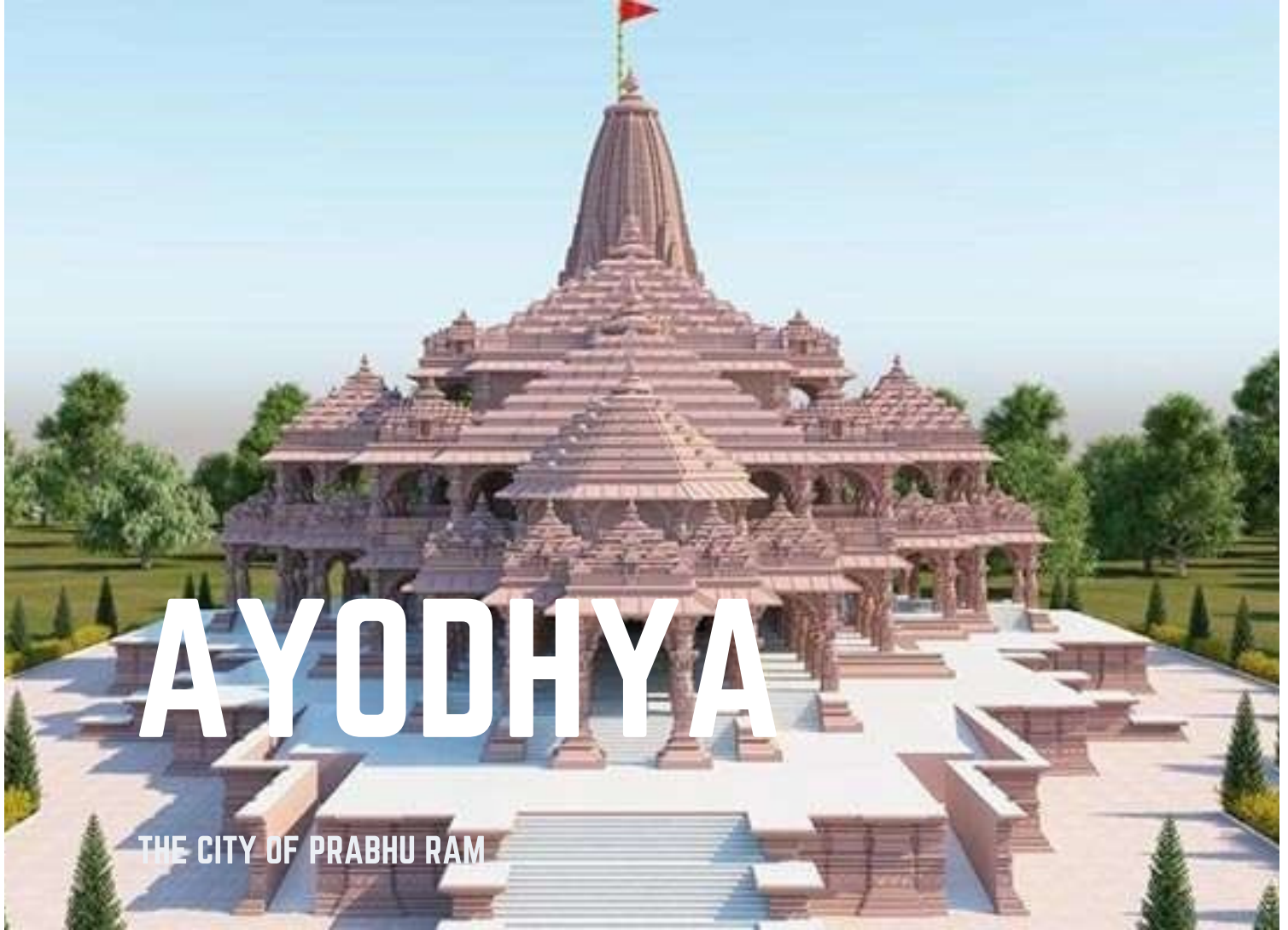
India is moving full throttle on solar projects. This has set the stage for higher domestic manufacturing and thus lower cost of solar products. With the consistent availability of sunlight throughout the year (for about 300 days), one of the most unique proposals is the implementation of solar surfaces for roads in India.

