G20 भारत 2023 INDIA

Azadi Ka Amrit Mahotsav

सत्यमेव जयते

CPWD

निर्माण भारती

केन्द्रीय लोक निर्माण विभाग

Nirman Bharati

Central Public Works Department

169th CPWD DAY

Celebrating

CPWD: POWERING DIGITAL IN PUBLIC WORKS

The Genesis of

CENTRAL PUBLIC WORKS DEPARTMENT

Public Works Department was formally established in the year 1854 in the sixth year of Lord Dalhousie's tenure as Governor General. In the minutes of meeting held on 12th July, 1854 the Governor General resolve that a central agency be provided by creating an office of Secretary to the Government of India in Department of Public Works. The note recorded by Lord Dalhousie was as under:

"...The organization of the Department of Public Works in the Indian Empire will be incomplete unless it shall be provided for the Supreme Government itself some agency by which it may be enabled to exercise the universal control confided to it over public works in India with the best of scientific knowledge with authority and system.

The Government of India shall no longer be dependent on expedients, but should be provided with a permanent and highly qualified agency to assist in the direction of this important branch of public affairs. I have, therefore, now to propose that such an agency should be provided by creating an office of the Secretary to Government of India in the Department of Public Works.

The person who holds it should always be a highly qualified officer of the Corps of Engineers. He should have the aid of an Assistant Secretary, also an officer of the Corps of Engineers. His salary I think should not be less than that of the Secretary to the Government of Bengal, namely ₹3,000 per month and the salary of the Assistant should not be less than that of the Assistant Secretary in Military Department..."

Colonel W.E. Baker of the Bengal Engineers was accordingly appointed first Secretary to the Department of Public Works, this is the genesis of the Central Public Works Department.

हरदीप एस पुरी
HARDEEP S PURI

सत्यमेव जयते

आवासन और शहरी कार्य मंत्री
पेट्रोलियम एवं प्राकृतिक गैस मंत्री
भारत सरकार
Minister of
Housing and Urban Affairs; and
Petroleum and Natural Gas
Government of India

Message

I extend my warm wishes to all the employees of the Central Public Works Department (CPWD) on the occasion of its 169th Annual Day. CPWD is a premier Government organisation that has been responsible for the construction and maintenance of some of the most iconic and architecturally significant buildings in India.

It is apt that this remarkable milestone is being commemorated through this special edition of **'Nirman Bharati'**. I am happy to note that this year's Annual Day is being celebrated under the theme of **Powering Digital in Public Works**. This is a relevant and important theme as CPWD seeks to embrace new technologies and digital approaches to improve its efficiency.

I am happy to note that CPWD has already made significant progress in the digital space. It has launched a number of online portals that allow citizens to engage with the department more easily. CPWD has also implemented numerous digital tools to improve its project management and procurement processes. These technologies have the potential to revolutionise the way CPWD functions.

I would like to take this opportunity to thank all the employees of CPWD for their dedication and hard work. Your contributions towards the development and growth of our nation's infrastructure is commendable. I look forward to seeing the CPWD's continued success in the years to come.

(Hardeep S Puri)

New Delhi
07 July, 2023

कौशल किशोर
KAUSHAL KISHORE

सत्यमेव जयते

आवासन और शहरी कार्य राज्य मंत्री
भारत सरकार
Minister of State for Housing & Urban Affairs
Government of India

MESSAGE

It gives me immense pleasure to know that Central Public Works Department is celebrating its 169th Annual Day on 12th July, 2023 and on this occasion CPWD is bringing out a special issue **'Nirman Bharati'** highlighting the activities and achievements of the Department.

It is a matter of satisfaction that Central Public Works Department under aegis of Ministry of Housing and Urban Affairs is playing a crucial role in the development of public works in India since its inception in 1854. The Annual Day celebration is an apt opportunity to reflect on the incredible 169 years of CPWDs journey and its contributions to the nation's progress. CPWD has come a long way covering a diverse range of public works, catering to the multifaceted needs of our nation from housing projects to recreational facilities, educational institutions to critical infrastructure, CPWD has consistently demonstrated its capability to undertake and execute projects that serve the public interest.

I congratulate CPWD for taking up the theme **'CPWD: Powering Digital in Public Works'** for this year's Annual Day Celebrations which is very apt. CPWD's focus on digitalization through ERP implementation is commendable and I encourage you to continue adopting digital dashboard-based working and set benchmark for public works.

I wish all success to CPWD on the occasion of its 169th Annual Day.

(Kaushal Kishore)

New Delhi
27th June, 2023

मनोज जोशी
सचिव
Manoj Joshi
Secretary

भारत सरकार
आवासन और शहरी कार्य मंत्रालय
निर्माण भवन, नई दिल्ली–110011
Government of India
Ministry of Housing and Urban Affairs
Nirman Bhawan, New Delhi-110011

MESSAGE

On the occasion of 169th Annual Day of Central Public Works Department, I convey my warm greetings and best wishes to entire CPWD family. This momentous occasion not only commemorates CPWD's rich legacy but also celebrates its remarkable contributions to the nation's infrastructure development.

It is encouraging to learn that on this occasion, a special issue **'Nirman Bharati'** highlighting the activities and achievements of the department is being brought out.

CPWD in its journey of 169 years has made significant strides in addressing a wide range of public works, encompassing residential, recreational, institutional and infrastructural requirements, as well as restoration, upgradation and beautification projects and has now evolved into a premier organization, known for its professionalism, quality, and timely execution of projects. Its comprehensive approach has bestowed it with a pan India presence that remains unmatched by other organizations.

I welcome the move of CPWD in taking up the theme **'CPWD: Powering Digital in Public Works'** for this year's Annual Day Celebrations. It reflects CPWD's vision and commitment to adopting digital technologies through ERP implementation, leading to streamlined processes, improved project management and better service delivery. The integration of digital tools and practices will undoubtedly contribute to the development of world-class infrastructure, aligning with public aspirations of a modern and digitally empowered India.

Once again, I extend my best wishes to CPWD on its 169th Annual Day and call upon all officers and staff to work with full commitment and dedication to take the Department to greater heights.

Manoj Joshi
(Manoj Joshi)

New Delhi
July 4, 2023

Rajesh Kumar Kaushal
Director General

सत्यमेव जयते

भारत सरकार
Government of India

केन्द्रीय लोक निर्माण विभाग
निर्माण भवन, नई दिल्ली–110011
Central Public Works Department
Nirman Bhawan, New Delhi-110011
Tel : 23062556/1317, Fax : 23061884
E-mail : cpwd_dgw@nic.in

MESSAGE

It is a matter of immense pleasure and joy for the entire CPWD fraternity that our department is completing 169 years of its glorious and eventful existence on 12th July, 2023. On this special occasion, I extend my warmest greetings and heartfelt greetings to each and everyone of you. This occasion not only commemorates our rich legacy but also serves as a reminder of our collective achievements and the path ahead.

I am delighted to share with you that CPWD has achieved a remarkable milestone by achieving the highest workload of Rs. 21,110 crores for the financial year 2022-23. This outstanding achievement is a testament to the dedication, expertise and hard work of every member of the CPWD family. I take this opportunity to express my heartfelt appreciation and gratitude to each and every member of CPWD for your relentless efforts, unwavering dedication and commitment to excellence that has propelled CPWD to achieve greater heights.

This year for our Annual Day Celebration, we have chosen the theme 'CPWD: Powering Digital in Public Works'. This theme highlights our commitment to leveraging digital technologies and innovation through implementation of ERP to enhance the efficiency and effectiveness of our operations. In an era of rapid technological advancements, embracing digital solutions will enable us to streamline processes, improve project management and deliver exceptional results.

I am also delighted to inform that the Department is bringing out its in- house annual publication 'Nirman Bharati' on this occasion. I am happy to note that this special edition has been brought out very well, covering lucid and useful information about the activities and achievements of the Department. The magazine also contains awards/commendations received by the Department and its officers. I am confident that this special edition shall be well received by the officers of the Department as well as client organizations and others, to whom CPWD provide services.

I congratulate Shri Devendra Kumar Sachan, Director (Tech&PR), Smt. Mitali Saikia, Architect (Tech&PR), CPWD, Shri Rakesh Papnai, Junior Hindi Translator and their team for bringing out this publication, covering the activities and achievements of the Department in a lucid manner.

Once again, I convey my best wishes to all on 169th Annual Day of the Department.

(Rajesh Kumar Kaushal)

New Delhi
July 5, 2023




169th CPWD DAY

Celebration

12 July, 2023







Contents

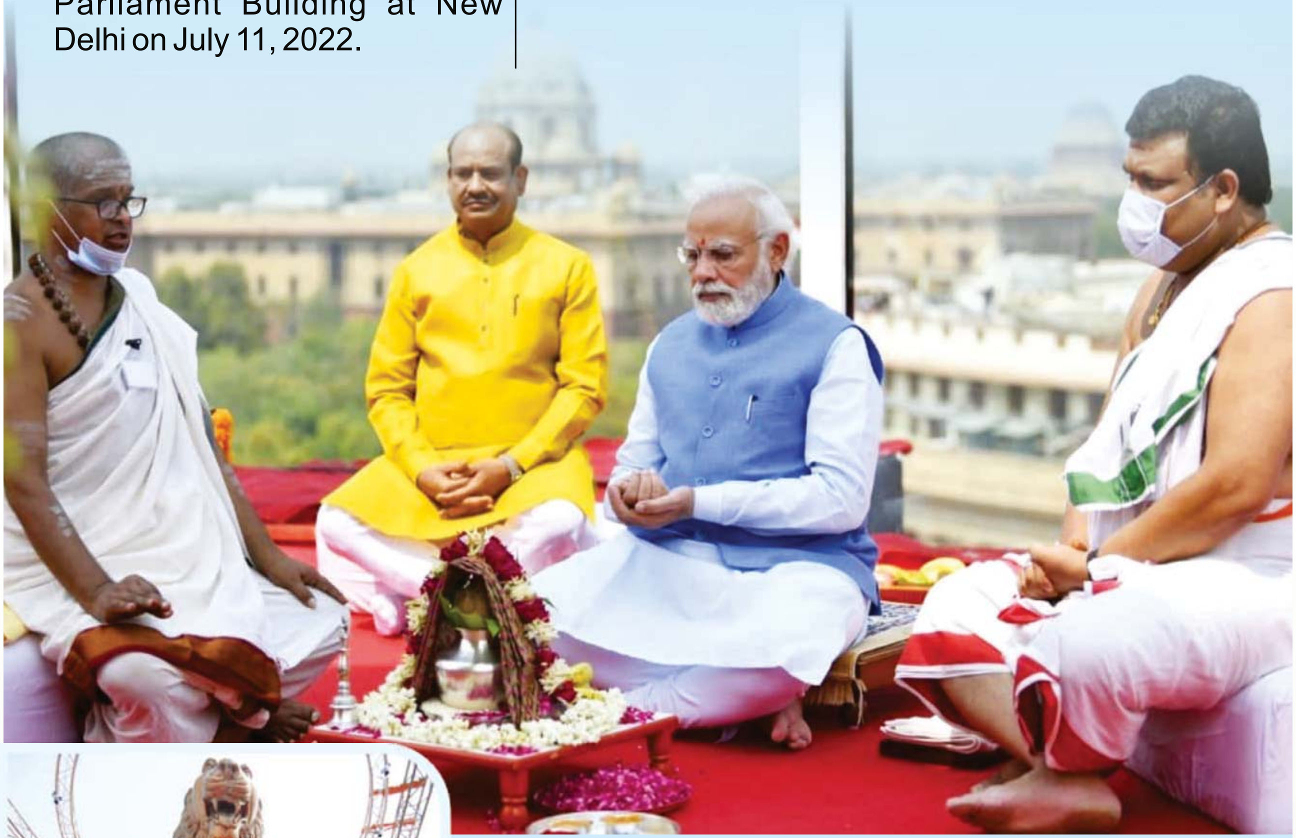
IMPORTANT **EVENTS**

Hon'ble President of India inaugurates Hostel Building for Trainee Officers for Lal Bahadur Shastri National Academy of Administration (LBSNAA) at Mussoorie on December 09, 2022.

Hon'ble President of India lays foundation stone for the construction of Indian Council of Medical Research-National Institute of Virology at Jabalpur, Madhya Pradesh on October 13, 2022.

Shri Ram Nath Kovind, Hon'ble President of India inaugurates 28 Type III quarters and 2 Sewerage Treatment Plants at Rashtrapati Estate, New Delhi on July 08, 2022.

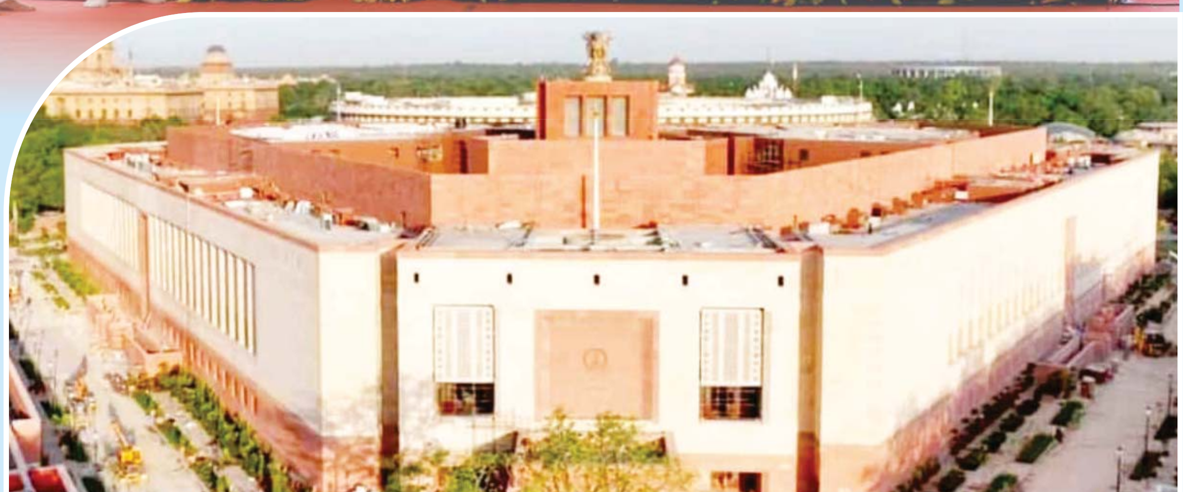
Hon'ble Prime Minister of India unveils the National Emblem on top of Central Foyer of New Parliament Building at New Delhi on July 11, 2022.



Hon'ble Prime Minister of India dedicates 'Kartavya Path' at India Gate, New Delhi to the Nation on September 08, 2022.

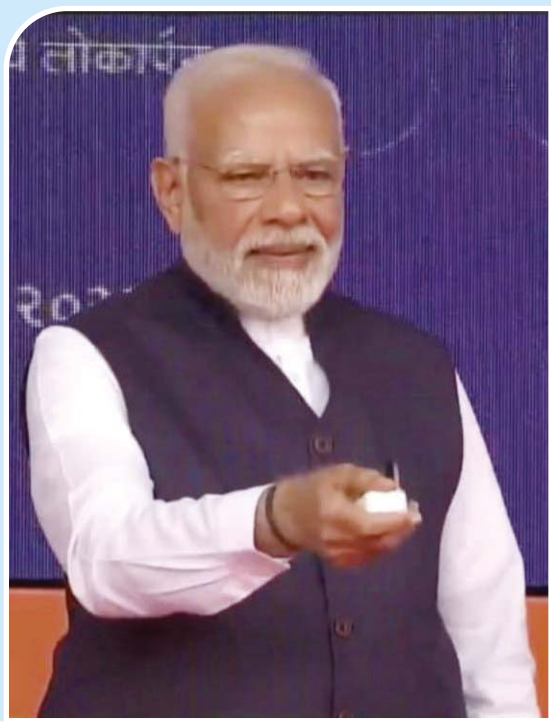
Kartavya Path

Hon'ble Prime Minister of India dedicates the prestigious New Parliament Building at Sansad Marg, New Delhi to the Nation on May 28, 2023.



Hon'ble Prime Minister of India inaugurates Indian Institute of Information Technology at Una, Himachal Pradesh on October 13, 2022.

Hon'ble Prime Minister of India lays foundation stone for the construction of National Institute for One Health at Nagpur on December 11, 2022 .



Hon'ble Prime Minister of India inaugurates Dr. Shyama Prasad Mookerjee National Institute of Water & Sanitation at Joka, Kolkata on December 30, 2022.

Hon'ble Prime Minister of India inaugurates Helicopter Factory for Hindustan Aeronautics Limited (HAL) at Tumakuru, Karnataka on February 06, 2023.

Hon'ble Prime Minister of India inaugurates IIT Dharwad campus at Dharwad, Karnataka on March 12, 2023.

Shri Amit Shah, Hon'ble Minister of Home Affairs & Co-operation inaugurates National Investigation Agency (NIA) office building at Naya Raipur, Chhattisgarh on August 27, 2022.

Shri Hardeep Singh Puri, Hon'ble Minister of Housing and Urban Affairs inaugurates General Pool Office Accommodation (GPOA)-2 at Kasturba Gandhi Marg and General Pool Residential Accommodation (GPRA) at Thyagraj Nagar and Mohammadpur, New Delhi on 12 April, 2023

Shri Dharmendra Pradhan, Hon'ble Minister of Education and Skill Development & Entrepreneurship lays foundation stone for the construction of Gangwal School of Medical Sciences & Technology and Yadupati Singhania Super Speciality Hospital at Indian Institute of Technology, Kanpur on July 16, 2022.

Smt. Anandiben Patel, Hon'ble Governor of Uttar Pradesh lays foundation stone for the construction of Central Administrative Tribunal, Lucknow Bench Building on July 27, 2022.

Shri Sarbananda Sonowal, Hon'ble Minister of Ports, Shipping, Waterways and Ayush lays foundation stone for the construction of National Institute of Sowa Rigpa (NISR) at Leh on September 08, 2022.