This has the potential to generate massive megawatts of energy that can power numerous buildings and other infrastructure. However, developing solar roads is not easy and requires more clarity and planning on many aspects before implementation. One proposal came from the Gujarat Energy Research and Management Institute (GERMI) to install solar panels across 205km of the Ahmedabad Rajkot highway to generate 104 megawatts of electricity.

The energy generated could be used to power the highway infrastructure, light the roads, and also run a bit of the adjoining buildings. This type of pavement design is in planning stage.

**- ZAHID ZAHOR**





Ayodhya, also called Oudh or Awadh lies on the Ghaghara River just east of Faizabad in Uttar Pradesh. Ayodhya is considered as one of the seven sacred cities of the Hindus, revered because of its association in the great Indian epic poem Ramayana with the birth of Rama and with the rule of his father, Dasharatha. The town was prosperous and well-fortified and had a large population.

The Ayodhya land dispute was a political, historical and socio-religious debate in India that had been on for decades. The dispute was focused on a portion of land in Ayodhya, Uttar Pradesh, which is considered among the Hindus to be the birthplace of the Hindu Lord Ram. According to some beliefs, it was originally the site of a Hindu temple that was demolished to construct a mosque known as Babri Masjid.

For their part, Muslims claim that the land was titled to them and Mir Baqi built the mosque on it in 1528 on orders of the first Mughal emperor, Babur. On December 17, 1959, Nirmohi Akhara filed a suit seeking possession of the site and claimed to be the custodians of the disputed land.

Following this, the Sunni Central Board of Waqf also filed a suit claiming ownership of the site on December 18, 1961. Later, some Hindu kar sevaks on December 6, 1992, demolished Babri masjid, an action that triggered communal riots all over India, killing at least 2,000 people.

Over the years, the matter had been brought up by both groups in various courts of the country. On September 30, 2010, the Allahabad High Court

ruled that the disputed 2.77-acre land in Ayodhya should be divided into three parts among the Hindus, Muslims and the Nirmohi Akhara. The petitioners moved the Supreme Court and the apex court stayed the HC verdict. In 2016, the court started a fresh hearing of the case. In 2017, the SC said that the matter was sensitive and suggested for the case to be settled out of court. It asked stakeholders to hold talks and find an amicable solution. However, no solution was achieved. In 2018, the Supreme Court set up a five-judge Constitution Bench to hear the land dispute case. On November 9, 2019, a Supreme Court Bench led by Chief Justice Ranjan Gogoi unanimously ruled that the disputed land be given to the Ram Janmabhoomi Nyas for the construction of a temple, and the Muslim side be compensated with five acres of land at a prominent site in Ayodhya to build a mosque.

In February 2020, Prime Minister Narendra Modi announced in the Lok Sabha that the government had given its approval to the proposal for "Shri Ramjanmabhoomi Tirtha Kshetra" trust to take care of the construction of a grand Ram temple in Ayodhya and other related issues.

Six months later, he visited Ayodhya to lay the foundation stone (a 40 kg silver brick) for the construction of the Ram Mandir at the Ram Janmbhoomi site. Despite the shadow of coronavirus pandemic, the event was extravagant, with as many as 175 invitees.

The original design for the Ram temple was prepared in 1988 by the Sompura family of Ahmedabad. The chief architect of the temple is Chandrakant Sompura. He was assisted by his two sons Nikhil Sompura and Ashish Sompura, who are also architects.

A new design, with some changes from the original, was prepared by the Sompuras in 2020, in accordance with vastu shastra and the shilpa shastras. The temple will be 235 feet wide, 360 feet long and 161 feet high. Once complete, the temple complex will be the world's third largest Hindu shrine. It is designed in the Gujara-Chaulukya style of Northern Indian temple architecture. A model of the proposed temple was showcased during the Prayag Kumbh Mela in 2019.

Larsen & Toubro offered to oversee the design and construction of the temple free of cost and is the contractor of the project. Central Building Research Institute, National Geophysical Research Institute and the Indian Institute of Technology (such as those Bombay, Guwahati and Madras) are assisting in areas such as soil testing, concrete and design. Reports emerged that the Indian Space Research Organisation (ISRO) had identified a stream of the Sarayu which flows under the temple.