Shri Bal Krishna Khand, Hon'ble Minister of Home Affairs of Nepal and Shri Naveen Srivastava, Hon'ble Ambassador of India to Nepal jointly performs Ground Breaking ceremony for the construction of Nepal Police Academy (NPA) at Kavrepalanchok, Nepal on September 23, 2022.

Shri Anurag Singh Thakur, Hon'ble Minister for Information and Broadcasting and Youth Affairs & Sports lays foundation stone for the construction of Integrated High Performance Centre for Sports Authority of India at Sonipat, Haryana on December 17, 2022.

Smt. Nirmala Sitharaman, Hon'ble Minister of Finance and Corporate Affairs performs Bhoomi Pujan and lays foundation stone for the construction of New Office Complex at Custom House, Chennai on December 17, 2022.

Dr. Munjapara Mahendrabhai Kalubhai, Hon'ble Minister of State for Ayush & Women and Child Development performs stone laying ceremony for the construction of additional floor of Central Ayurveda Research Institute, Bhubaneswar on April 19, 2023.

Shri Jai Ram Thakur, Hon'ble Chief Minister of Himachal Pradesh lays foundation stone for the construction of 'Khalini Chowk Flyover' under Shimla Smart City Mission at Shimla on July 07, 2022.

Shri Parshottam Rupala, Hon'ble Union Minister for Fisheries, Animal Husbandry and Dairying lays foundation stone for the construction of Indian White Shrimp breeding and Improvement Facility Centre for Central Institute of Brackishwater Aquaculture (CIBA) at Santhome, Chennai on February 27, 2023.

GLIMPSES OF COMPLETED PROJECTS

Hostel Building for Indian Institutes of Science Education and Research (IISER) at Berhampur.

e-Class Room & Computer Centre for National Institute of Technology (NIT) at Hamirpur, Himachal Pradesh.

Extension of Core Lab Building for Indian Institute of Technology (IIT) at Kanpur, Uttar Pradesh.

Administrative Building for BSF HQ Frontier at Shillong, Meghalaya.

Dining Block 'Kedaram' for Indian Institute of Technology at Palakkad, Kerala.

Girls Hostel for National Institute of Biotic Stress Management (NIBSM) at Baronda, Raipur.

Container Yard Building equipped with 40 tonne capacity EOT crane for National Centre for Polar and Ocean Research (NCPOR) at Goa.

Centre for Citizen Services for National Legal Services Authority (NALSA) at Jaisalmer House, New Delhi.

10 bedded hospital for CRPF at Lethpora, Jammu & Kashmir.

100 bedded hospital Annexe building for Swami Vivekanand National Institute of Rehabilitation Training and Research (SVNIRTAR) at Olatpur, Odisha

National Career Service Centre for differently abled persons at Una, Himachal Pradesh.

Tertiary Cancer Care Center (TCCC) for Shri Lal Bahadur Shastri Medical College Mandi at Ner Chowk, Himachal Pradesh.

Administrative Block for BSF HQ SDG (WC) at Chandigarh.

100 bedded hostel for Central University of Kerala at Kasaragod.

Guest House and state-of-the-art Sports Facilities for National Institute of Technology at Srinagar.

Combination Devices Block for Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST) at Trivandrum.

Earth Science Building for Indian Institute of Technology at Kanpur.

Central Revenue Quarters at Anna Nagar, Chennai.

Multipurpose Hall at Old AG Colony, Bhubaneswar.

200 bedded Girls' Hostel for Regional Institute of Education (RIE) at Bhubaneshwar.

Executive Training Centre for UCO Bank at Kolkata.

Single Living Accommodation for Hovercraft Crew Members, for Indian Coast Guard at Rushikonda, Visakhapatnam.

Holiday Home at Prayagraj, UP

Holiday Home at Varanasi, UP

Delhi Zonal Office for IDBI at Office Block Tower in East Kidwai Nagar, New Delhi

Tripti Bhojanalaya for Shri Mata Vaishno Devi Shrine Board (SMVDSB) at Jammu & Kashmir.

Office Building for Directorate of ESIC Health Care at Panchkula, Haryana.

Auditorium for National Institute of Technology, Puducherry at Karaikal.

Office building for Export Credit Guarantee Corporation (ECGC) at Mumbai.

Durga Bhawan for Shri Mata Vaishno Devi Shrine Board (SMVDSB) at Katra.

e-Sewa Kendra & Facilitation Centre at Supreme Court of India, New Delhi.

Yoga & Recreation Hall at Additional Building Complex for Supreme Court of India, New Delhi.

Quarters and Common Dining Hall & Kitchen in Girls Hostel for Central University of Kerala (CUK) at Kasargod, Kerala.

National Technology Centre for Ports, Waterways & Coasts (NTCPWC) at Discovery Campus, IIT-Madras, Chennai.

Canteen and Dispensary Building for National Institute of Food Technology, Entrepreneurship and Management-Thanjavur (NIFTEM-T) at Tamil Nadu.

GLIMPSES OF ONGOING PROJECTS

Academic Building for Indian Institute of Technology at Gandhinagar.

Permanent Campus of Indian Institute of Technology at Bhilai.

Head Office Building for Uttarakhand Gramin Bank at IT Park, Dehradun

University of Ladakh at Leh.

100 bedded ESIC hospital building at Kakinada, Andhra Pradesh

New Academic Complex - II of Indian Institute of Technology, Madras at Chennai

GLIMPSES OF UPCOMING PROJECTS

Chemistry Department Building for Indian Institute of Technology, Roorkee.

PMSSY Hospital Building at Bhagalpur.

Canara Bank at Kolkata.

500 Bedded Two Girls' Hostels for IIT at Kharagpur.

500 Bedded Boys' Hostels for Indian Institute of Technology at Kharagpur.

200 Bedded ESIC Hospital at Beltola, Guwahati.

ESI Hospital at Kakinada.

Administrative Block for Indian Institute of Technology, Dharwad

Knowledge Resource & Data Centre for Indian Institute of Technology at Dharwad.

100 Bedded ESIC Hospital at Raigarh, Chhattisgarh

Super Speciality Hospital at Bilaspur, Chhattisgarh

Executive Training Centre for UCO Bank at New Town, Rajarhat

Indian Institute of Management at Bodh Gaya.

Residential Quarters and Main Gate for ICAR-National Institute of Biotic Stress Management (NIBSM) at Baronda

Visitors Guest House for Indian Institute of Technology, Madras at Chennai.

Married Accommodation for Coast Guard at Haldia, West Bengal.

Regional Centre for IGNOU at Muttathara, Trivandrum

Academic Block for AIIMS at Raipur

GST Building at Ghaziabad

RECENT IMPORTANT **MoUs**

MoU signed with National Institute of Open Schooling for the construction of Regional Centre Building for NIOS at Rohini, Delhi on July 18, 2022.

MoU signed with Shri Mata Vaishno Devi Shrine Board for the construction of Skywalk at Durga Bhawan, Katra Jammu & Kashmir on August 09, 2022.

MoU signed with Canara Bank, Bhubaneswar for construction of their Staff Quarters and Guest House on August 25, 2022.

MoU signed with Reserve Bank of India for redevelopment of their residential complex at Mahim, Mumbai on September 05, 2022.

MoU signed with Rashtriya Raksha University for construction of Rashtriya Raksha University (RRU) Campus at Gandhinagar on September 09, 2022.

MoU signed with University of Kerala for the construction of their Boy's, Girls and International students hostel at Kariavattom Campus, Thiruvananthapuram on September 17, 2022.

MoU signed with Reserve bank of India, Ahmedabad for redevelopment of La-Gajjar Chambers for RBI at Ahmedabad on September 28, 2022 .

MoU signed with Reserve Bank of India for the construction of their office and residential complex at Imphal, Manipur on October 04, 2022.

MoU signed with Central University Kashmir (CUK) for the construction of Residential Model Township at Ganderbal, Jammu & Kashmir on October 04, 2022.

MoU signed with IIM Raipur for the construction of their campus (Phase-II) at Raipur on October 07, 2022.

MoU signed with National Institute of Disaster Management (NIDM) on October 27, 2022.

MoU signed with Kerala Industrial Infrastructure Development Corporation KINFRA on October 29, 2022.

MoU signed with National Institute of Technology Calicut for the construction of new Academic Block for NIT Calicut on December 09, 2022.

MoU signed with NIFT Shillong for the construction of new buildings and boundary wall for NIFT at Shillong on December 10, 2022

MoU signed with AIIMS Patna for the construction of 150 bedded Critical Care Hospital block for AIIMS at Patna on December 15, 2022.

MoU signed with AIIMS, Bhubaneswar for the construction of Critical Care Health Building for AIIMS, Bhubaneswar on December 15, 2022.

MoU signed with Hindustan Aeronautics Limited (HAL) for construction of Building for Engine Test Bed (ETB), Module Change Workshop (MCW) and allied services at Indian Air Force, Naliya, Gujarat on January 06, 2023.

MoU signed with JIPMER, Puducherry for the construction of 150 bedded Critical Care Hospital for JIPMER at Puducherry on Feb 15, 2023.

MoU signed with Central Bank of India for construction of Multi-Storied Residential Accommodation at Chennai on March 31, 2023.

OTHER **KEY ACTIVITIES**

RUNATHON 2022

An inaugural CPWD Runathon 2022 was organized by National CPWD Academy to celebrate Azadi Ka Amrit Mahotsav on October 30, 2022. Many officers and staff from CPWD and other Central Govt. Departments and their family members actively participated in the run.

WALKATHON

As a part of Azadi Ka Amrit Mahotsav, 'Anu walkathon' was organized by Deptt. of Atomic Energy from Rajaji Bhawan Complex CPWD to Elliot's beach on August 28, 2022. The Walkathon was flagged off by Shri Rajesh Kumar Kaushal, Special Director General-Chennai, CPWD and Shri Venkatraman B., Director Atomic Energy (DAE) Kallapakam in the presence of Shri Ramdass Director, National Institute of Ocean Technology and Shri Rajesh Khare, Chief Engineer- Chennai, CPWD.

VIGILANCE AWARENESS WEEK

On occasion of 'Vigilance Awareness Week 2022' from October 31 to November 6, 2022, Shri Shailendra Sharma, Former Director General, CPWD administered 'Integrity Pledge' to officers and staff of CPWD on 31 October, 2022 at Nirman Bhawan, New Delhi.

CONSTITUTION DAY

On the occasion of 'Constitution Day 2022' to commemorate the adoption of the Constitution of India, Shri Shailendra Sharma, Former Director General, CPWD and senior officers of CPWD read the preamble to the Constitution on November 25, 2022 at Nirman Bhawan, New Delhi.

पुरस्कार वितरण समारोह

महानिदेशालय, केलोनिवि में 01, सितंबर, 2022 से 30, सितंबर, 2022 तक हिन्दी प्रयोग प्रोत्साहन मास का आयोजन किया गया। इस दौरान हिन्दी विषयक कुल 08 प्रतियोगिताओं के 54 विजेताओं को पुरस्कृत किया गया।




GOOD GOVERNANCE WEEK

CPWD participated in the Good Governance Week- 2022 organized by DARPG from October 19 to 23 December, 2022 at Vigyan Bhawan, New Delhi. Dr. Jitendra Singh, Hon'ble Union Minister for Personnel, Public Grievances and Pensions inaugurated the event. A stall highlighting the achievements of CPWD during the Special Campaign 2.0 was displayed at the exhibition.


SPECIAL PRIZE FOR THE REPUBLIC DAY

CPWD bagged the 'Special Prize' for the Republic Day 2023 Tableau, which was made entirely of flowers, showcasing the rich biodiversity of the nation, scattering the message of biodiversity conservation. Shri Ajay Bhatt, Hon'ble Minister of State of Defence and Tourism conferred the award to Shri P K Tripathi, DDG Horticulture CPWD and his team on January 31, 2023 at New Delhi.

CLEANLINESS CAMPAIGN

Radiating the larger message of jan bhagidaari in cleanliness, CPWD organized 'Outdoor Cleanliness Campaign' at India Gate Lawn, Kartavya Path, New Delhi on October 27, 2022. Shri Shailendra Sharma, Former Director General, CPWD participated in the campaign along with Shri Ranjit Singh, Special Director General, CPWD and other officers of CPWD.

FAREWELL PROGRAM 'SAARANG'

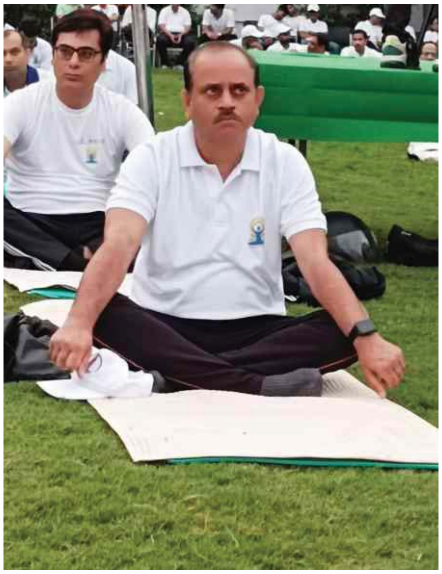
The Assistant Executive Engineers (C&E/M) ESE-2020 of CPWD organized a farewell program 'SAARANG' at National CPWD Academy, Ghaziabad on May 6, 2023, as the day marked the end of their 52-weeks foundation training. The event was attended by Shri Shailendra Sharma, Former Director General CPWD, Shri Anant Kumar, Former E-in-Chief, PWD Govt. of NCT of Delhi, Shri A K Rajdev, ADG PWD, Shri Ujjwal Mitra, Former ADG T&R, CPWD, Shri Naimuddin, Chief Engineer, T&R, Smt. Manju Sharma, Former President, CPWD Officers' Wives Association and other Senior Officials of CPWD & PWD.

TREE PLANTATION

Shri Manoj Joshi, Secretary, Ministry of Housing and Urban Affairs inaugurated Plantation Drive at Sundar Nursery, New Delhi on August 07, 2022 in the presence of Shri P B Singh, Additional Director General, Region Delhi, CPWD, Shri Ved Prakash, Joint Secretary, MoHUA, Shri P K Tripathi, Deputy Director General (Hort.), CPWD, New Delhi and other CPWD Officers & Staff.

YOGA DAY PROGRAMME ON 21ST JUNE 2023

Shri Rajesh Kumar Kaushal, Director General, CPWD and various senior officers of CPWD and MoHUA participated in the Yoga celebration at Vigyan Bhawan, New Delhi and actively took part in it.



ACCESSIBLE INDIA CAMPAIGN

Under the 'Sugamya Bharat' Mission, CPWD has undertaken the massive task of making public buildings accessible. Under this mandate, CPWD has completed accessibility works of 211 Buildings of MoHUA. Accessibility works in 889 Buildings of other Ministries has also been completed by the CPWD.

ERP AND E-GOVERNANCE INITIATIVES

- CPWD, under the guidance of MoHUA, has taken the initiative to migrate its entire operations to a cloud-based ERP so that such technologies can be leveraged for improved delivery of all projects and enhanced client satisfaction in our maintenance operations.

- The proposed ERP application – e-NIRMIT - will take CPWD to a seamless working environment wherein all ERP modules, existing IT applications along with all required Central Govt. applications/portals like PFMS, Bhavishya, ERS, OCMS, PGMS, LIMBS, CPWD e-SEWA, Pragati etc. would operate completely in sync. The ERP solution would allow highly accurate and dynamic project monitoring and control along with risk alerts related to any project.

- Apart from the foundational ERP IT, the application will allow in-process on-line data capture from the vast operations of CPWD, E&M and construction equipment through IOT instrumentation, SCADA, BIM, BMS, visual imagery equipment installed at worksites and mobile/smart phone-based applications used by site engineers.

- This data will be used not only for analytics for tasks such as preventive maintenance, breakdown analysis, real-time progress monitoring and control for projects spread over each corner of the country, but also for machine learning algorithms to aid decision-making in real-time, improvement of efficiency in deployment of resources, early-alerts for worker safety at site and better-quality assurance in its works using artificial intelligence.

- The ERP will integrate all CPWD stakeholders such as contractors, consultants, vendors, clients, arbitrators, officials, project managers etc. into a seamless cloud-based environment for improving efficiency, eliminating time and cost over-runs of projects and works, cutting wastage and improving client satisfaction.

- Both the MoHUA as well as the Department are seeing e-NIRMIT as an opportunity for organizational change in CPWD and as a tool for its cultural transformation.

- CPWD has a rich legacy of successful service to the nation for 169 years. The adoption of new technology will not only change the way routine business are conduct but also help in the use of immense organizational learning for the benefit of the society and the nation at large.

- It will be an important step in realizing our Hon'ble Prime Minister's dream of a digital India and serve as a lighthouse ERP Project for the entire Public Works ecosystem of the country to emulate. This project has the potential of completely overhauling and rejuvenating the Public Works administration in the country.

ECO FRIENDLY & SUSTAINABLE INITIATIVES

CPWD is committed to keep pace with technological advancement and adopting indigenous, sustainable, energy efficient green and clean technologies in all its construction activities and is spearheading the construction industry in respect of environment friendly construction practices.

Use of renewable energy

- CPWD has taken initiatives for generation of renewable energy in Government Buildings, Roof top Solar PV plants have been made mandatory in all new projects. Installation of 20 MW capacity solar power plants in 194 Government Buildings has been completed till date. Further, all field units have been directed again to take up Solar PV plants in remaining GPOA and Non-GPOA buildings as well as new projects as per the site feasibility.

Implementation of Energy Efficiency Measures in Government Building

- Replacement of conventional light fittings, fans & ACs with energy efficient LED light, fans and ACs in 550 Government Office buildings completed till date resulting in saving of 1674 lakh units cumulatively of electricity and reduction in carbon dioxide emission of 1,50,740 Tons. It is expected that there will be reduction in carbon dioxide emissions upto 3,34,046 Tons cumulatively upto 2024.

- To address the problem of depleting ground water resources, CPWD has made it mandatory to install Rain Water Harvesting system and Waste Water Recycling plant in all its major projects.

- New campuses are being developed by CPWD with zero discharge and zero waste concept.

- CPWD is already using C&D waste materials in its works in shape of sand, aggregates, bricks, PCC blocks, Paver Blocks etc. In Delhi, so far, more than 6850 Metric Tons of C&D waste materials have been utilized. This resulted in saving of equal quantity of natural stone and sand, reduction in CO_2 emissions by over 137 Metric Tons and saving in water use by 5400 kiloliters.

WORKSHOPS AND SEMINARS

CPWD organized 3 days' workshop on ERP Implementation' from August 24 to 26, 2022 at Mumbai. Shri S R Kinra, Former Special Director General, Mumbai, CPWD inaugurated the workshop on August 24, 2022 in presence of officers and staff of CPWD. Workshop was attended by more than 100 officers in-person and around 350 officers joined online.

ERP orientation training conducted for newly appointed 55 Junior Engineers of CPWD at Regional Training Institute, Delhi on August 29,2022.

CPWD organized a workshop for 'ERP implementation in CPWD' on September 07, 2022 at Bhopal for more than 100 CPWD officers. Shri J J R Meena, Chief Engineer-Bhopal, CPWD inaugurated the workshop.

CPWD organized ERP training for newly appointed Junior Engineers in CPWD on October 03, 2022 at Regional Training Institute, New Delhi to more than 55 CPWD officers.

CPWD organized ERP workshop on "Contract and BOQ data collection form" on October 04, 2022 at Nirman Bhawan, New Delhi.

CPWD organized 3 days' workshop on "Train the Trainers" for ERP implementation in CPWD from at National CPWD Academy, Ghaziabad from October 26 to 28, 2022. Shri Ranjit Singh, Special Director General-HQ, CPWD inaugurated the workshop on October 27, 2022.

Shri Shahabuddin Ahmed, Additional Director General, CPWD inaugurated Foundation Training for newly recruited Junior Engineers (Civil & Elect.) of SSC 2019 batch on November 04, 2022 at Kolkata.

CPWD organized an interactive session of Assistant Executive Engineers of 2020 batch with senior officers of CPWD at Conference room, Nirman Bhawan on March 27, 2023. Shri Shailendra Sharma, Former Director General, CPWD graced the occasion along with Shri Ranjit Singh, SDG HQ, Shri DC Goel, ADG Tech, Shri Ujwal Mitra, ADG Training and other senior officers of CPWD. It was followed by a technical session on earthquake design in which Smt. Sangeeta Wij, Managing Partner, M/s S D Engineering Consultants LLP was the Keynote speaker.

Shri Shailendra Sharma, Former Director General, CPWD graced the ICI-ACECON - Asian Conference & Exhibition on 'Revolutions in Concrete Construction: Vision 2050' as 'Chief Guest' on 23rd September 2022 at New Delhi. The two Days Conference and Exhibition was organized by the Indian Concrete Institute, New Delhi Centre in association with Federation Internationale du Beton (FIB) and the Institute of Engineers, India (IEI) and it was attended by various professionals, academicians, designers, consultants, experts from the construction industry.

CPWD participated in the Indian Urban Housing Conclave-2022 held in Rajkot, Gujarat from October 19 to 21, 2022. Shri Shailendra Sharma, Former Director General, CPWD gave a presentation on the 'Use of innovative technologies by public and private agencies' on October 19, 2022 highlighting the various innovative initiatives and technologies adopted and implemented by CPWD.

PRECAST CONSTRUCTION TECHNOLOGY FOR HIGH-RISE BUILDINGS AT MUMBAI

Dr. Shishir bansal
Additional Director General, Hyderabad

1. INTRODUCTION

CPWD has recently taken up the execution of office space & 769 residential quarters for CBIC & Custom Offices and their staff in a 24 Acres Plot located in Custom Enclave, Wadala, Mumbai. The entire project costing about Rs. 1000 Crore falls in 46 acres of land divided in 3 parts (4 acres, 24 acres & 18 acres) by Eastern freeway and other city roads. The site is adjacent to existing salt pans some small portion of the land also falls under Coastal Regulation Zone-II and provides panoramic view of Arabian Sea from one side.

Keeping in view the latest circulars issued by CPWD, bids were re-invited in EPC Mode-II as Technology Neutral tenders. Successful bidder M/s B G Shirke offered Prefab construction for 6 towers of residential quarters and thus the work has been taken off at site as Prefab Construction Technology for residential towers to be completed in 32 months.

2. MAJOR COMPONENTS OF PROJECT

A. Office Building: Basement + 04 Podium Parking+ 16 Storey

The office building has been planned as a single multistorey tower, comprising of 1 Basement, 4 Podiums and 16 storey heights (1B+4 Podium Parking+16 Floors) totalling 60000 sqm of plinth areas. The building is designed to have all the desirable amenities in order to allow the efficient functioning of the Central Government Taxation department. At each floor, arrangement of furniture, full cabins & half cabins and workstation have been planned with movable furniture, compactors and workstations. At level-1 (floor above Podium), Auditorium has been planned with the acoustic treatment and furnishing like chairs, carpets, tables, audio-video equipment, false ceilings, stage lighting, auditorium lighting, motorized curtain etc.

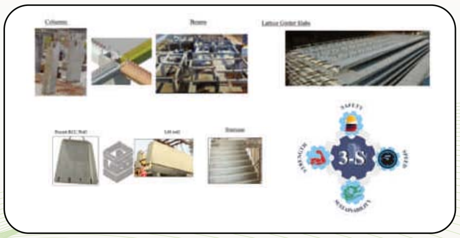
B. Residential Quarters:

02 Podium Parking + 27 to 33 storeys Residential quarters (180 Nos. Type II, 300 Nos. Type III, 210 Nos. Type IV quarters have been planned as a separate towers for each Type of accommodation. But one Executive Tower contains Type- 35 Nos. Type V, 35 Nos. Type VI, 7 Nos. VII & 7 Nos. VIII accommodation.

3. PREFAB CONSTRUCTION TECHNOLOGY

The Precast Construction Technology being adopted at site by M/S B G Shirke has 3-S' brand name that is fully developed for Prefab Building Construction System after years of Research and Development supplemented by extensive field trials. 3-S stands for - **STRENGTH, SAFETY & SPEED.** It automatically imparts the fourth Dimension of **SUSTAINABILITY.** '3-S' system is time-tested-proven in India and abroad since 1972 and has been successfully implemented in construction of over 2.70 Lakh dwelling units in India. Industrialized 3-S Prefab System using RCC Precast with or without shear wall, columns, beams, Cellular light weight concrete slabs/ semi precast solid slabs, suitable for any number of floors has been validated and recommended by BMTPC. This system is developed taking into consideration Indian conditions including their climatic conditions, seismic zones etc. The full scale '3-S Prefab' structure has been tested for reverse cyclic loading at CSIR-CBRI, Roorkee to evaluate its performance under seismic Zone IV and the performance found to be very satisfactory, conforming to codal requirements. Recently the National Earthquake Testing Facility (NETF), MNIT Jaipur has also carried out the test for Seismic Performance Evaluation of full-scale building built using Industrialized 3-S Prefab System as stipulated in CPWD OM dated 24.03.2022 and structure satisfied the acceptance criteria towards performance under seismic loads of much greater magnitude than the stipulated one.

In short, it can be said that 3-S Prefab system is a sustainable technology as it is Proven and Tested Innovative Rapid technology with assured construction Quality, executed at a better pace with Eco Friendly & Technology and assuring safety of Construction Workers.

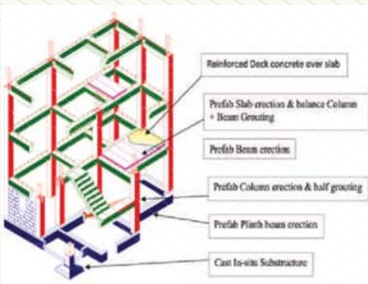


4. MAJOR COMPONENTS OF 3-S PREFAB SYSTEM

Any structural system in a building project consist of foundation, plinth beams, columns, beams, slabs, walls, stair case and lift walls. In 3-S Prefab system, all these components after in situ foundation has prefab plinth beams, columns, beams, slabs, walls, stair case, lift walls.

4.1 Erection of '3-S' Prefab Components

CPWD has recently taken up the execution of office space & 769 residential quarters for CBIC & Custom Offices and their staff in a 24 Acres Plot located in Custom Enclave, Wadala, Mumbai. The entire project costing about Rs. 1000 Cr. falls in 46 acres of land divided in 3 parts (4 acres, 24 acres & 18 acres) by Eastern freeway and other city roads. The site is adjacent to existing salt pans. Some small portion of the land also falls under Coastal Regulation Zone-II and provides panoramic view of Arabian Sea from one side.



4.2 Erection Sequence

After completion of foundation, components of super structure are erected, aligned and connected using Self-Compacting Concrete (SCC) of appropriate grade along with secured embedded reinforcement in following steps.

a. Column Erection and alignment
b. Precast RCC Wall and shaft erection
c. Precast RCC beam erection and alignment
d. Precast RCC slab erection and alignment
e. Placement of dowel bars
f. Grouting and concreting with SCC

Thereafter, **'Wet Jointing'** of various precast RCC elements is done as following:

- ✓ Connections with in-situ Self-Compacting Concrete (SCC) / Non-shrink grout of appropriate grade for achieving required rigid joints.
- ✓ Precast slabs with rebar lattice girders projecting above top surface.
- ✓ Slabs to have 55 mm to 75 mm thick in-situ RCC topping laid over slab after erection there by making them “composite”.

5. STATE OF THE ART PRECASTING SETUP

The Success of the Precast technology lies in timely Pre-casting of the Required components with standards like the quality of the components, dimensional accuracy of Precast components, minimum dependency on manpower, minimum handling of materials, minimum wastage of materials, assured adequate curing, optimum utilization of water and other materials, minimum water cement ratio, adequate concrete cover for reinforcement and covered working shed for minimum weather disturbance.

5.1 The Precast Wall and slab unit is provided with steel moulds eliminating wood to assure proper shape and dimensional accuracy of components and proper oiling and compaction ensure good finishing and quality of components; round PVC cover ensuring adequate cover for reinforcement, mechanized concreting, vibrating, finishing and lifting- shifting allow less manpower and its dependency, eliminating high attitude working risk, all weather working with covered shed and allows low water-cement ratio and proper control due to immediate concrete consumption.

5.2 Lattice Girder manufacturing facility for slab reinforcement allows timely Fabrication of Required quantity of Lattice Girder, proper shape and spacing can be achieved and Maintened by welding, lesser supervision required for mechanized production and dependency on manpower gets reduced and subsequently lesser wastage of material as production takes place from Steel coils.

5.3 Concrete Transportation System allows immediate consumption of Concrete within 5 to 10 minutes, allows low water–cement ratio, drastically reduced admixture and retarder, low wastage of concrete, no diesel vehicles required for transportation, thus environmentally sustainable and allow saving on fuel and manpower also.

6. CONCLUSION:

3-S PRECAST TECHNOLOGY is truly a sustainable technology suitable for high rise buildings with following inherent advantages over other construction technologies:

a. **Better And Assured Quality Of Work:**
With CNC grade accuracy & dimensional consistency with factory like working conditions, efficient supervision due to work in factory environment, controlled concrete quality, assured cover to Reinforcement bars, assured Curing due to accelerated curing systems adopted, trained workforce due to repetitive type of work and higher proportion of automated activities reduces the possibility of human errors. Thus Extra-High Quality assurance is achieved.

b. **Speed of Construction**
Different activities can be simultaneously and independently taken up. By the time plinth gets ready, pre-casting of three to four upper floors is possible, which can substantially reduce the overall time. Less cycle time is required on floor to floor basis. Covered workplace facilitates ensure unhindered progress of work. It has lesser dependency on other pre-requisite activities, lesser effect of environmental changes and activities like walling, Plastering etc. reduce drastically.

c. **Eco Friendly Technology**
It is an Eco Friendly technology in many respects due to no air pollution, due to covered / enclosed work place, lesser water required for curing due to accelerated curing system adopted, nil wastage of depleting construction materials, nil use of wood in the construction system, reduced noise pollution due to reduced site activities, reduced rework, use of Fly-ash / GGBS to the maximum possible extent and minimal maintenance owing to objective quality construction.

d. **Safety of Construction Workers**
Safety of construction workers is assured as maximum work is carried out on ground which reduces the risk to substantial extent, simultaneous erection of walls and parapets reduces risk of working at heights, minimal workforce exposed to high risk work at height and an efficient supervision and quality control are possible leading to reduced risks at work.

e. **Cost Efficient Construction**
It has direct as well as in direct savings in cost of construction. Direct savings is a result of reduced labour requirement due to automation, reduced wastage of materials, reduced activities like walling, plaster etc., shortened execution period, higher efficiency of workforce and minimal rejection of work. Indirect savings are due to savings in interest on investment due to early completion, saving in establishment cost, saving in escalation cost due to advance progress and early billing, early return on investments and savings in maintenance cost due to better quality.

NEW PARLIAMENT BUILDING
Special Features and Challenges in Design & Construction

Sandeep Kumar Kanaujiya,
Superintending Engineer (Civil)

P. Bhagat Singh,
Chief Engineer (Civil)

New Parliament building is constructed over a 9.5 acre plot of land contiguous to the existing Parliament House at New Delhi. The Project was sanctioned for Rs 971 Cr by the Lok Sabha Secretariat on 15.06.2020 with a mandate of the Government of India to complete the Project as a Historic icon in the Capital of the Country and in a highly compressed time schedule.

The Project has several special features and is completed in the midst of various constraints and challenges, which are briefed out in this article.

Project Brief

• Project Name	New Parliament Building
• Project management	Central Public Works Department
• Main Contractors	M/s Tata Projects Limited
• Consultants	M/s HCP DPM Pvt Ltd , Ahmedabad
• Project Configuration	B+GF+FF+SF (22m ht & 36.5 m ht up to crown)
• Start Date	14/01/2021
• Inauguration Date	28/05/2023
• Project Duration	28 Months
• Built Up Area	65,000 Sqm
• Plot Area	42,031 Sqm
• Sanctioned cost	Rs 971 Cr

Need for New Building

1) Capacity Expansion
2) Infrastructure modernization and
3) Seismic design considerations of the Structure

The present building will be appropriately retrofitted and meaningfully used in conjunction with the new facility.

Special Features

1. Iconic Building
2. Unique Structure
3. Longer design life of Structure
4. New Materials & Technologies
5. Highest degree of Security
6. Environmental Sustainability
7. MEP services

1. Iconic Building

The one and only kind of building in the country—The temple of democracy

Triangular Shaped Building comprising of Lok Sabha, Rajya Sabha & Courtyard.

THEME OF INTERIORS

Rajya Sabha
Lotus (National Flower)

Lok Sabha
Peacock (National Bird)

Court Yard
Banyan (National Tree)

2. Unique Structure

- Designed for Seismic Zone V
- Foundation : Raft Foundation with varying thickness 1.5m to 2.65m
- LS, RS Chambers:
- Semicircle with diameter of 57 m
- Beam depth upto 3.3 m
- Slab depth 250 mm
- Corbels of depth 6 m
- 12 columns size 5.58 m x 0.75 m
- Unsupported Columns Height 24 m above Ground floor slab

Chamber Foundation

Chamber Foundation

Centre Foyer below National Emblem

3. Longer design life of Structure

- Designed for Higher degree of environmental exposure
- Self-Compacting Concrete
- Admixtures for durability
- Grade of Concrete upto M60
- Corrosion Resistant Steel
- (Integral Crystalline admixtures)

4. New Materials & Technologies

- Self-Compacting Concretes with PPC or OPC+ Fly Ash
- Reinforcement Couplers
- Polymer Mortars and Ready mixed plasters
- Modular Form works of PERI, RMD Kwikform, Rapid shore
- CNC cut stone, wooden and Brass decorative Jalis , Furniture and Hand knotted Carpets
- CLSM (Controlled Lean Strength Copper pipes for Material)
- Concrete Curing Compounds
- Fly ash Bricks
- Gypsum plasters
- Soil nailing for Slope protection
- Manufactured sand (No river sand)
- Stainless steel for plumbing and Hot water supply

5 Highest degree of Security

- CCTV CAMERA (PTZ ,BULLET ,THERMAL)
- Biometric Cum Smart Card
- Full Height Double Door Security Electric Turnstile
- Inbuilt Hydraulic bollards.
- Road Blocker
- HHMD
- Under vehicle Surveillance System
- Non –Lethal High Electrical Fencing system.
- ACS Reader & Controller
- Boom Barrier ,Flap Barrier.
- Tyre Shredder
- DFMD
- XRAY Baggage Scanner
- Bullet proof Morchas
- CBRN protection

6 Environmental Sustainability

- Environment Friendly Construction practices
- Provisionally certified by IGBC as Platinum rated Green building and Targeted for GRIHA 5 Star rating

Environment Friendly Construction practices

- 4 nos. of Mist Spray Anti-Smog
- Mist Spray systems.
- Sensor based Air Monitoring Units (AMU) installed to monitor real time Ambient Air Quality (AQI).
- Automatic Air purification system /Smog Tower
- Noise Barriers 10m high
- 3 nos. of Sewage Treatment Plants of capacity 200 KLD, 100 KLD and 80 KLD (at NPB and KN) for treating waste water that is reused on site for construction activities.
- Gas based Gensets being used on site.
- Adherence to Ageing norms of vehicles and deployment of BS-IV and above Vehicles on site.
- Use of VFD in all Tower Cranes, Automatic Stirrup Machines and VRD in Welding, Bending and Grinding Machines
- Use of M sand (crushed sand in place of natural sand) for concreting.
- Use of Fly ash for M50 above concrete grade wherever OPC is being used.
- Use of LED Lights for reduced energy consumption.
- Use of Curing Compounds and Bio blocks in urinals to reduce water consumption.