The construction work will be accomplished with 600 thousand cubic feet of sandstone Bansi mountain stones from Rajasthan. Thirty years ago, more than two hundred thousand bricks etched with the 'Sri Rama' in several languages had arrived from various parts of the country; these will be utilized in the foundation. Traditional techniques will be used to create the shrine while at the same time it will be made sure that the shrine will be strong enough to sustain natural calamities such as earthquakes. There will be no use of iron in the construction of the temple. The fusing of the stone blocks will require ten thousand copper plates.



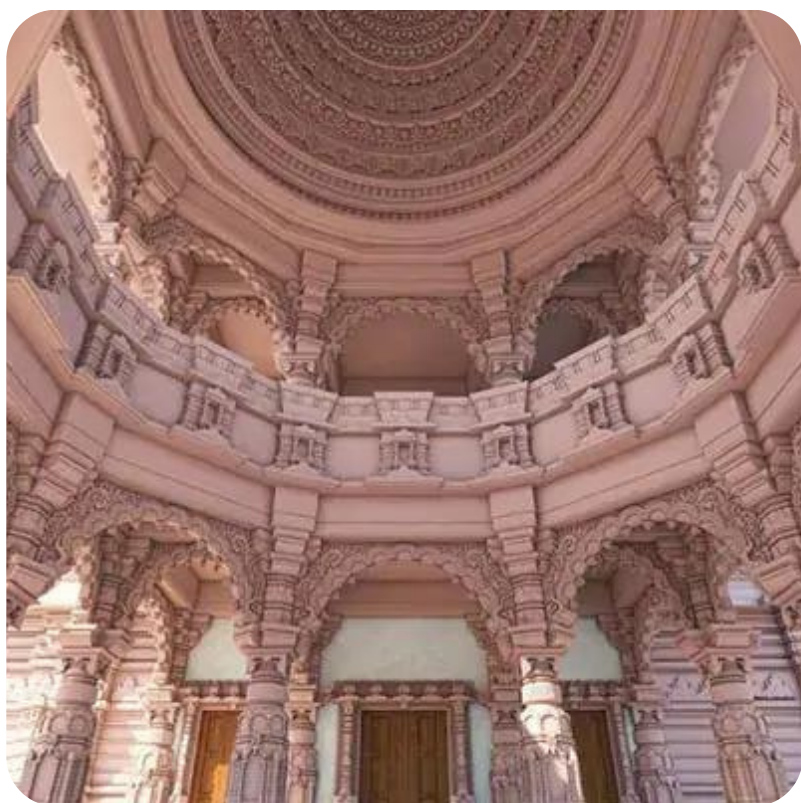


The main structure of the temple will be built on a raised platform and will have three storeys. It will have five mandapas in the middle of the garbhagriha (sanctum sanctorum) and the entry – the three mandapas Kudu, Nritya, and Rang; and two mandapas for the Kirtan and Prarthana on the other side. In Nagara style, the mandapas are to be decorated with shikhara. The tallest Shikhara will be that above the Garbhagriha.

The building will have a total of 366 columns. The columns will have 16 idols each to include the incarnations of Shiva, the Dashavataras, the chaushath joginis, and the 12 incarnations of the goddess Saraswati. The width of the stairs will be 16 feet. In accordance with scriptures dedicated to the design of temples dedicated to Vishnu, the sanctum sanctorum will be octagonal.

The temple will be built in 10 acres and 57 acres of land will be developed into a complex with a prayer hall, "a Ramkatha Kunj (lecture hall), a Vaidik Pathshala (educational facility), a Sant Niwas (saints' residence) and a Yatri Niwas (hostel for visitors)" and other facilities like a museum and a cafeteria.

**- RITESH SHARMA**



# MODERN TECHNOLOGIES IN SURVEYING

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"The Future is already here."

-Author  
William  
Gibson



Surveying is the science of determining terrestrial information in the form of distances and angles along with dimensional position of the points, has come a long way since its inception. From exhaustive field work and mathematics taking days on end to using a smartphone to note the distance between two points on different continents, new technological achievements have not only improved terrestrial observations but also observations of places deemed inaccessible before with remarkable accuracy. Surveyors work with elements of geometry, trigonometry, regression analysis, physics, engineering, metrology, programming languages, and the law. They use equipment, such as total stations,

robotic total stations, theodolites, GNSS receivers, retroreflectors, 3D scanners, LiDAR sensors, radios, inclinometer, handheld tablets, optical and digital levels, subsurface locators, drones, GIS, and surveying software.