Well being of Work force

- Accommodation given to all workers working for the project.
- Each gang of workers are provided with separate kitchen where all kitchens are equipped with IGL PNG connections.
- RO water is being provided to all the workers.
- Separate Urinals Latrines.
- Barber Shop, Canteen, grocery shop provided inside the camp.
- Food provided to all the new workers during quarantine period.
- During 2nd covid wave period, all workers were provided with free grocery for 3 months.
- Different activities like Yoga session, carom competition.
- All workers are covered under workmen compensation policies.
- Workers are being paid on time.
- Vaccination for workers.
- Skilled development training to workers
- Hospital Tie ups – BLK Max Super Specialty Hospital

- Locally available Sand stone and Lakha Red Granites
- Fly Ash Cements and Fly Ash bricks
- Rain water harvesting
- Water recirculation through STP
- Electrical Energy conservation measures
- Water and energy auditing for 2 years of Operation

Electrical Energy Conservation Measures

- Low losses transformer a per ECBC.
- Presence/occupancy day light sensor in offices and toilets.
- KWH meter for each services (like lighting, power, AC etc)
- Monitoring of major equipment on IBMS. (like Main HT/LT panel, meters, DG set, UPS etc.)
- Main panels at substation with gas flooding system and TTA type.
- Voltage drop up to maximum 6% (up to end point).
- Space for 1 no. future transformer and main LT panel, considered in substation.
- Approx. 20% spare feeder in all panel and distribution boards.
- Fire survival cable for critical load like fire panel, lifts etc
- IP 68 busduct from DG set to substation.
- 6A sockets are international type.
- 30-meter height stack for exhaust pipe of DG set.
- Bulk diesel storage tank for 8 hour back up supply

7- MEP services

- 6.5 MW Capacity Substation with IP68 Bus ducts and 100% DG back Up
- UPS for Essential Services
- Centralized HVAC system with MERV Filters & UVGI system
- Lifts 23 Nos i/c Goods lifts
- STP (sewage Treatment Plant) with MBR (Membrane Bio Reactor) Technology
- CCTV and Access Control Systems
- Fire Fighting and Fire Alarm Systems (Clean agent system for Server rooms)
- IBMS (Integrated Building Management System)
- ICT (Internet and Intranet, Telecommunication) Network
- Video walls for information Display
- Special Security systems
- Language Interpretation and Broad Casting Services
- Fully Digital Multimedia screens for each MP, with Interpretation and Voting facilities
- Audio Visual and Public Address Systems
- High Performance Lighting systems
- Illuminated Signages
- Façade Lighting
- Hydro pneumatic Plumbing system, Sewerage network and Organic Waste Composter
- Irrigation System
- Acoustic Systems

Challenges in Construction

1 Stringent time schedule for completion

- 28 months against minimum 36 months even with best bench marking performance
- Fast Execution through:
- Deployment of 5000 work force in peak time
- Deployment of huge Machinery
- Use of large area of Centering, Shuttering
- Parallel Off site procurement
- Close Monitoring at High level
- Effective handling of Covid Pandemic
- Dedicated Project teams

2 Working Constraints - Security, Logistics, Covid Pandemic

- Security scanning all the time during construction
- Least Movement Space
- Covid wave 2 and 3
- Planning during Covid 1
- Efficient Project Management (Primavera, PMIS)
- Quick Decision making
- Conflict Management
- Owning of the Project at all levels

3 Multiple Stake holders

- Lok Sabha Secretariat
- Rajya Sabha Secretariat
- PM Office
- MoHUA
- MoHA
- National Security Adviser
- Parliament Security Services
- Intelligence Bureau
- Delhi Police
- Special Protection Group
- Central Reserve Police Force
- National Informatics Centre
- MTNL
- Sansad TV
- NDMC
- Indraprastha Gas Limited
- Delhi Metro consumption.

4- Statutory authorities

- CPWD (Local Authority for Govt. buildings)
- DUAC (Urban Planning)
- UTTIPEC (Traffic impact)
- Central Vista Committee
- Heritage Conservation Committee (HCC)
- Delhi Fire Services
- Delhi Metro Rail Corporation
- IGL for Gas pipe line
- NDMC
- Ministry of Environment Forest department
- DPCC
- DFO/Tree Officer for Tress Transplantation

CONSTRUCTION OF 129 MLD WATER TREATMENT PLANT – AN OVERVIEW

CR Nanda,
Chief Engineer

CPWD was entrusted with construction of 129 MLD Water Treatment Plant for WATCO funded by Indian Oil Corporation under CSR scheme to supply water to Cuttack city. The project was sanctioned for Rs. 55.60 crore and completed with 50.00 crore with Rs. 5.60 crore savings. While preparing the estimate difficulty was faced to find technical details, specifications etc. for execution of such huge capacity WTP work. However, the above work was executed in active consultation with Water Corporation and Public Health Engineering Department of Odisha. The design, sequencing, specification etc. are considered as per CPHEEO guideline.

The basic requirement suggested by the client is the capacity of treatment plant and final output water quality. The raw water is sourced from river Mahanadi and brought to site trough 1300 mm dia pipe line. The river water is normally high in turbidity and also carries other impurities. The treatment plant is designed to remove the impurities to acceptable level and finally stored in the clear water storage before pumping to public distribution system. The raw water quality and treated water quality is tabulated below.

The quality of raw water is as below :-

a) PH	:	6.8 – 7.5
b) Color	:	50 Pt.
c) Turbidity	:	1500 mg/lt.
d) TSS	:	2500 mg/lt.

As per CPHEEO guidelines the treated water fit for consumption of human being should have following parameters :-

a) Color	:	Not greater than 5 Hazen units
b) Turbidity	:	Not greater than 2 NTU (Nephelometre Turbidity Unit)
c) Test/odure	:	Un-objectionable
d) Free chlorine residual	:	Not less than 2 mg/ltr after 30 minutes of contact
e) Appearance	:	Clear & sparkling
f) Bacteriological Standards	:	No coli form

The WTP is hydraulically designed with following steps to achieve above :-

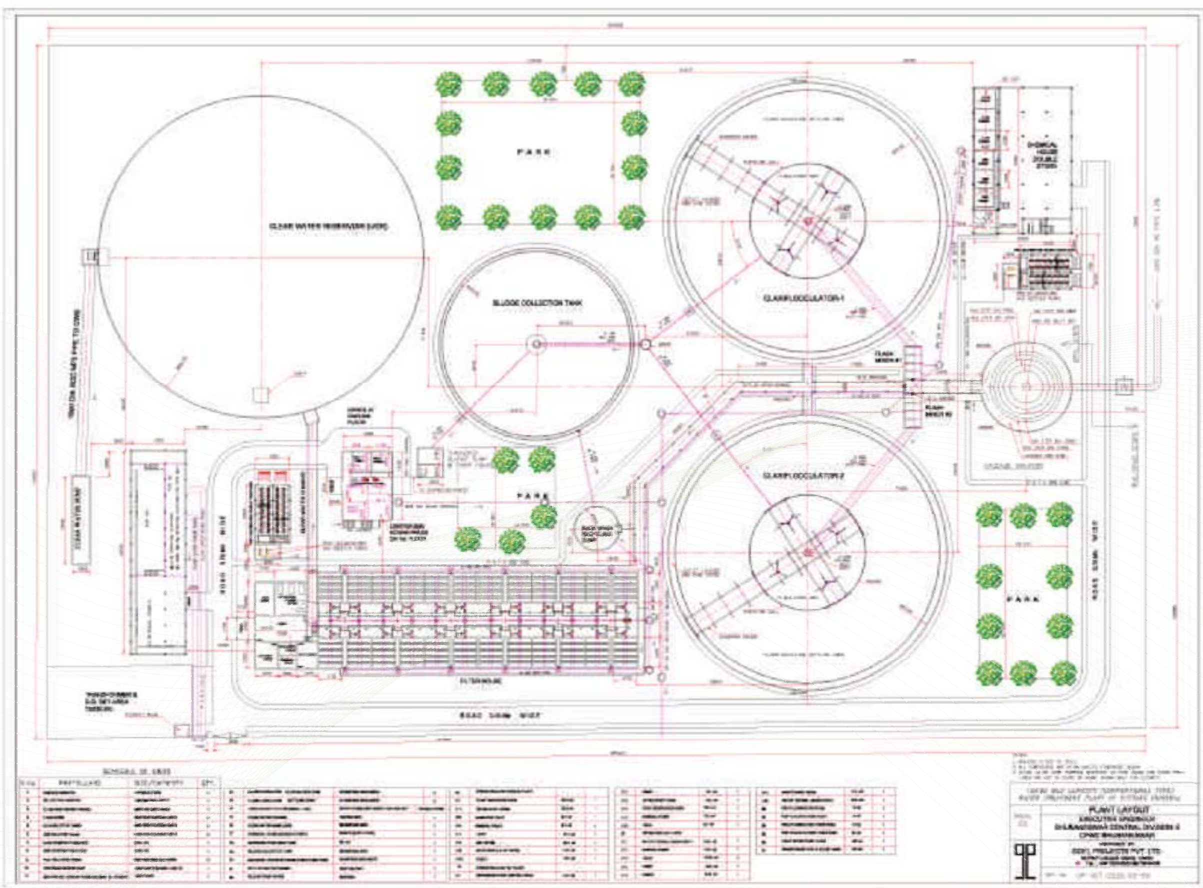
1. Aeration
2. Chemical Dosing
   (a) Alam & Lime
   (b) Pre-Chlorination
3. Clarifloculator
4. Filtration
5. Post-Chlorination
6. Clear water storage
7. Pumping to public distribution system.

The above steps as per CPHEEO guideline are provided in the treatment plant. The lay-out plan of plant and cross-section details are shown in fig-1 and fig-2 respectively.

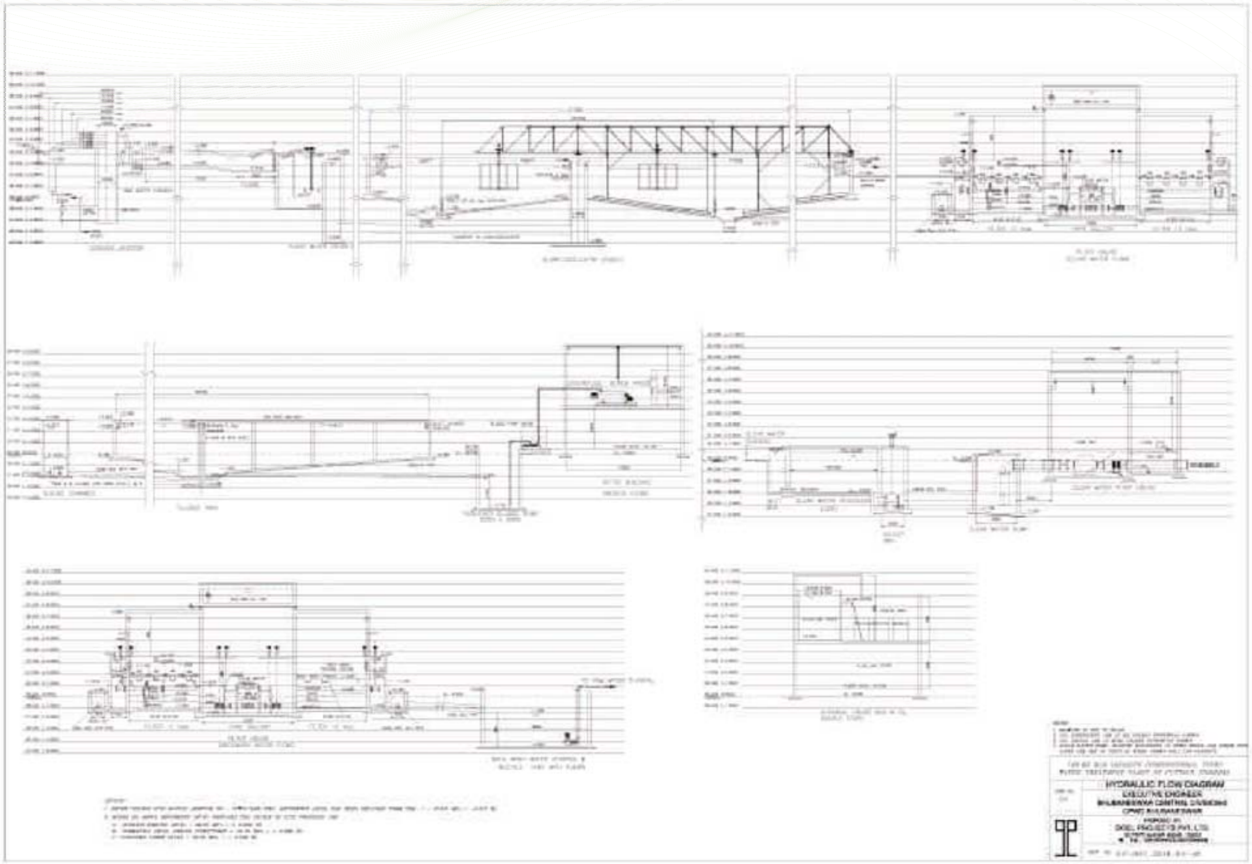
Details of individual components are as detailed below :-

1. **Aeration:-** Aeration is a process generally used for exchange of gases between water and atmosphere. By this process oxygen is added to water and carbon dioxide, hydrogen- sulfide are removed to minimize odure. By aeration minerals like manganese, iron are also removed. In the present plant aeration has been done through 5 step cascading aerator. Water is entered into aerator from the centre and flowing to lower level in sheet form. The diameter of aerator is varying from 6.8 metre at top to 14.7 metre at bottom with a fall of 0.3 metre on each step. After the aeration, water is collected on peripheral channel and moves forward through 2600 mm wide water channel to flash mixer.

2. **Chemical Dosing:** While moving through the channel, after aeration the next process in treatment is removal of turbidity and dissolved solids by sedimentation process. This has been achieved by adding alum and lime as coagulant. These chemicals are stored in chemical storage building and pushed to water channel through dosing pipes. The chemical house is a double storied building with floor area of 600 Sqm on each floor. The ground floor is used for storage of alum and lime. The dosing tanks, mixer and pumping arrangement are made in first floor. There are 3 alum solution tanks and 3 lime solution tanks provided for the purpose. The chemicals lime and alum are fed to water channel @ 160 mg. per litre and 55 mg. per litre respectively to facilitate coagulation.



(Fig-1)



(Fig-2)

3. **Clarifloculator:** After chemical dosing, the water enters in to clarifloculator through flash mixture. There are 2 numbers of clarifloculator of 57.7 metre outer diameter. The central portion of 23.7 metre diameter is used for flocculation where vigorous mixing is done through motorized paddles. After the mixing in the flocculation zone, water moves to settling zone of the clarifloculator where settlement of particles takes place. The clear water is collected through peripheral channel and moves through settled water channel towards gravity filter. The sludge collected at the bottom of clarifloculator are removed and sent to sludge collection tank.

4. **Filtration:** After completion of coagulation and settlement of particles, cleaned water moves in to filtration area. There are 24 number of filtration beds of 28.83 sqm area each. Total filtration bed area is 692 Sqm. The water passes through 3 layered filter media and collected at the bottom of the pit. The filter media consists of 500 mm gravel followed by 500 mm sand and 250 mm anthracite coal at top. A back washing mechanism through water is also in position to remove chocked filter beds. Total process of filtration and back washing is automated and is Controlled by supervisory control and data acquisition (SCADA).

5. **Post-Chlorination:** After completion of the filtration, the clear water moves through clear water channel of 1800 mm width to underground clear water reservoir. While moving through the channel, automatic sampling of water for various parameters are done to ensure quality of water. As per requirement, post-chlorination is also done at this stage to maintain required residual chlorination of 2 mg. per litre after 30 minutes of contact. The clear water reservoir is a huge structure to store 12000 cum water with 66.7 m dia.

6. **Pumping to Distribution System:** From clear water reservoir water is carried to clear water sump through 1600 mm diameter RCC pipe. The clear water is pumped to public distribution system through pumps of various capacity in pump house.

7. **Sludge:** From the bottom of clarifloculator, sludge with water moves to sludge collection tank. The sludge is pumped out from the tank to screw press unit where solid sludge cakes are formed. The cakes are used as manure for horticulture work.

The total process of treatment of water is designed in such a way that no pumping is required to lift water in any place. It is totally gravity driven. Also in the process, there is zero wastage of water. The water used for washing of filtration media and water obtained from sludge tank are back fed to flash mixer for recycling. The photograph of the plant is attached as fig-3

(Fig-3)

NEW PARLIAMENT BUILDING SAFETY & DURABILITY OF STRUCTURE

Ashwani Mittal,
Executive Engineer (Civil)

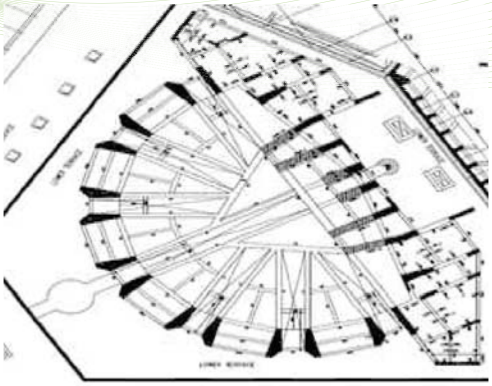
Sandeep Kumar Kanaujiya,
Superintending Engineer (Civil)

In spite of multifarious challenges in the construction of new Parliament Building, not only the objective of timely completion with quality was ensured, but also highest degree of attention was paid for ensuring safety during construction & operation and also for longevity & durability of the structure.

Safety During Construction: All safety measures including wearing helmets, safety footwear, High visible clothing Jackets, safety belts, gloves & other measures depending upon the specific activity, proper scaffolding and working platforms with handrails to work at higher elevations etc. were religiously implemented.

New Parliament Building won Sarvashrestha Suraksha Puraskar (1st Prize) during construction in 2022
30 Safe Million Man Hours as on 05.05.2023

Safety Checks (after construction) of vulnerable areas:

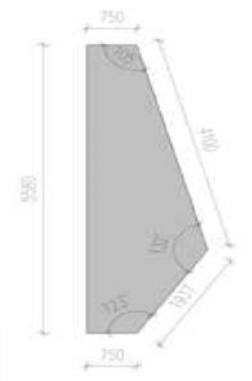


- RCC Structure of LS & RS Chamber
- LS & RS Chamber MS Frame for False Ceiling work.
- Stone Cladding /Jali work

RCC Structure of LS & RS Chamber

- Semi-circle with diameter of 57 m
- Slab depth 250 mm & Beams of depth up to 3.3 m
- Corbels of depth 6 meter
- 12 Columns of Size 5.58 m x 0.75 m
- Unsupported Column Height = 24 m above Ground Floor Slab.

RCC Column Structure in Chambers



Plan of Size of Columns of Chambers

Plan Area of Chamber

Apart from design stage measures like Seismic Zone V, Higher Environmental Exposure conditions, Higher loads approximate 25%, High grade concrete & Corrosion resistant steel etc. & Strict **Execution & Quality control for RCC Structure like** Execution as per drawings, RCC(1,12,435 cum) test @ 8,090 Nos., Steel (TMT (27716 MT) test @ **1003 Nos.- Compliance 100 %,** Rejection of RCC Transit Mixers = 367 cum/1,12,435 cum i.e. 0.33 % of total RCC, Custom designed robust Centering & shuttering system, further reviews has been done through well established Engineering methods.

1 Core Cutting Test : 24 Nos. - Results found satisfactory
2 Rebound Hammer tests : 750 Nos. - Results found satisfactory
3 Ultrasonic Pulse Velocity (UPV) tests : 125 Nos. - Results found satisfactory

Core Cutting Test

Core of Length 130 mm X 70 mm diameter

3 Samples Taken from Panel

Rebound Hammer tests

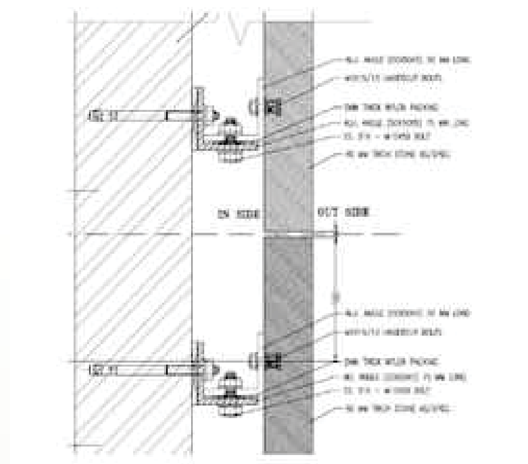
LS & RS Chamber MS Frame for False Ceiling work. Apart From Seismic Zone V considered for design. Lateral Sway Movement : 4-5 mm during Earthquake, False ceiling Suspenders hanged in the Steel rod embedded through Beam during casting & **Execution Quality control like** Whole Structural Steel Fabricated in Factory, Structural Steel Strength Manufacturer Test: 28 Nos., Structural Steel Strength at site test: 32 Nos., DPT Test of welding : 374 in factory and 22 at site, Bolt Test : 3 Nos., Pull out Test at site on chemical anchors : **2 Nos, further Checked during peer review & some deficiencies found and corrected, Lok Sabha all 104 suspenders bolt tightening checked through torque wrench, Rajya Sabha all 96 suspenders bolt tightening checked through torque wrench.**

Stone Cladding /Jali work

Apart from design considerations like Seismic Zone V considered for design, Façade Solid concrete Block instead of Fly ash Bricks, Under cut method for Main Building of more height, Pin Method in utility building for lesser height, MS Frame design to support Sandstone Jali, Shop drawing indication number of under cut & spacing etc., during Execution following has been done:

- Three mock ups done at Kirti Nagar before mass execution
- Pull out test for under-cut anchors in Sandstone: **4 Nos.** & Sandstone Transverse Strength :**350 Nos.**
- Pull out test for Dash Fastener in Concrete:**4 Nos.**
- Strength of clamps/Fastener: **15 Nos.**
- Strength test for Aluminum Frame behind Cladding
- Stone cladding on bottom side of Porch & Utility corridor changed to Moisture Resistant

Stone Jali In Facade



Stone Jali work with MS Frame

Undercut Anchors Method of Dry Cladding (More sturdy but Time consuming)

नींव जिस पर भवन अपना आधार पाता है

"आप कमजोर नींव पर मजबूत इमारत का निर्माण नहीं कर सकते।"
-गॉर्डन बी हिंकले

अनुराग खरे
अधीक्षण अभियंता

किसी भी भवन के निर्माण का मुख्य भाग उसकी नींव होती है। प्रसिद्ध कहावत भी है कि जिस वृक्ष की जडें मजबूत होती हैं वह उतना ही मजबूत होता है। ठीक इसी प्रकार मजबूत नींव पर बनी इमारतें सदियों के इतिहास को कहने में सक्षम होती हैं। नींव के बिना आप दुनिया में गगनचुंबी इमारतों का निर्माण नहीं देख सकते हैं। वास्तव में एक इमारत की सुंदरता नींव पर बहुत हद तक निर्भर करती है, क्योंकि यह नींव का ही महत्व है जो इमारत को समय की कसौटी पर खरा उतारेगा। ढांचागत डिज़ाइन में भवन का कुल भार नींव के माध्यम से ही मृदा में रूपांतरित होता है। एक इमारत की ताकत उसकी नींव में होती है। किसी भी नींव का मुख्य उद्देश्य उसके ऊपर की संरचना को पकड़ना और उसे खड़ा रखना है। इसके विपरीत, स्पष्ट कारणों से एक खराब नींव रहने वालों और पड़ोस के लिए अत्यधिक खतरनाक हो सकती है। गगनचुंबी इमारतों के निर्माण कार्य के साथ ही बड़े शहरों में मजबूत नींव बनाना और भी महत्वपूर्ण हो गया है। इमारत का सबसे महत्वपूर्ण हिस्सा यकीनन वह नींव है जिस पर इसका निर्माण किया गया है। यह इमारत का वह आधार है जो अधिरचना से भार को पृथ्वी पर स्थानांतरित करता है।यदि नींव ठीक से नहीं बनाई गई तो इमारत को भविष्य में गंभीर संरचनात्मक समस्याओं का सामना करना पड़ सकता है। नींव के बिना स्तंभों का आधार जमीन में प्रवेश करेगा जिससे संरचना में अस्थिरता पैदा होगी क्योंकि नींव स्तंभों से भार को बड़े क्षेत्र में फैलाने में मदद करती है। नींव के महत्व को निम्न बिंदुओं के माध्यम से समझाया जा सकता है:

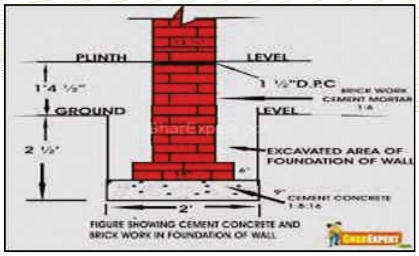
1. **बिल्डिंग सपोर्ट** - यह नींव ही है जो पूरे ढांचे का भार वहन करती है और इसे समतल रखती है। क्रैकिंग या बकलिंग से बचने के लिए इसे लाइव लोड के साथ-साथ डेड लोड सहन करने में सक्षम होना चाहिए। यदि नींव में किसी भी बिंदु पर किसी भी प्रकार की कोई खराबी आती है या यह विफल हो जाती है, तो इमारत अस्थिर हो सकती है या गिर भी सकती है। बिल्डिंग की नींव का अर्थ सिर्फ कंक्रीट डालना नहीं है बल्कि इसे मिट्टी में ठीक से फिट करना है जैसे कि इसे मिट्टी में सिल दिया गया हो। भार वहन सुनिश्चित करने के लिए इसे आवश्यकतानुसार संकुचित किया जाना चाहिए।

2. **विपत्तियों से सुरक्षा** - नींव के निर्माण से पहले क्षेत्र के मौसम और उसकी जमीनी स्थिति के बारे में अध्ययन करना आवश्यक है। किसी भी प्राकृतिक आपदा जैसे भूकंप, चक्रवात आदि के प्रभावों का सामना करने के लिए नींव को काफी मजबूत बनाया जाता है। नींव की ताकत हमेशा उस अत्यधिक प्राकृतिक आपदा के अनुसार डिजाइन की जाती है जो संबंधित क्षेत्र में पहले ही आ चुकी है।
   संक्षेप में, एक संरचना के निर्माण में नींव दो प्रमुख महत्वपूर्ण भूमिका निभाती है:
   1. इस का प्राथमिक उद्देश्य पूरी इमारत के भार को वहन करना है।
   2. एक अच्छी तरह से डिज़ाइन की गई और मजबूत नींव प्राकृतिक आपदाओं में भी इमारत को खड़ा रखती है। अच्छी तरह से निर्मित नींव भूकंप, बाढ़, तेज हवा आदि जैसी आपदाओं के समय इमारत में रहने वालों को सुरक्षित रखती है।

निर्माण विशेषज्ञों और इंजीनियरों के अनुसार, नींव को "मृत" भार और "जीवित" भार का सामना करने में सक्षम होना चाहिए। मृत भार मूल संरचना का भार या भार है। इसे डेड लोड कहा जाता है क्योंकि यह स्थिर रहता है। दूसरी ओर, जीवित भार लोगों और अन्य वस्तुओं का भार है जो वे अपने साथ लाते हैं। नींव दृढ़ होनी चाहिए और पूरी इमारत के वजन को जमीन पर लाने में सक्षम होनी चाहिए। यदि भवन ढलान वाले क्षेत्रों या नम भूमि पर बनाया जा रहा है, तो नींव को अनुकूलित और टिकाऊ होना चाहिए।

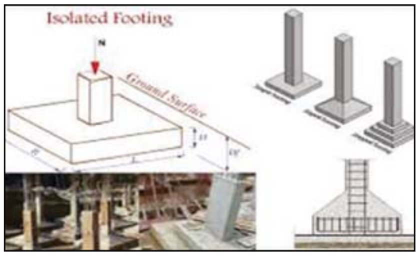
यदि भवन की नींव मजबूत न हो तो भवन की गिरने की सम्भावना बहुत अधिक हो जाती है। किसी भी भवन की संरचनात्मक रूपरेखा बनाने में नींव का डिजाइन एक मुख्य भाग होता है। नींव मुख्यतः निम्न प्रकार की होती है

1. **ईंट के काम में पट्टीनुमा नींव (strip foundation in brick work)**
   स्ट्रिप फाउंडेशन में एक स्ट्रिप जिसे आम बोलचाल में पट्टी कहते हैं। जिसको भारी दीवारों के नीचे बनाया जाता है। यह निरंतर स्ट्रिप दीवार में एक आधार के रूप में कार्य करतीं हैं। स्ट्रिप को बनाने के लिए कंक्रीट का उपयोग होता है। कंक्रीट मुख्य रूप से नींव के लिए इस्तेमाल की जाने वाली सामग्रियों में से एक है। नींव की खांइयो को भरने के लिए कंक्रीट का इस्तेमाल होता है। कंक्रीट की सहायता से दीवार को एक आधार प्रदान किया जाता है जो दीवार के लिए पर्याप्त संक्षारक शक्ति को विकसित करता है क्योंकि कंक्रीट नींव पर भार को सपोर्ट करने के लिए कठोर हो जाती है।



भवन निर्माण के इतिहास में पोर्टलैंड सीमेंट के इस्तेमाल से पहले नींव निर्माण के लिए ईंटो का इस्तेमाल होता था। ईंटों से ही नींव की स्ट्रिप बनाई जाती थी। नींव को सीधे अधोभूमि से या प्राकृतिक पत्थरों के फाउंडेशन पर बनाया जाता था। कंक्रीट स्ट्रिप फाउंडेशन की चौड़ाई अधोभूमि (subsoil) की असर क्षमता और नींव पर पढ़ने वाले भार पर निर्भर करती है।

2. पृथक आधार (isolated footing)



यह सबसे अधिक इस्तेमाल की जाने वाली नींव का प्रकार है जिसका उपयोग सिंगल कॉलम के लिए किया जाता है। एक पृथक आधार का आकार वर्गाकार या आयताकार हो सकता है और इसका उपयोग तब किया जाता है जब संरचना का भार स्तंभों के माध्यम से स्थानांतरित किया जाता है। यह सबसे सरल और सामान्य प्रकार की नींवों में से एक हैं। इनका उपयोग तब किया जाता है जब भवन का भार स्तंभों द्वारा ले जाया जाता है। आमतौर पर, प्रत्येक कॉलम की अपनी एक फुटिंग होती है। फुटिंग कंक्रीट का एक वर्ग या आयताकार पैड है, जिस पर स्तंभ बैठता है। फुटिंग का आकार प्राप्त करने के लिए, इंजीनियर को कॉलम के भार के अनुरूप डिजाइन बनाना होता है जो वहां की मिट्टी की सुरक्षित असर क्षमता पर निर्भर करता है।

आइसोलेटेड फुटिंग्स (isolated footings) के निम्न प्रकार होते हैं।

1. एकल पैड आधार (single pad footings)
2. स्टेप कोलंम आधार (stepped column footing)
3. ढलान वाला स्तंभ आधार (sloped column footing)
4. वाल फुटिंग्स विदाउट स्टेप (wall footing without step)
5. सीढ़ी दार दीवार काआधार (stepped wall footing)
6. ग्रिलेज फाउंडेशन (grillage foundation)

3. संयुक्त आधार (combined footing)

जब दो या दो से अधिक कॉलम इतने करीब होते हैं कि अलग-अलग फुटिंग्स के ओवरलैपिंग का कारण बनते हैं, तो इन्हें संयुक्त फुटिंग्स द्वारा बदल दिया जाता है। इसका उपयोग तब भी किया जाता है जब मिट्टी की वहन क्षमता आवश्यकता से कम होती है या यदि स्तंभ संपत्ति/सीवर लाइनों के पास होता है।

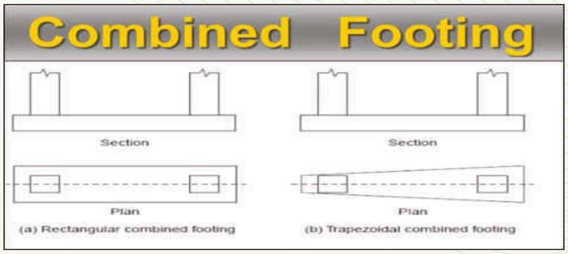
जब स्तंभ को बारीकी से फैलाया जाता है, तो संयुक्त पैरिंग प्रदान की जाती है ताकि उनके पैर एक दूसरे के साथ ओवरलैप हो जाएं | ऐसे समय में जब कॉलम निकट होते हैं और यदि हम अलग-अलग पड़े हुए पैरों को अलग कर देते हैं, तो अलग-अलग पड़ने की तुलना में एक संयुक्त पैर प्रदान करना बेहतर होता है।

निम्न स्थिति में संयुक्त पायदान का प्रयोग किया जाता है-

- जब केंद्र से स्तंभों के बीच की दूरी छोटी होती है और मिट्टी में कम असर क्षमता होती है। व्यक्तिगत कॉलम फुटिंग एक दूसरे को ओवरलैप कर सकते हैं।
- यदि प्रॉपर्टी लाइन और सीवर लाइन के पास कॉलम स्थित है, तो गुरुत्वाकर्षण का कॉलम सेंटर फुटिंग के साथ मेल नहीं खाएगा। फिर, आसन्न आंतरिक स्तंभ के साथ इस फुटिंग को संयुक्त करना आवश्यक है।
- किसी भी कारण से एक तरफ के पैर के आयाम प्रतिबंधित हैं, ताकि स्तंभ के चरणों को संयोजित किया जा सके।

उपयुक्तता:

- कॉलम के लिए बारीकी से जगह दी गई है।
- प्रॉपर्टी लाइन या सीवर लाइन के पास स्थित कॉलम।



कंबाइंड फ़ुटिंग दो प्रकार की होती है

1. आयताकार संयुक्त आधार (Rectangular combined footing)
2. टरपेजोइडल संयुक्त आधार (Trapezoidal combined footing)

3. बेडा नींव (raft foundation)

राफ्ट फाउंडेशन को मैट फाउंडेशन के रूप में भी जाना जाता है| यह एक निरंतर स्लैब है जो एक नींव के निर्माण के पूरे क्षेत्र को कवर करता है और अपने वजन को जमीन पर स्थानांतरित करता है। इस प्रकार यह संरचना के सभी भार वहन करने वाले तत्वों के लिए एक बेड़ा या चटाई के रूप में डिज़ाइन किया गया है। इसका उपयोग कम असर क्षमता वाली मिट्टी जैसे विशाल मिट्टी में किया जाता है। राफ्ट फाउंडेशन (raft foundation), जिसे मैट फ़ाउंडेशन भी कहा जाता है, का उपयोग अक्सर बेसमेंट के निर्माण के समय किया जाता है। एक बड़ा बेड़ा, पूरे तहखाने का फर्श स्लैब नींव के रूप में कार्य करता है, भवन का भार भवन के पूरे फुटप्रिंट पर समान रूप से पड़ता है। इसे बेड़ा कहा जाता है|

आजकल मैट फ़ाउंडेशन का उपयोग वहां किया जाता है, जहाँ रिइन्फोर्समेंट कंक्रीट की राफ्ट को इमारत के पूरे भार को जमीन से स्थानांतरित करने के लिए डिज़ाइन किया गया है अर्थात जहां बिल्डिंग लोड को एक बड़े क्षेत्र में फैलाना पड़ता है, या जहां कॉलम को बारीकी से फैलाया जाता है, जिसका अर्थ है कि यदि इंडिविजुअल फुटिंग का उपयोग किया जाता है, तो वे एक दूसरे को स्पर्श करेंगे। इस फाउंडेशन का उपयोग कम असर क्षमता वाली मिट्टी के लिए भी किया जाता है, क्योंकि यह इमारत के पूरे क्षेत्र में इमारत के वजन को वितरित करता है, न कि छोटे क्षेत्र में या व्यक्तिगत बिंदु पर। अंततः मिट्टी पर प्रति क्षेत्र तनाव कम करता है।