Surveying is being used from ancient time to modern era in various ways. In ancient Egypt, a rope stretcher would use simple geometry to re-establish boundaries after the annual floods of the Nile-River and In England, William the Conqueror commissioned the Domesday Book in 1086. It recorded the names of all the landowners, the area of land they owned, the quality of the land, and specific information of the area's content and inhabitants. It did not include maps showing exact locations. In modern era, Dutch mathematician Willebrord Snellius (a.k.a. Snel van Royen) introduced the modern systematic use of triangulation.

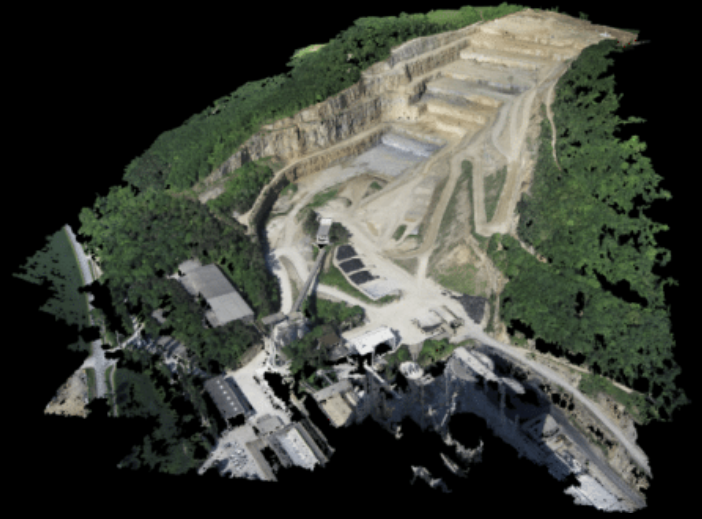
In India, the great Trigonometric Survey began in 1801. The Indian survey had an enormous scientific impact. It was responsible for one of the first accurate measurements of a section of an arc of longitude, and for measurements of the geodesic anomaly. It named and mapped Mount Everest and the other Himalayan



peaks. Dr Trevor Lloyd Wadley developed the Tellurometer during the 1950s. It measures long distances using two microwave transmitter/receivers.

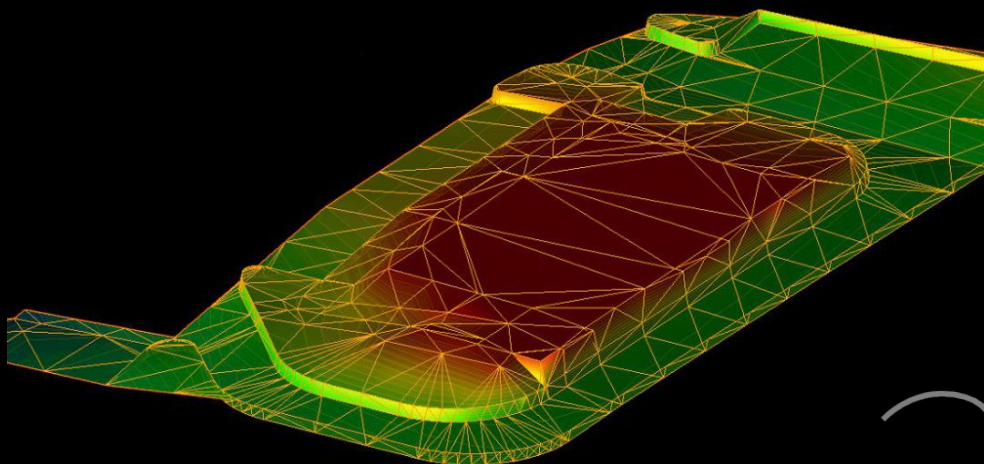
There was a revolution in surveying techniques in starting of 21st Century like introduction of Global Positioning System, Remote sensing, Lidar and drone. Software and data management techniques improved with introduction of Geographic information systems and geoinformatics. Introduction of RTK (Real time kinematic) and PPK (Post processed kinematic) technologies in collection of global navigation satellite systems improving accuracy.