सिविल इंजीनियरों के लिए तनाव की अवधारणा बहुत सरल है। हम जानते हैं कि तनाव क्षेत्र के अनुपात में होता है। उदाहरण के लिए| अगर किसी इमारत में 10 मीटर x 10 मीटर का वजन 100 टन है, और एक बेड़ा नींव है, तो मिट्टी पर तनाव वजन / क्षेत्र = 100/100 = 1 टन प्रति वर्ग मीटर है।

एक अन्य मामले में, यदि एक ही इमारत में 4 अलग-अलग फ़ुटिंग्स हैं, प्रत्येक 1 मीटर x 1 मीटर है, तो नींव का कुल क्षेत्रफल 4 M2 होगा, और मिट्टी पर तनाव 100/4 होगा, जो प्रति वर्ग लगभग 25 टन है। इसलिए यह नींव पर प्रति यूनिट क्षेत्र में लोड बढ़ाता है।
आमतौर पर उपयोग किए जाने वाले दो प्रकार के राफ्ट है।

1- फ्लैट राफ्ट (flat raft) 2- चौड़े पैर की राफ्ट (wide toe raft)

एक अन्य मामले में, यदि एक ही इमारत में 4 अलग-अलग फुटिंग्स हैं, प्रत्येक 1 मीटर x 1 मीटर है, तो नींव का कुल क्षेत्रफल 4 M2 होगा, और मिट्टी पर तनाव 100/4 होगा, जो प्रति वर्ग लगभग 25 टन है। इसलिए यह नींव पर प्रति यूनिट क्षेत्र में लोड बढ़ाता है।
आमतौर पर उपयोग किए जाने वाले दो प्रकार के राफ्ट है।

1- फ्लैट राफ्ट (flat raft) 2- चौड़े पैर की राफ्ट (wide toe raft)

5. पाइल नींव (pile foundation)

पाइल एक प्रकार की गहरी नींव है जो कंक्रीट, लकड़ी या स्टील से बनी होती है। यह एक छोटे व्यास के स्तंभ की तरह होता है जिसे जमीन में गाड़ दिया जाता है। सरल शब्दों में, ढेर नींव में उथले नींव से अधिक गहराई होती है। इस प्रकार की नींव मुख्य रूप से पुल निर्माण में उपयोग की जाती है।

पाइल फ़ाउंडेशन का उपयोग फुटिंग के आधार से भार को ज़मीनी स्तर से काफी गहरे स्थित कठोर चट्टानी स्तर तक स्थानांतरित करने के लिए किया जाता है। ये कंक्रीट, लकड़ी या स्टील से बने पतले स्तंभों की तरह होते हैं, जिन्हें जमीन में गाड़ा या डाला जाता है। इसका उपयोग तब किया जाता है जब मिट्टी की वहन क्षमता इमारत के भार को सहन करने और इसे कठोर चट्टानी परत में स्थानांतरित करने के लिए पर्याप्त नहीं होती है। पाइल नींव का प्राथमिक उद्देश्य घर्षण ढेर का उपयोग करके भार का प्रतिरोध करना है|

इस प्रकार की नींव का उपयोग तब किया जाता है जब नींव के नीचे की मिट्टी में कठोर असर तक गहरी मिट्टी में इमारत के भार को ले जाने के लिए पर्याप्त असर क्षमता नहीं होती है। ढेर नींव का मुख्य कार्य भार को ढेर बिंदु या आधार पर घर्षण ढेर और अंत-असर ढेर के संयोजन से जमीन के निचले स्तर पर संचारित करना है।

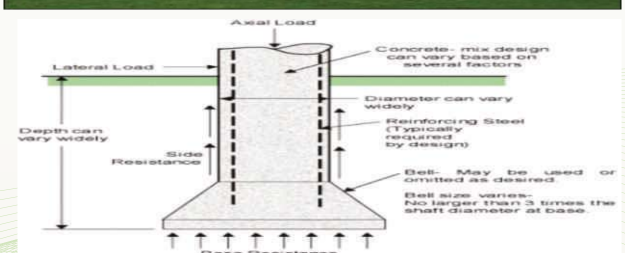
उपयुक्तता (Suitability):

हम एक पाइल नींव का उपयोग करते हैं जब:

1. संकुचित या कमजोर ऊपरी मिट्टी की परत
2. क्षैतिज बलों की उपस्थिति
3. उत्थान बलों के अधीन
4. मिट्टी का कटाव

इसके अतिरिक्त पुल इत्यादि का निर्माण करने के लिए कूप नींव (well foundation) का भी उपयोग किया जाता है। इसे दिए गए चित्र के माध्यम से समझा जा सकता है-

नींव निर्माण में यह ध्यान देना बहुत जरूरी है कि वह भवन का भार पूर्ण रूप से एवं बराबर मात्रा में मृदा में स्थानांतरित करे। ऐसा न होने पर भवन या इमारत अपना सही आकार लेने में असफल हो जाती है। उदाहरण के लिए- पीसा की मीनार जोकि अपनी नींव की डिज़ाइन खराब होने के कारण यह एक दिशा में झुक गयी है।



नींव निर्माण में एक मुख्य भाग मृदा की वहन क्षमता एवं उस स्थानके तलरूप या स्थलाकृति काभी होता है, जिस स्थान पर इस भवन का निर्माण होता है। उदाहरण के तौर पर यदि हम चट्टानी इलाके में भवन निर्माण कर रहे है तो वहन क्षमता बहुत ज्यादा होती है व हल्की नींव (isolated footing, combined footing) से भी निर्माण कार्य हो जाता है। इसके ठीक विपरीत यदि हम उस स्थान पर निर्माण कर रहें हैं जहाँ मृदा की वहन क्षमता बहुत कम है या दलदल इत्यादि है तो वहाँ पर डीप या पाइल फाउंडेशन इत्यादि की भी जरूरत पड़ती है। कौनसी तरह की नींव किस स्थान पर उपयुक्त होगी इसका निर्णय मृदा की वहन क्षमता जांच कर निर्धारित किया जाता है। आज वर्तमान में हम बहुत सारे भवनों की पहाड़ों में संरचनात्मक विफलता के बारे में सुनते हैं। इसका मुख्य कारण मृदा एवं नींव का सही तरीके से डिजाइन न किया जाना होता है। पहाड़ों पर तो इसकी भी जाँच अति आवश्यक होती है कि स्लिप सर्किल जिसके तहत मिट्टी का एक बड़ा भाग फिसल सकता है वह है कि नहीं और यदि है तो उसका क्या निस्तारण है। पहाड़ों पर वैसे तो भूस्खलन के स्थान, उन पर उगने वाले पेड़ों से आसानी से चिन्हित किये जाते हैं। यदि पेड़ के तने सीधे ऊपर न जाकर गोलाकार –आकृति में ऊपर जा रहे हैं तो यह सम्भव है कि इस स्थान की मिटटी गिर रही है। ऐसे में भविष्य में भूस्खलन हो सकता है। ऐसे स्थानों पर हमें भवन निर्माण करने से बचना चाहिए। इसके अतिरिक्त यदि वर्टीकल क्लिफ (उर्ध्व) के पास भवन बनाना है तब उसमें नींव का निर्धारण बहुत महत्वपूर्ण हो जाता है अन्यथा पूरा भवन स्खलित हो सकता है। सामान्यतया इन स्थितियों में गहरी नींव का निर्माण होता है।

मैदानी इलाको में सामान्यतः रेतीली या चिकनी मिट्टी होती है। इन में भवन निर्माण के समय ध्यान देने की बात यह होती है कि भवन का कुल भार समान रूप से उस मिट्टी पर स्थानांतरित हो जाए। कई बार मृदा क्षमता के अनुसार एंव छोटे भवनों में हम पृथक आधार का निर्माण करते हैं। इसमें एक बात यह ध्यान देने की होती है कि भवन का अंतर निपटान (differential settlement) न हो। ऐसे भवन जिनमें कम्पोजिट आधार दिया जाता हैं। जैसे कि कुछ स्थानों पर पट्टीनुमा नींव तथा अन्य स्थानों पर पृथक या संयुक्त नींव। इन स्थानों पर भवन निर्माण की विफलता का साधारणतया मुख्य कारण अंतर निपटान होता (differential settlement) है।

अंतर निपटान में न केवल भवन का संरचनात्मक विघटन होता है बल्कि इससे गैस लाइन, पानी लाइन भी फट जाती है। राफ्ट या पाइल नींव समान्यतया उन स्थानों पर बनाई जाती है। जहाँ भवन बहुमंजिले होते हैं या मृदा की वहन क्षमता कम होती है।इसका भी निर्धारण भवन के कुल भार के अनुसार होता है। हालाँकि राफ्ट नींव से अंतर निपटान की संभावना बहुत हद तक कम हो जाती है। फिर भी नींव का सही तरीके से संरचनात्मक डिज़ाइन बहुत आवश्यक होता है। पाइल नींव का भी डिज़ाइन नमूना जांच करने के बाद ही किया जाता है। हालाँकि पाइल नींव से भवन की लागत में काफी वृद्धि होती है।

भवन निर्माण के समय यह भी सुनिश्चित कर लेना चाहिए कि जिस स्थल पर भवन निर्माण हो रहा है, वहां काली कपास की मिटटी या कोई अन्य ऐसी मिटटी न हो जिसका क्षरण बहुत ज्यादा होता हो। इस प्रकार की मिटटी में भवन निर्माण करने पर संरचनात्मक विफलता का खतरा बहुत अधिक होता है। अतः ऐसे स्थानों पर डिज़ाइन करते समय इससे सम्बंधित सभी सावधानियों का पूर्ण ध्यान रखा जाना आवश्यक है।

आजकल के भवन भूकम्प की दृष्टि से डिज़ाइन किये जाते हैं। इसमें यह भी ध्यान रखने की जरूरत होती है कि जिस स्थान पर इनका निर्माण हो रहा हो वहां द्रवीकरण का खतरा न हो। इसके लिए भी उन स्थानों पर जहाँ बलुई मिटटी हो वहां भूकम्प में इमारत धंसने का खतरा बहुत ज्यादा होता है। भवन निर्माण में इसका निस्तारण किया जाना बहुत जरूरी है।

आजकल मृदा परीक्षण में मृदा की वहन क्षमता, भूजल की गहराई, मृदा का प्रकार जैसे- रेतीली, चिकनी मिटटी इत्यादि का पता चल जाता है। अतः भवन निर्माण के पहले पूर्ण मृदा परीक्षण करवाना आवश्यक है। पहाड़ी इलाकों में ढाल स्थिरता का भी परीक्षण जरूर करवाना चाहिए।

अनेक बार ऐसे भवन जिनमें तलघर भी होता है, उनमें भूजल कितनी गहराई पर है, इसका भी विशेष ध्यान रखना पड़ता है। यदि भूजल तालिका बहुत ऊँची है जोकि मृदा परीक्षण में पता चलता है तो पहले पानी को पम्प के माध्यम से निकालकर प्रबलित कंक्रीट से वाटरप्रूफ तहखाना की संरचना का निर्माण करना चाहिए। इसके डिज़ाइन में पानी के उत्क्षेप का भी ध्यान रखा जाता है। कुछ स्थानों पर जहाँ भवन का निमर्ण नदी इत्यादि के पास हो रहा है, वहां बहुत संभावना होती है कि पानी के बहाव से नींव के नीचे की मृदा निकल जाये। इस स्थिति में भवन का व्यस्थापन बहुत आसानी से हो जाता है व भवन संरचना विफल हो जाती है। ऐसे स्थानों पर प्रतिधारण भित्ति इत्यादि का निर्माण विशेषतया किया जाता है। आजकल नींव के ऊपर ही विशेष संरचनाएं बना दी जाती हैं जोकि भूकम्प की स्थिति में भवन की रक्षा करती हैं। इनका भी आजकल मुख्य इमारतों में बहुत उपयोग हो रहा है।अनेक बार भवन की वास्तु योजना इस प्रकार की होती है कि भवन का भार वितरण समान नहीं होता है या कई बार ऐसी आकृति के भवन बनते हैं जोकि सीसमिक डिज़ाइन के अनुसार नहीं होते हैं व भूकम्प में हानि की संभावना बहुत होती है।

ताजमहल के नीचे लकड़ी के लट्ठे लगाये गए हैं। यह लकड़ी पानी में और अधिक मजबूत हो जाती है। यही कारण है कि नदी के किनारे होते हुए भी ताजमहल इन लकड़ी की नीव पर सुरक्षित खड़ा रहा। इसके अतिरिक्त विभिन्न स्थानों पर जगह के अनुसार लोकल मैटेरियल से भी नींव बनायी जाती है जोकि उस स्थान के अनुसार उपयुक्त होती है।

एल, टी, ई और वाई आकार वाले भवनों को उचित स्थानों पर पृथक्करण खंड प्रदान करके आयताकार भागों में विभाजित किया जाना चाहिए।

एक अच्छे संरचनात्मक अभियंता को इस तरह के भवनों को तापीय विस्तार जोड़ से पृथक कर देना चाहिए ताकि भवन पर वास्तुगत प्रभाव न हो तथा संरचना भी सुरक्षित रहे। तापीय विस्तार जोड़ के समय भवन की नींव का भार विभिन्न कालमों के माध्यम से किस प्रकार स्थानांतरित हो रहा है, इसका विशेष ध्यान रखना चाहिए अन्यथा भवन निर्माण की विफलता की संभावना बढ़ जाती है।

इस लेख का आशय मुख्य रुप से यह बताना है कि सामान्यतः जो भाग हमें दिखाई नहीं दे रहा, वह जमीन के अंदर होता है, वह भाग भवन का सबसे महत्वपूर्ण भाग होता है। पुनर्वास भविष्य में संभव नहीं होता है। आज हम पहाड़ों पर अनेक समस्याओं का सामना कर रहे हैं, वह केवल और केवल अभियांत्रिकी का सही तरीके से प्रयोग न करने के कारण हुआ है। यदि निर्माण कार्य इमारत की उपयुक्त डिज़ाइन निर्माण के स्थान एवं उसकी स्थलाकृति को देखकर किया जाये तो कोई कारण नहीं है कि भूकम्प आदि से इमारत को जरा सी भी क्षति पहुंचे। हम प्रकृति को अवश्य दोष देते हैं परन्तु ज्यादातर कारणों में दोषी संरचनात्मक नक़्शे ही हैं जोकि सभी मापदंडों को ध्यान में न रखकर कुशल इंजीनियरों द्वारा नहीं बनाये जाते।

ROLE OF COURTS IN DOMESTIC ARBITRATION

Anil Kumar Gupta,
Superintending Engineer

Introduction

Purpose of arbitration is to bring about cost-effective & expeditious resolution of disputes and further preventing multiplicity of litigations by giving finality to an arbitral award. Award made by the Arbitration Tribunal (AT) is granted the status and effect same as a judgement made by the court. The Act has adopted the approach of minimal judicial interference, according to section 5 of the Arbitration and Conciliation Act 'no judicial authority shall intervene except where so provided in the Act'. The process of arbitration is designed to be autonomous but a complete exclusion of the role of courts would be counter- productive. The role envisaged for the courts is to be supportive towards arbitration, the courts alone have the power to rescue it in certain situations. The 2015 amendments were brought to preserve the sanctity of the arbitral regime as an aiding mechanism to relieve the overburdened Indian Judiciary.

Pre-Arbitration

The Act mandate the competent court to supervise and assist the arbitration, wherever parties needed. It is obligatory upon the Court to refer parties to arbitration where there is valid arbitration agreement prescribes section 8. Party may seek help of the court to constitute an arbitral tribunal section 11 state; wherever there are justifiable doubts as to arbitrator's impartiality or independence the competent court have to decide upon a challenge, section 13 narrates; section 14 empowers the courts to decide upon the termination of mandate of the Arbitration Tribunal on request of the parties. Party may request the court for granting interim relief in the pre arbitral stage stated in the section 9.

During-Arbitration

Assistance in evidence taking, issue warrant, attach property etc, may be taken from the court (section 27). Section 29A specifies the time limits for the pronouncement of award, the competent court may extend such time limits if the parties so desire. If the Court finds that the proceedings have been delayed for the reasons attributable to the AT, then, it may order reduction of fees of Arbitrator; or may substitute one or all of the arbitrators; or may costs upon any of the parties under this section.

Post Award

After the pronouncement of arbitral award, an aggrieved party may apply for setting aside of such award only on certain specified grounds before the court under section 34 of the Act that too within three months of receiving of Award. If the court finds that such award is vitiated by patent illegality appearing on the face of the award or the award is in conflict with public policy of India, such an award may be set aside by the court. However, such award cannot be set aside on the grant of erroneous application of law or by re-appropriation of evidence. The Supreme Court in numerous judgements held that the grounds set out under section 34 of the Act will not apply if the view taken by the arbitrator is plausible.

Section 36 provides that after expiry of time for setting aside the award, the award will have an effect of a decree of a court and shall be enforced in the same way. If the award is challenged in the court, it would not imply an automatic stay on the award, for putting a stay on the award there shall be a specific order from the court.

Competent Court and it's Jurisdiction

Section 2(1)(e) of the Act defines "Court", in domestic arbitration competent court means the principal civil court (District Court) of original jurisdiction in a district, and includes High Court in exercise of its ordinary original civil jurisdiction. But it does not include any civil court of a grade inferior to principal civil court. Section 20 of the Act defines "Place of Arbitration", The parties are free to agree on the place of arbitration. Failing any agreement, the place of arbitration shall be determined by the AT having regard to the circumstances of the case, including the convenience of the parties. In such a situation and the Courts within whose jurisdiction part of cause of action have arisen or the Defendant carries out its business would have jurisdiction over the matter. Cases where parties have not agreed for the seat of Arbitration, it cannot confer jurisdiction to a place where no part of cause of action has arisen or has no nexus with the parties.

The Arbitration need support of the national court to exist, 2015 amendments minimize the supervisory role of courts in the arbitral process. But undue Judicial intervention in arbitration proceedings adds significantly to the delays in the arbitration process and ultimately negates the benefits of arbitration.

GAS BASED FIRE SUPPRESSION SYSTEM

Yashdeep Sachdeva,
Assistant Executive Engineer (E&M)

IS 15493:2004 is the standard that specifies provisions and recommendations for general requirements, type of clean agent and their containers, container arrangement, distribution systems, such as piping, nozzles, pipe supports, alarm system, type of enclosure etc. for GAS BASED FIRE SUPPRESSION SYSTEM.

There are some basic **Terminologies** which are required to be understood to holistically understand the working of Fire Suppression System:

1. **Class A Fires:** Fire in ordinary combustible materials such as wood, cloth, paper, rubber, many plastics, electrical and electronic hazards without any flammable fluid or gas.
2. **Class B Fires:** Fire in flammable liquids, oils, greases, tars, oil-based paints, lacquers and the like.
3. **Clean Agent:** Electrically non-conducting, vaporizing or gaseous clean agent that does not leave a residue upon evaporation.
4. **Engineered Systems:** A system in which the supply of the clean agent stored centrally is discharged through a system of pipe and nozzles in which the size of each section of pipe and nozzle orifice is calculated in accordance with relevant gaseous quantity to be used.
5. **Flooding Quantity:** Mass or volume of clean agent required to achieve the design concentration within the protected volume within the specified discharge time.
6. **Inert Gas Agent:** A clean agent that contains as primary components of the gases IGOI, IG55, IG100 or Ig541.
7. **Lowest Observed Adverse Effect Level (LOAEL):** The lowest concentration of clean agent at which an adverse toxicological or physiological effect has been observed.
8. **Nominal Size:** A numerical designation of size which is common to all components in a piping system other than components designated by outside diameters or by thread size.
9. **Primary Release:** Release of clean agent initiated by detection system or manual operation under normal operating conditions.
10. **Safety Interlock:** A switch that monitors the occupation of the protected area and automatically inhibits the discharge of the clean agent when the area is occupied.
11. **Secondary Release (Slave):** A release that is a consequence and dependent on the operation of the primary release, for example, pneumatic connection.
12. **Super-pressurization:** The addition of a gas to the clean agent container, where it is necessary to achieve the required pressure for proper system operation.
13. **Total Flooding:** The act and manner of discharging an agent for the purpose of achieving a specified minimum agent concentration throughout a hazard volume.
14. **Total Flooding Systems:** A fire-fighting system that is arranged to discharge clean agent into an enclosed space to achieve the appropriate design concentration.

A. General Information and Requirements

A. 1. General

1. Extinguishing gases are used effectively to suppress fire through physical or chemical action.

2. Clean agent gas extinguishing systems are useful in extinguishing fires in specific hazards or equipment and in occupancies where an electrically non-conductive medium is essential or desirable, or where clean-up of other media poses a problem.

3. Where clean agent gas extinguish & systems are used, a fixed enclosure shall be provided about the hazard that is adequate to enable the specific concentration to be achieved and maintained for the specified period of time.

4. The effects of agent decomposition on fire protection effectiveness should be considered while using clean agents in hazards with high temperatures (for example, furnaces and ovens, etc.).

A. 2. Suitability and Application

A. 2.1 Total Flooding Systems

Gaseous fire extinguishing systems are used primarily to protect hazards that are in enclosures or equipment that, in itself, includes an enclosure to contain the agent for establishment of required concentration and maintenance thereof for the required period. Some typical hazards that may be suitable include, but or not limited to, the following:

a) Within enclosures, such as rooms, vaults, enclosed machines, containers, storage tanks and bins.

b) For enclosed electrical hazards, such as transformers, control cubicles, switch boards, circuit breakers, and rotating equipment.

c) For enclosed flammable liquid/gas storage and processing areas.

d) For engines using flammable fuels.

e) For electronic hazards, such as computers, data processing equipment, control room, telecom facilities.

f) Sub-floors and other concealed spaces.

g) Other high value assets.

Some of the gaseous fire extinguishing systems may also be used for explosion prevention and suppression where flammable materials may collect in confined area.

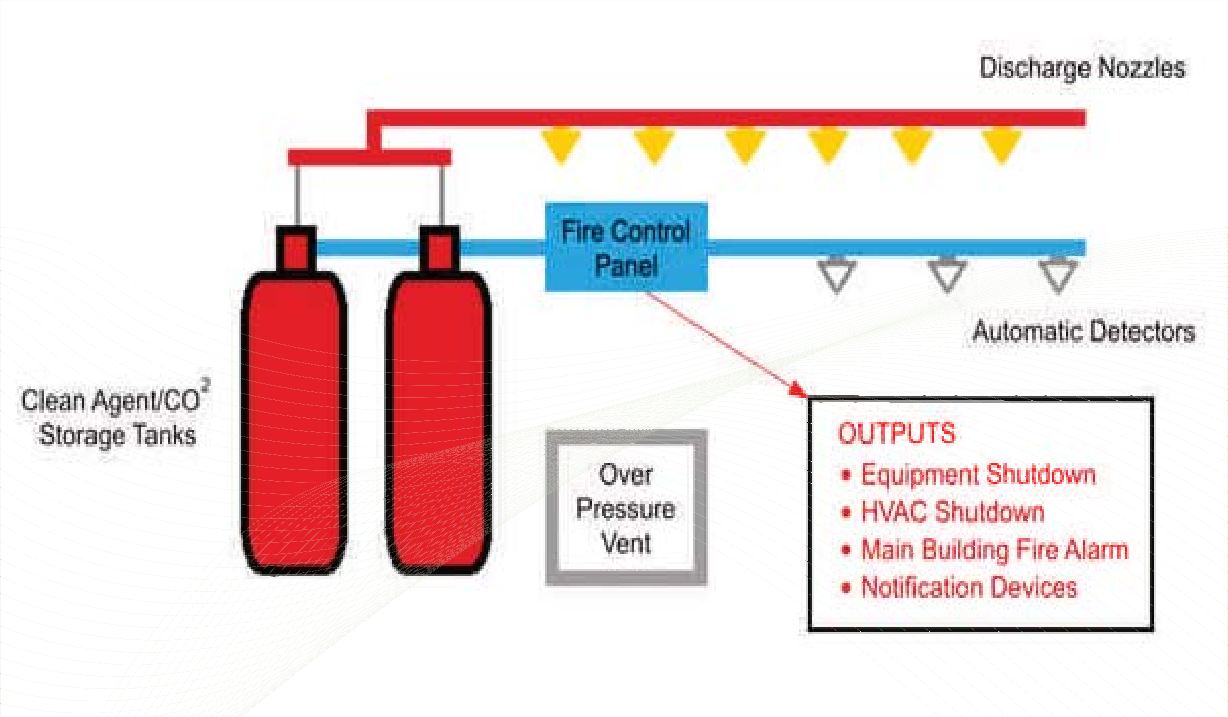


Fig.1. Gas Based Fire Suppression System-Basic Layout

A.3 Components of Gaseous Flooding System

A.3.1 Agent Supply and Container Arrangement

A.3.1.1 Agent Supply

Quality Requirement - The clean agent shall comply with quality and purity standards appropriate to the agent selected for extinguishment. Each batch of agent manufactured shall be tested and certified to applicable specification. Agent blends should remain homogeneous in storage and be used within the approved temperature range and environmental conditions at the place of installation.

A.3.1.2 Storage Container Arrangement

a) Containers should be adequately mounted to allow free passage of air around the base and suitably supported to provide for convenient individual servicing or content weighing. There should be enough space for a full on-site inspection of the container.

b) Containers brackets or devices integral with the container for attachment to structures should be designed to cater the maximum expected mass, vibration effects and shock loading, appropriate to the installation.

A.4. Detection, Actuation, Alarm and Control Systems

a) Detection, actuation, alarm and control systems should be installed, tested and maintained in accordance with IS-2189.

b) Automatic detection should be by any approved method or device capable of detecting and indicating heat, flame, smoke, combustible vapours or any abnormal condition.

c) All devices should be designed for the intended service and should not readily be rendered inoperative or susceptible to accidental operation. Devices normally shall be designed to function properly from –20°C to 55°C or marked to indicate temperature limitations.

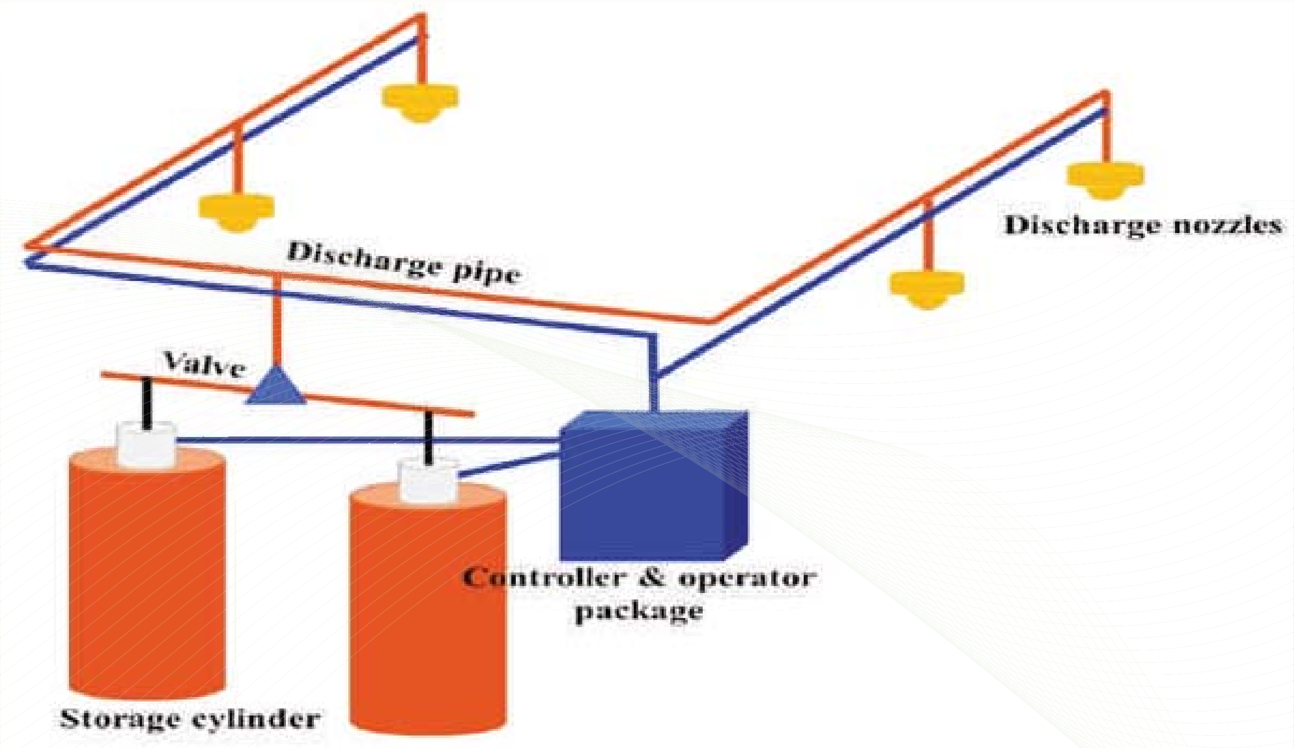


Fig.2. Schematic Layout at Execution for TOTAL FLOODING SYSTEM

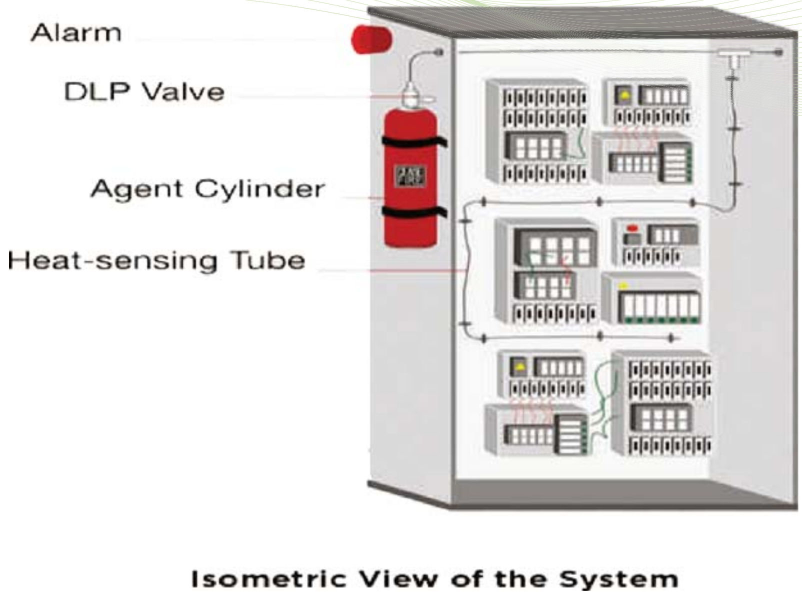


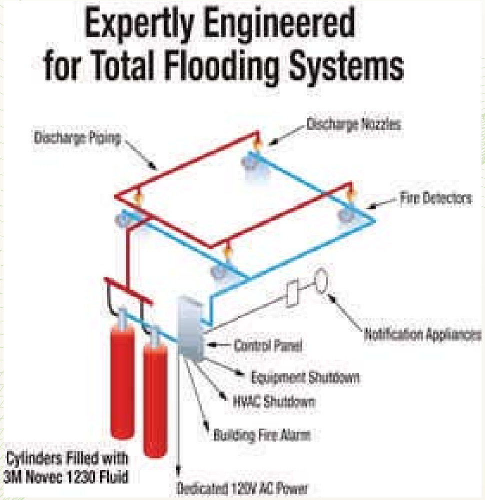
Fig.3. Fire Suppression Layout in ELECTRICAL PANELS

A.5.1. Engineered System

An engineered system uses large storage containers installed in central location. Single pipe feeds the nozzle located inside the hazard area. Predicting pipe pressure losses and designing nozzle orifice sizes requires complex flow calculations for both agent and nitrogen phases (in case of halocarbon gases) and for agent (in case of line gases), which takes into account the minimum and maximum volumes or the enclosure.

A.5.2. Pre-Engineered System

A pre-engineered system involves a single container, maximum of two nozzles and a small piping network. This system can be multiplied to cover larger volume areas. The larger area is viewed as a number of smaller areas, each protected by a single modular unit.



A.5. Engineered and Pre-Engineered System

BREAKING THE CYCLE: REDEFINING FILIAL PIETY IN TODAY'S CHANGING WORLD

Chenna Vivek Kumar,
Assistant Architect

Filial piety, or the obligation to care for one's parents in their old age, is a central concept in traditional Indian culture. The idea is deeply rooted in our values and beliefs, and has been passed down from generation to generation. In fact, the ancient Hindu scriptures place parents even above God, emphasizing the importance of respecting and taking care of our elders.

However, in today's rapidly changing world, the notion of filial piety is being put to the test. As the population of senior citizens in India grows at an unprecedented rate, the burden of care and support falls heavily on the younger generation. But is it fair to expect children to take care of their parents in their old age, especially when they are dealing with their own set of challenges.

The traditional Indian family structure provided a safety net for the elderly, with the younger generation taking care of their parents and grandparents. However, changing socio-economic dynamics have made it increasingly difficult for this model to be sustainable. With rising costs of living and increased mobility, children often move away from their parents to pursue education and employment opportunities.

It is in this context that we need to revisit the notion of filial piety. While there is no denying the importance of respecting and honoring our elders, we must also acknowledge the limitations of the traditional Indian family structure. Parents cannot and should not expect their children to be their sole caregivers in their old age. It is unreasonable to place this burden on the younger generation, who are often dealing with their own set of challenges.

We need to explore alternative ways of providing care and support for the elderly. This could involve creating robust social support systems, where senior citizens can access healthcare, social services, and financial assistance. Additionally, we need to encourage our parents to become financially independent in their old age, by saving money, investing in retirement plans, and taking advantage of government schemes designed to support senior citizens.

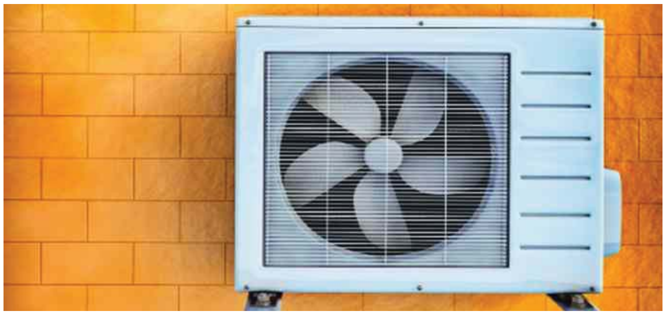
As a society, we need to shift our focus from individualistic notions of duty towards a collective responsibility for the welfare of the elderly. This means creating a social safety net that allows senior citizens to live with dignity and respect, regardless of their financial and social status. It also means redefining our understanding of filial piety, from a narrow and rigid notion to a more inclusive and compassionate one.

In conclusion, it is time for us to acknowledge the changing realities of our society and re-evaluate our notions of filial piety. We must move away from the expectation that children should look after their parents in their old age, towards a more collective responsibility for the welfare of the elderly. By doing so, we can create a society that is truly compassionate and inclusive, one that values and respects its elders.

As the great Indian scholar, Rabindranath Tagore once said, "Age considers; youth ventures." Let us venture forth into a new age of care and compassion for our elders.