There are various benefits of Drone surveying like reduction in field time and survey costs, to provide accurate and exhaustive data etc. The modern surveying is used for land surveying and cartography, land management and development, slope monitoring, urban planning, future expansion, health, disaster management and relief, space technology, military etc.



Surveying techniques have evolved and continue to evolve along with human technological advancement. The potential is limitless. Integration of machine learning and AI technologies with drone mechanics is being tested with highly satisfactory results. Surveying techniques have evolved and continue to evolve along with human technological advancement. The potential is limitless. Integration of machine learning and AI technologies with drone mechanics is being tested with highly satisfactory results. The union of Robotics and Surveying open avenues of surveying the most remote and inaccessible places on earth (like the deepest part of oceans and volcanoes) and beyond, without putting human life at risk.

**- UTKARSH PRATAP SINGH**



20

# THE EFFECTS OF LOCAL SITE CONDITIONS ON STRONG GROUND MOTION.



It has been a well-known fact that local geological, topography and geo-technical conditions have a very important impact on the strong ground motions. Ground motion at a particular site due to earthquakes is influenced by source, travel path, and local site conditions. First relates to the size and source mechanism of the earthquake (source effect). Second describes propagation of stress waves through the crust to the top of bedrock beneath the site of interest (path effect). Third describes the effects of the upper hundreds of meters of rock and soil and the surface topography at the site (local site effect).

The influence of local geologic and soil conditions on the intensity of the ground shaking and earthquake damage has been known for many years. MacMurdo (1824) noted that "building situated on rock were not by any means so much affected. As those whose foundations did not reach to the bottom of the soil." Few researchers like Wood (1908), Reid (1910), Gutenberg (1927) worked on local site effects.

The information about the local site effects is useful in the simulation of strong ground motions and hence, the results of the site response studies are one of the most important inputs for seismic hazard assessment of a region. The damage caused by Bhuj earthquake (7.7 Mw), which has been one of the most destructive earthquakes of 2001 is because of site-effects and liquefaction.

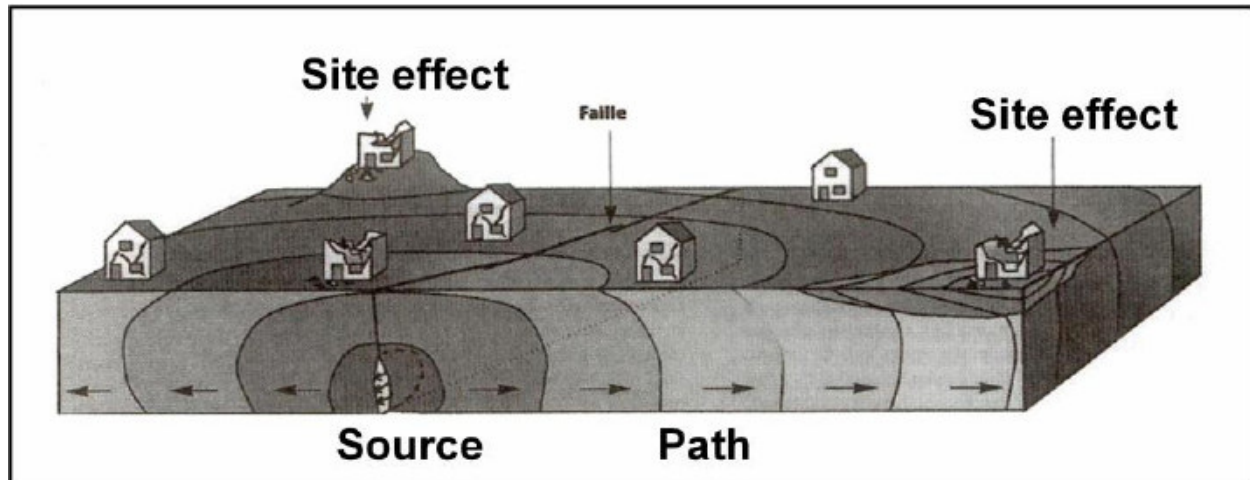
On September 19, 1985 Michoacán earthquake ( $M_s=8.1$ ), extensive damage occurred in Mexico city, which was some 350 km away from the epicenter, whereas it caused only moderate damage near the epicenter. The effect of local soil condition on strong ground motion was confirmed by the highly selective damage in the city. The greatest damage was reported in those areas underlain by 38 to 50 m of soft soil with characteristic site periods at 1.9 to 2.8 seconds. Even in this area, buildings less than five storeys and modern buildings



greater than 30 storeys survived with minimal damage. However, buildings in the range of 5 to 20 storeys were completely collapsed or damaged badly.

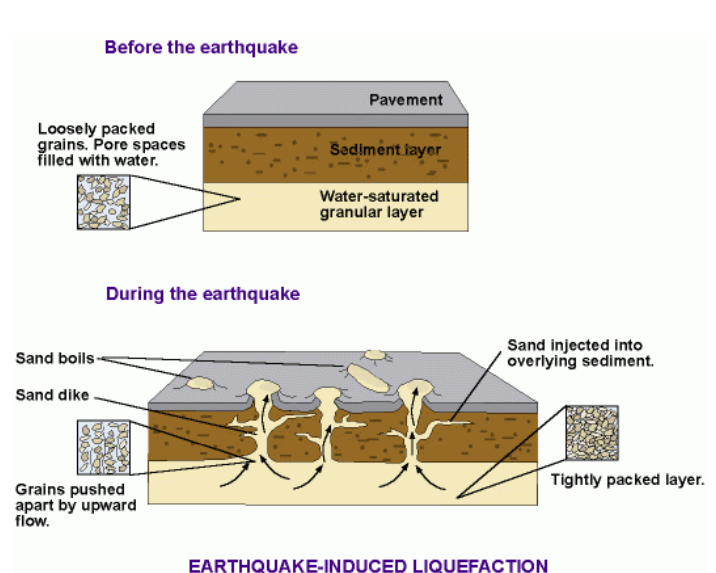
The October 19, 1989 Loma Prieta earthquake produced MMI VIII shaking in the epicentral region, but intensities were actually higher, MMI IX, in portion of San Francisco and Oakland which were at a distance of about 100 km.

The effect of local soil condition on strong ground motion can be understood from the recordings of two instruments, located at Yerba Buena (rock outcrop) and Treasure Island (man-made hydraulic fill). The underline soil composition of Treasure Island instrument was a layer of 13.7 m thick loose sandy soil followed by a 16.8 m thick San Francisco Bay mud. The Yerba Buena instrument was placed directly on the rock.



Peak accelerations at the Yerba Buena were 0.06g in E- W direction and 0.03g in N- S direction; the corresponding values at Treasure Island were 0.16g and 0.11g. Though both the instruments were virtually at the same distance from the source the main reason of such difference in recordings was the local soil conditions.

The significant amplification of the underlying bedrock motion was accounted for the presence of soft soil at the Treasure Island. The importance of the local site effects can be established from the fact that same earthquake caused extensive damage in some areas and relatively lesser in others within the same vicinity.