THE AIR CONDITIONING PARADOX: BALANCING COMFORT AND SUSTAINABILITY IN INDIA

Chenna Vivek Kumar,
Assistant Architect



As the summer heat envelops the Indian subcontinent, air conditioning has become a necessary comfort for many. However, this seemingly innocent luxury also presents a paradoxical challenge that we must address as responsible citizens of the planet. On the one hand, air conditioning is a blessing in the sweltering heat, providing relief and comfort. On the other hand, air conditioning can contribute to the urban heat island effect, leading to rising temperatures and a negative impact on the environment.

India's rapid economic growth and urbanization have led to an exponential increase in the demand for air conditioning. This growth in air conditioning presents a significant challenge for our environment. AC units consume a considerable amount of energy, contributing to greenhouse gas emissions and climate change. Furthermore, air conditioning systems can also lead to increased air pollution by recirculating indoor air that may contain pollutants.

To address the paradox of air conditioning in India, we must look towards the future and consider alternative cooling technologies that can mitigate the environmental impact of cooling systems. Fortunately, there are alternative cooling technologies that are more sustainable and energy-efficient than traditional air conditioning.

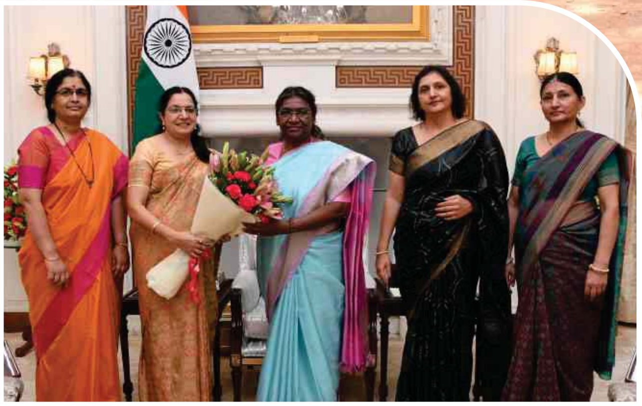
One such alternative is radiant cooling, which uses chilled water or other fluids to cool surfaces like walls and ceilings. These cooled surfaces then radiate coolness into the space. This technology can reduce the energy consumption of air conditioning systems and mitigate the urban heat island effect. Similarly, evaporative cooling, which uses water to cool air, has the potential to significantly reduce energy consumption and is a more sustainable alternative to traditional air conditioning.

While alternative cooling technologies offer a promising solution, there are also steps we can take as individuals to reduce the environmental impact of air conditioning. One of the most effective ways to reduce the environmental impact of air conditioning is to use it responsibly. We can do this by setting the temperature to a reasonable level, such as 24-26°C, rather than cranking up the AC to its maximum capacity. It is also important to turn off the AC when leaving the room and to keep doors and windows closed to prevent cool air from escaping.

Another way to reduce the environmental impact of air conditioning is to ensure that the AC unit is serviced regularly. A well-maintained air conditioning system will not only consume less energy but also reduce the likelihood of refrigerant leaks, which can have a significant impact on the environment.

In conclusion, the paradox of air conditioning is a challenge that requires immediate attention. As individuals, we must take responsibility for our actions and strive towards a future that is sustainable and green. By adopting sustainable practices such as responsible use of air conditioning, regular servicing of AC units, and exploring alternative cooling technologies, we can reduce the impact of air conditioning on our environment. The way forward is to embrace new technologies and practices that enable us to live comfortably while minimizing our environmental impact. Let us work towards a future that is both cool and eco-friendly.

ACTIVITIES OF CPWD OFFICERS' WIVES ASSOCIATION



Prime activities of the association

- Scholarship for degree and diploma courses on merit-cum-means basis for the wards of Group C & Work-charged employees.
- Special donation for the education of the underprivileged students to help them in pursuing their studies.
- One time ex-gratia payment to needy Group C & Work-charged employees of CPWD in the event of untimely death, accident, long illness etc.
- Donations for humanitarian causes like flood affected areas, Blood Banks, Red Cross Society, Schools for Blinds, Missionaries of Charity, PM Relief Fund, CM Relief Fund etc.
- "Parivar Ki Har Beti Apne Bharose" scheme to provide aid to the girl-child of Group C& Work-

charged employees of CPWD with the objective to make them economically independent in their life.

- Special donations in cash or kind to support financially deprived people or to organizations sharing same object.
- Satya Goel Scholarship for students of CPWD Group C & Work-charged employees who score high in their X and XII exams on merit basis by these trusts through OWA.
- Legal Aid Clinic - A new initiative to provide free legal advice to Group C & Work-charged employees of CPWD, staff and laborers by the professionally qualified advocates and groups.
- Crèches at construction sites under the name 'Bal Basera' for the children of laborers who are engaged by the contractors at various construction sites. These crèches provide informal education, nutrition, medical care and a safe environment to children aged 1-7 years. Presently 6 crèches are being run with around 20-25 children.
- Day Care Centre, Nursery and Play School at its Head office building premises for children of age 6 months to 12 years at a very nominal fee.
- Vocational Training Centre with the sole objective to provide training and empowering women economically. The Centre conducts different diploma courses like tailoring and embroidery recognized by Usha Sewing School, computer courses and many short term hobby classes are conducted from time to time.
- Cultural, recreational programs and workshops are conducted for the children at Day Care, Vocational Training Centre and at the crèche sites.
- Organising Health Camps for workers.








BEST PROJECTS

(I) BEST COMPLETED PROJECTS

S. No.	Region	Name of Building	Location	Prize
1	SDG PRND	New Parliament Building, New Delhi	New Delhi	1st
2	ADG Hyderabad	Ekalavya Model Residential School (EMRS) at Chintapalli, Visakhapatnam	Vishakha-patnam	2nd
3	SDG Mumbai	Development of new Academic facility for IIIT (PPP) Surat using Pre-Engineered Steel Structures.	Gujarat	3rd
4	ADG Hyderabad	Establishment of National Animal Resource Facility for Biomedical Research (NARF-BR) at Genome Valley, Turkapally, Hyderabad	Hyderabad	4th
5	ADG Border	OP Tower at Lakhpatwari along Indo-Pak Border, Bhuj, Gujrat	Bhuj, Gujrat	Special

(II) BEST E&M SERVICES COMPLETED

S. No.	Region	Name of Building	Location	Prize
1	ADG Hyderabad	Permanent Campus for IIT Tirupati	Tirupati	1st
2	SDG PRND	General Pool Office Accommodation-2 at KG Marg, New Delhi	New Delhi	2nd

(III) BEST ARCHITECTURAL PLANNING / DESIGN

1	SDG PRND	Global Centre for Traditional Medicine-WHO at Jamnagar, Gujarat	Jamnagar, Gujarat	1st
2	ADG Hyderabad	Proposed Administrative Building and Lecture Hall Complex for University of Hyderabad	Hyderabad	2nd
3	SDG Chennai	Construction of 150 Bedded Critical Care Unit, JIPMER - Puducherry	Puducherry	3rd

(IV) BEST INTERIOR COMPLETED

1	ADG Delhi	IDBI Bank, East Kidwai Nagar, New Delhi	New Delhi	1st
2	ADG Delhi	International Guest House, NASC Complex, Pusa, New Delhi	New Delhi	2nd
3	SDG PRND	Jodhpur Officers Hostel, New Delhi	New Delhi	3rd

(V) BEST INTERIOR & FURNISHING DESIGN

1	SDG Mumbai	ECGC office building at Gundavali, MV Road, Andheri (E), Mumbai	Mumbai	1st

(VI) BEST HORTICULTURE MAINTAINED CAMPUS /LAWN/GARDEN/PARK

1	SDG Chennai	Maintenance of Horticulture works at Rajiv Gandhi Ninaivakam, Sriperumbudur, Tamil Nadu	Sriperumbudur, Tamil Nadu	1st

(VII) BEST SERVICE CENTRES

S. No.	Region	Name of Building	Location	Prize
1	ADG Bangaluru	Service Centre Code-350, GPRA at HSR Lay Out Bangaluru (Electrical)	HSR Lay Out Bangaluru	1st
2	SDG Chennai	Service Centre Code-1373, GPRA KK Nagar Chennai (Electrical)	KK Nagar Chennai	2nd
3	ADG Lucknow	Service Centre Code-957, GPRA SC, KS-A, Sec-10, Vidyadhar Nagar, Jaipur (Civil)	Vidyadhar Nagar, Jaipur	3rd
4	ADG Delhi	Service Centre Code-322, Nanak Pura, New Delhi	Nanak Pura, New Delhi	4th

BEST PERFORMERS

(A) DG Medals and Commendation Certificates (EE & above level from all Regions)

(I) OFFICERS SELECTED FOR DIRECTOR GENERAL MEDAL

S. No.	Name of the Officer	Category	Post held
1	P. Bhagat Singh	Chief Engineer (Civil)	Chief Engineer, Parliament Civil Works Zone, Parliament House Complex, New Delhi
2	Vikas Gupta	Chief Engineer (Elect.)	Chief Engineer, Parliament Elect. Works Zone, Parliament House Complex, New Delhi
3	K Lingeswaran	Chief Architect	Chief Architect O/o ADG, Kochi
4	Sheel Rajneesh	Superintending Engineer (Civil)	Director (Operation &Training), ERP
5	E. S. Chakravarti	Executive Engineer (Civil)	Executive Engineer (P) O/o CE, Vijayawada
6	Yashesh Vyas	Architect	Architect O/o CE, Gandhinagar

(II) OFFICERS SELECTED FOR COMMENDATION CERTIFICATE

S. No.	Name of the Officer	Category	Post held
1	Dr. Shishir Bansal	Chief Engineer (Civil)	CE cum ED, Wadala Project Zone, Mumbai
2	Amit Garg	Superintending Engineer	SE cum PD, IIT Kanpur
3	Praveen Kumar Agrawal	Superintending Engineer	SE cum PD, Goa Circle
4	Sarvesh Tiwari	Executive Engineer (Civil)	EE-II, Bhopal
5	Smt. Saraswati Konwar	Executive Engineer (Civil)	EE and SM, Kimin Division
6	Ajay Mittal	Executive Engineer (Civil)	EE, Haldwani
7	Smt. D P Chnye	Architect	Architect O/o ADG, Guwahati
8	Dhanabalan Chandran	Architect	Architect, O/o Senior Architect (PRND), New Delhi
9	V. S. Chaitanya	Architect	Architect, O/o ADG Hyderabad
10	Anurag Singh Gangwar	Architect	Architect O/o ADG Chandigarh
11	Smt. K Saraswathi	Architect	Architect O/o ADG Kochi
12	D. A. Gonnade	Dy. Director (Hort)	DD(H) Nagpur

(B) Best Performers and Best Region for ERP Adoption

(I) OFFICERS SELECTED FOR DIRECTOR GENERAL MEDAL

S. No.	Name of the Officer	Category	Post held
1	Phani Bushan Singh	Best Performing Region	SDG, Mumbai
2	Ravindra Pratap Singh	Chief Engineer	CE, NDZ-II
3	Anand Kamal Pandey	SE(Civil)	SE(W&TLQA), O/o ADG Bangalore
4	Rajpal Pandwal	EE(Elect)	EE, DED-201, NDZ-II
5	Ramesh Gyanidas Ninawe	EE(Civil)	EE(P) O/o SDG Mumbai
6	Dr. Poonam Chand	DD(Hort)	Horticulture Division-II, NDZ-II

(II) OFFICERS SELECTED FOR COMMENDATION CERTIFICATE

S. No.	Name of the Officer	Category	Post held
1	P. Sridhar	Superintending Engineer	SE(W&TLQA) O/o ADG Hyderabad
2	Atul Wamanrao Sadhankar	SE Mumbai-I	SE Mumbai-I O/o SDG Mumbai
3	Sujit Kumar	EE(Civil)	EE(Civil) O/o ADG Patna
4	N. Vivit Samuel Vedaraj	Architect	Architect O/o CA, Kochi, ADG Kochi
5	Vimal Kumar Tuli	Assistant Administrative Officer	AAO, EC-II(A), CPWD
6	Deepak Sharma	Office Superintendent	O/o E-in-C, PWD Delhi
7	Ashok Kumar	Assistant Section Officer	O/o ADG Chandigarh

(C) DG Medals and Commendation Certificates (Below AEE level and from HQ)

(I) OFFICERS / STAFF SELECTED FOR DIRECTOR GENERAL MEDAL

S. No.	Name of the Officer	Category	Post held
1	Ms. Anjulata Meena	EE(C)	Office of DDG(ERP)
2	Ms. Nupur Tripathi	AEE(C)	Office of DDG(ERP)
3	Durga Ram Chowdhary	AE(C)	Office of SE (TAS) CSQ (Civil)
4	Anil Kumar Jain	Private Secretary	PS to DG, CPWD

(II) OFFICERS/STAFF SELECTED FOR COMMENDATION CERTIFICATE

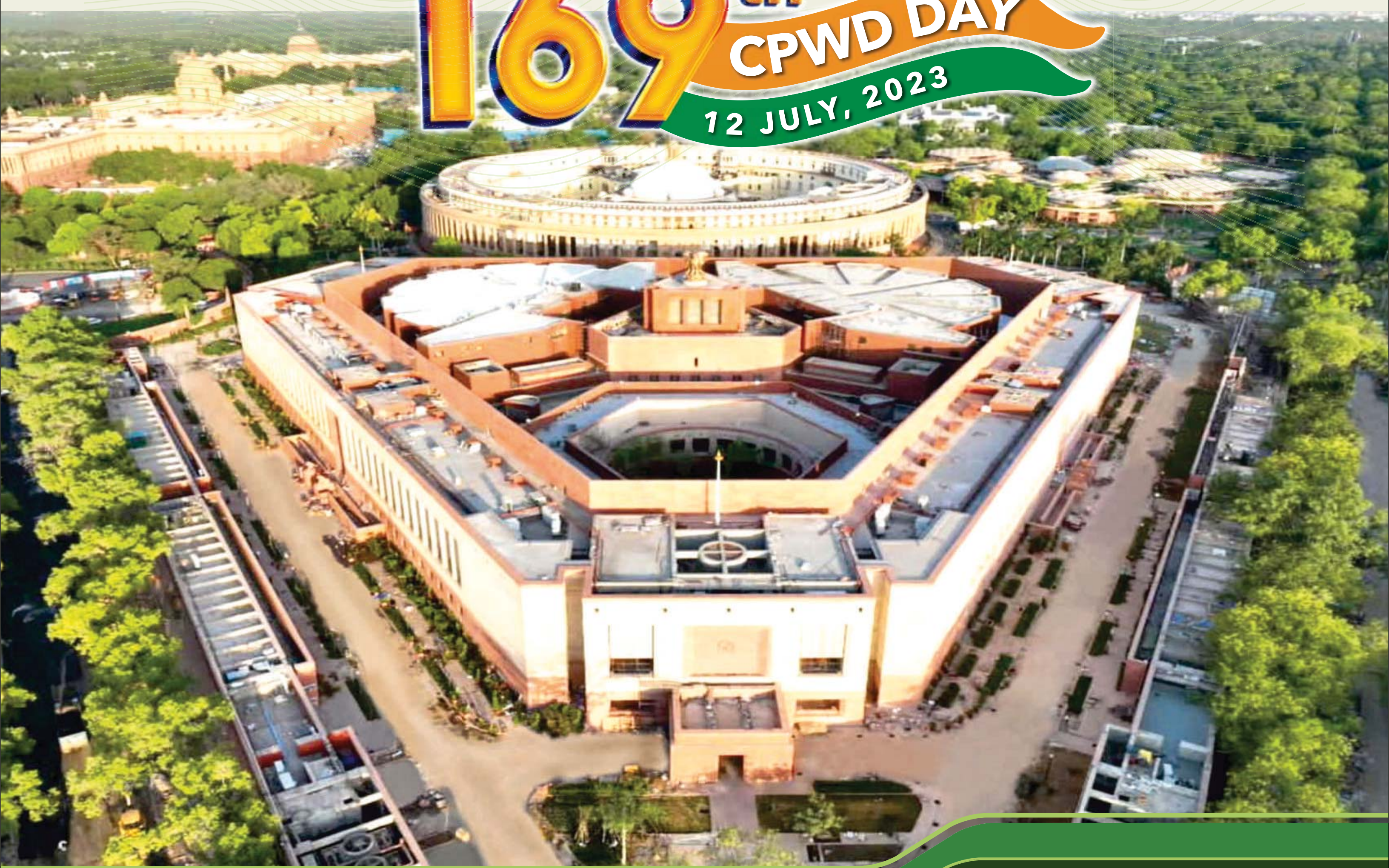
S. No.	Name of the Officer	Category	Post held
1	Rakesh Papnai	Junior Hindi Translator	Office of Director (Tech&PR)
2	Dheerendra Kumar Sharma	Assistant Section Officer	Office of EC-VIII
3	Virendra Kumar	Motor Lorry Driver	Office of DG CPWD
4	Satyaveer Bagri	Multi-Tasking Staff	Office of SE (TAS) CSQ (Civil)

सत्यमेव जयते

Central Public Works Department

Celebrating 169th CPWD DAY

12 JULY, 2023



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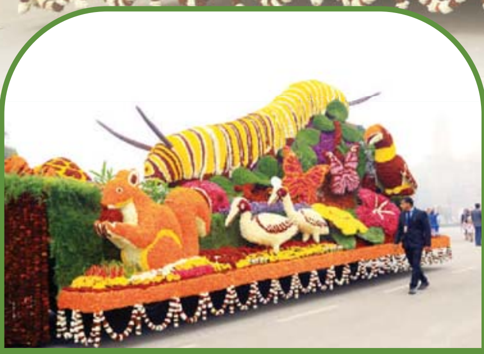

The colourful floral tableau of CPWD based on the theme 'Biodiversity Conservation' showcased during the Republic Day Parade at Kartavya Path, New Delhi occasion won the special prize for the 17th consecutive time. The tableau crafted with variety of colourful and fragrant natural flowers highlighting the relevance of creating awareness for the protection and growth of Nation's biodiversity was appreciated by all.

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