- VISHVAJEETH RK

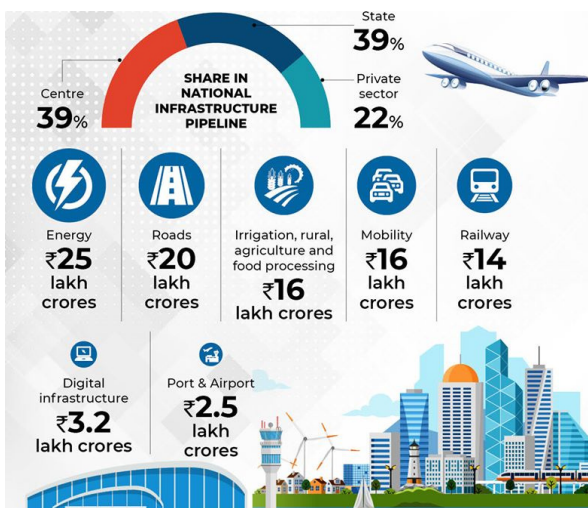
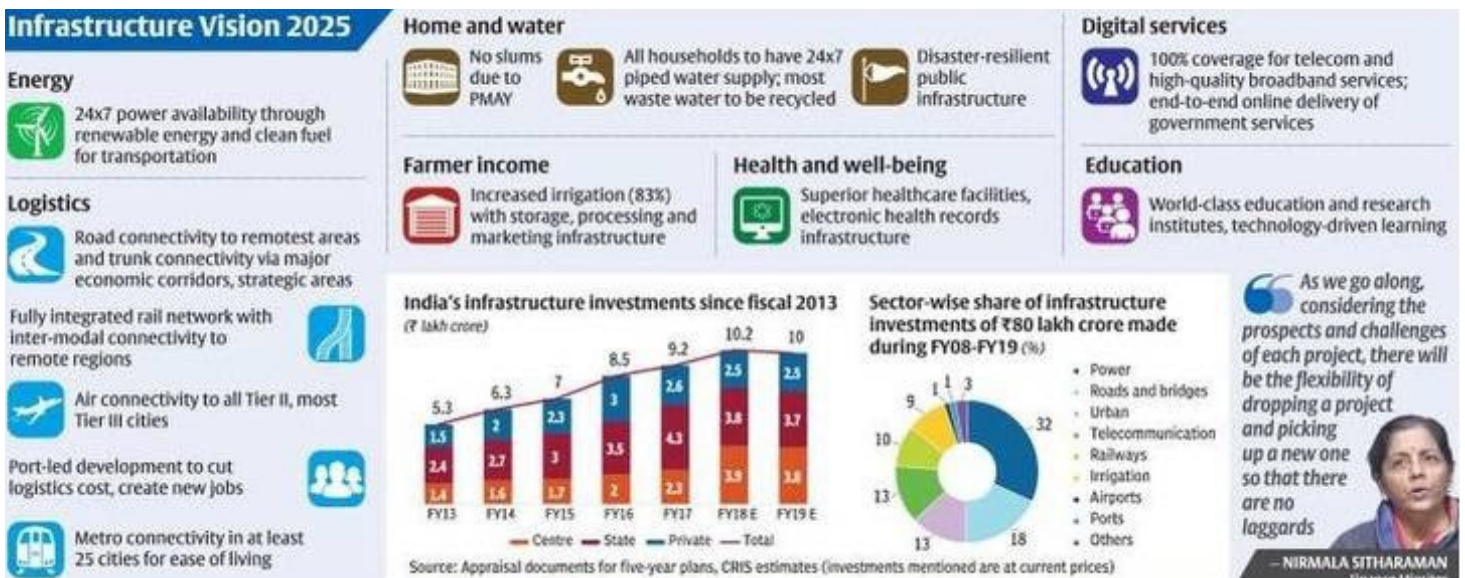
# TOWARDS ATMANIRBHARTA - INFRASTRUCTURE

The National Infrastructure Pipeline (NIP) is a group of social and economic infrastructure projects in India over a period of five years with an initial sanctioned amount of ₹102 lakh crore (US\$1.4 trillion). The pipeline was first made public by the Prime Minister of India Narendra Modi during his 2019 Independence Day speech. Projects in energy, roads, railways and urban infrastructure under the National Infrastructure Pipeline (NIP) have been identified by a task force. About 42% of such identified projects are already under implementation, 19% are under development and 31% are at the conceptual stage.

The NIP task force appears to have gone project-by-project, assessing each for viability and relevance in consultation with the States. Considering that the NIP will be like a window to the future, a constant review becomes paramount if this is not to degenerate into a mere collation and listing of projects. A periodic review, as promised by the Finance Ministry, is necessary. The government's push on infrastructure development will not only enable ease of living — such as metro trains in cities and towns — but also create jobs and increase demand for primary commodities such as cement and steel. From this perspective, this push to invest in infrastructure is welcome.

The National Infrastructure Pipeline (NIP) Online Dashboard, India Investment Grid (IIG) is an interactive and dynamic online platform to showcase investment opportunities in India to the global investor community.

***Self-reliant is not the only word, self-reliance is the greatest weapon of human!!!***



Developed and managed by Invest India, the National Investment Promotion and Facilitation Agency, IIG serves as the gateway to investments in India, and is also widely used by Indian missions and embassies across the world. IIG allows investors to search a pan-India database for investment opportunities across sectors; Track the progress of preferred projects and indicate interest and Directly communicate with project promoters. It was inaugurated by Finance Minister Nirmala Sitharaman in August 2020.



# THE BURJ KHALIFA

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A \$1.5 BILLION DOLLAR TOWER

The Burj Khalifa is the tallest building in the World with a height of 829.8 meters which is much higher than the former tallest building Taipei (508 meters). This building got the name "Burj Khalifa" to honour the president of the neighbouring emirate of Abu Dhabi, Sheikh Khalifah ibn Zāyid Āl Nahyān. It was known as Burj Dubai or Dubai Tower during the construction. It is located in Downtown Dubai, an area along Sheik Zayed Road. The address of Burj Khalifa is 1 Sheikh Mohammed Bin Rashid Boulevard, Dubai.

The Burj Khalifa tower was designed by the Chicago-based architectural firm of Skidmore, Owings & Merrill. Adrian Smith served as architect, and William F. Baker served as structural engineer.

The Burj Khalifa tower took 6 years to build. In January 2004, foundation excavation work was commenced. On January 4, 2010, tower was formally opened but that time entirely interior work was not completed.

The Burj Khalifa held a total of eight world records, including those for the tallest building, the highest habitable floor, and the longest elevator travel distance at the time of its completion. It was built to house a variety of commercial, residential, and hospitality ventures. The 39th floor and floors below are used as hotels or residences by Armani. The floors from 39th floor to 108th floor are mainly used for residences, above 108th floor to 154th floor are office spaces. Floor no. 124, 125 and 148 are exception, which are the 3 separated observation decks for public sightseeing. There is also a restaurant set at floor 122. The floors above level 154 to 163 are all mechanical floors. There are total of 2909 stairs from the ground floor to 160th floor since the number of floor is so huge.

The tower is built on a shamrock-shaped footprint, making the tower seen like a letter 'Y' from above in the air, this shape derived from Hymenocallis, also known as desert lily, a local plant live in desert, the tower's cross section area reduces gradually as it rises. This is shape in the one hand is for the stability of the building. On the other hand, this type of shape is more suitable for the hotels and residences. The Y shape design can provide the people living in it with the views to the greatest extent.

24

The Burj Khalifa was developed by a renowned local real estate firm "Emaar Properties". The construction of Burj Khalifa was constructed by Samsung Group.

The construction started in 2004, the building started rising in March 2005. After that Burj Khalifa grew very fast, below is how it looked in February 2006. The building had become a 30-floor highrise building from a Y-shape base structure in less than one year.

The construction work became faster when building built to higher floors. As of January 2007, the tower had more than 100 floors built. In February 2007, it became the building with most floors on the Earth. Still the tower was substantially growing and it topped out in January 2009 at its full height of 829.8 meters.

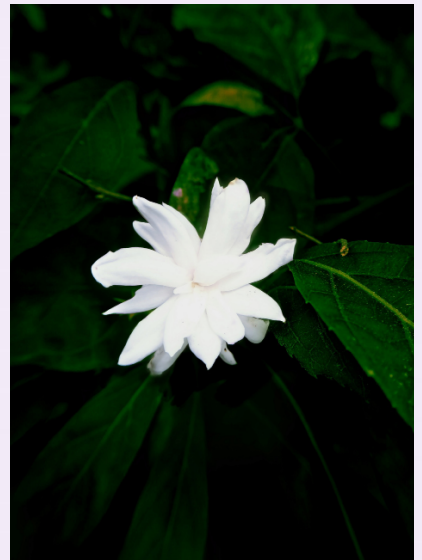
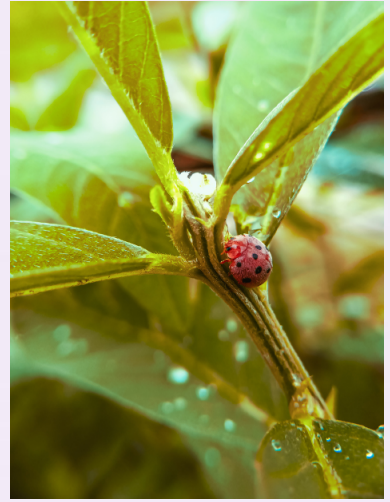
**- NAVYA R**



*The estimated cost of the whole project is around 1.5 billion dollars and out of 1.5 billion dollars, the tower itself costed around 1 billion dollars*



# PHOTOGRAPHY





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