सत्यमेव जयते

स्वच्छ भारत
एक कदम स्वच्छता की ओर

Nirman Bharati
Central Public Works Department

निर्माण भारती
केन्द्रीय लोक निर्माण विभाग

Celebrating

166th CPWD DAY

July 12, 2020

CPWD : STRIVING FOR INDIGENOUS ENGINEERING SOLUTIONS FOR A SELF RELIANT INDIA

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 is extracted below:

"...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 come 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 Bangal, namely Rs.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.

हरदीप एस पुरी
HARDEEP S PURI

आवासन और शहरी कार्य राज्य मंत्री (स्वतंत्र प्रभार)
नागर विमानन राज्य मंत्री (स्वतंत्र प्रभार)
वाणिज्य एवं उद्योग राज्य मंत्री
भारत सरकार
Minister of State (I/C), Housing & Urban Affairs
Minister of State (I/C), Civil Aviation
Minister of State, Commerce & Industry
Government of India

MESSAGE

I would like to congratulate the Central Public Works Department on its 166th Annual Day being celebrated on 12 July, 2020. On this occasion, CPWD is publishing a special issue of '**Nirman Bharti**' highlighting the activities and achievements of the Department.

Since its formation in July 1854, CPWD has played a crucial role by constructing infrastructure essential to the growth of the country. Today, CPWD has dedicated itself to inculcating new construction technologies making green and sustainable infrastructure accessible to all.

I am happy to know that CPWD in consonance with reforms under the Atmanirbhar Bharat Abhiyan recently announced by Hon'ble Prime Minister, has chosen the theme '**CPWD –Striving for Indigenous Engineering Solutions for a Self Reliant India**' for this year's Annual Day Celebrations.

Taking this opportunity I urge everyone at CPWD to take cognizance of these new developments and to adapt with skill, speed and efficiency. Your contribution is essential for India's success in achieving self sufficiency as well as expertise to share nationally.

I once again wish all success to the CPWD family on the occasion of its 166th Annual Day.

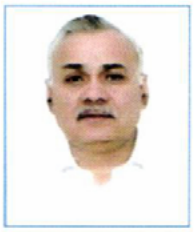
(Hardeep S Puri)

New Delhi
24 June 2020

DURGA SHANKER MISHRA

सत्यमेव जयते

SECRETARY
MINISTRY OF HOUSING AND URBAN AFFAIRS
GOVERNMENT OF INDIA



MESSAGE

On the occasion of 166th Annual day of Central Public Works Department, I convey my warm greetings and best wishes to entire CPWD family. It is encouraging to learn that on this occasion, a special issue '**Nirman Bharti**' highlighting the activities and achievements of the Department is being brought out by CPWD.

I am happy to note that CPWD is performing very well in all spheres of its activities and transforming expectations of its large clientele with regard to their built requirements into a tangible reality, well within time, quality and fiscal prudence.

I welcome the move of the CPWD in taking up the theme of **'CPWD – Striving for Indigenous Engineering Solutions for a self-reliant India'** for this year's Annual Day Celebrations. CPWD must focus on use of local materials and architecture in most efficient manner in its works.

It is a matter of satisfaction that over the years, CPWD has constructed breath-taking buildings and infrastructure projects all over the country. CPWD has also made sincere efforts in constructing Green Buildings over the last few years and its efforts in sustainable development and reducing the carbon footprint are indeed laudable.

I wish CPWD all success on the occasion of its 166th Annual Day and call upon all CPWD officers and staff to work with full commitment and dedication and take their Department to greater heights.

(DURGA SHANKER MISHRA)

Vinit Kumar Jayaswal
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 pride that our Department is completing 166th years of its glorious service to the Nation on 12th July 2020. On this auspicious occasion, I convey my best wishes to you. It is apt that we rejoice our industrious and progressive journey of achievements and success together on this auspicious Day.

I also extend our heartiest thanks and gratitude to our large esteemed clientele for reposing their faith in us. We assure that CPWD shall continue to provide the requisite engineering services to them to their best satisfaction.

This year we have chosen **'CPWD –Striving for Indigenous Engineering Solutions for a self-reliant India'** as the theme for our Annual Day Celebrations. We will focus on exploration and maximum use of locally available materials, local architecture, native green and clean technologies in our construction activities.

I am happy to note that the Department is bringing out **'Nirman Bharti'** on the occasion of this 166th Annual Day. I congratulate Shri K S Gaur, Director (Tech & PR) and Smt Mitali Saikia, Architect (Tech&PR), CPWD for bringing out this publication, covering the activities and achievements of the Department in a very lucid manner.

Once again, I convey my best wishes to all on 166th Annual Day of the Department.

(V K Jayaswal)

CONTENTS

IMPORTANT EVENTS

Hon'ble President of India

SHRI RAM NATH KOVIND

inaugurates additional building complex of Supreme Court of India, New Delhi in the gracious presence of Shri Justice Ranjan Gogoi, Hon'ble Chief Justice of India on July 17, 2019.

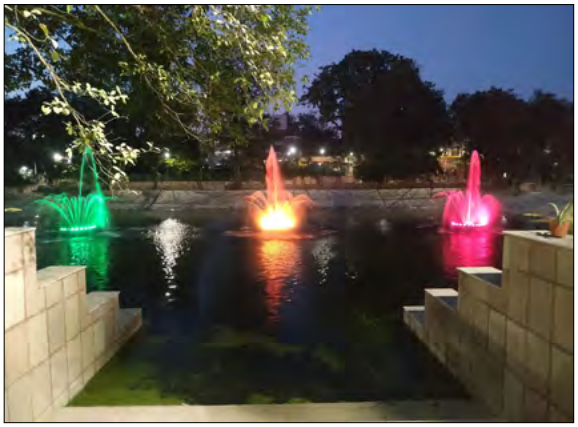
Hon'ble President of India, lays the foundation stone of administrative building at AIIMS Jodhpur on December 7, 2019.

Hon'ble Prime Minster of India dedicates dynamic façade lighting of Parliament House Complex to the nation on August 13, 2019.

Hon'ble Prime Minister of India inaugurates newly constructed duplex flats for Hon'ble Members of Parliament in North Avenue, New Delhi on August 19, 2019.

Hon'ble Prime Minister of India dedicates state-of-the-art dynamic architectural Illumination with synchronized light and sound system of Rabindra Setu (Howrah Bridge) Kolkata to the nation on January 11,2020.

Hon'ble Prime Minister of India inaugurates six state of the art iconic projects - Centenary 430 bedded Super Speciality Hospital, Psychiatric Hospital, Vedic Vigyan Kendra, Bharat Adhyayan Kendra, residential flats for Tata Memorial Trust and Rejuvenated Mandakini Kund at Varanasi on February 16, 2020.



Shri Amit Shah, Hon'ble Union Home Minister, lays the foundation stone of CRPF Head Quarter Building at CGO Complex, Lodhi Road, New Delhi on December 29, 2019.

Shri Amit Shah, Hon'ble Union Home Minister, dedicates the Fire Service College, Nagpur to the nation on January 2, 2020 .

Shri Amit Shah, Hon'ble Union Home Minister, inaugurates Regional Hub for NSG at Rajarhat, Kolkata on March, 1, 2020.

Dr. Harsh Vardhan, Hon'ble Union Minister of Heath and Family Welfare, lays the foundation stone of administration and academic building for International Institute of Population Science at Deonar, Mumbai on February 22, 2020.

Shri Amit Shah, Hon'ble Union Home Minister, inaugurates state-of-the-art dynamic façade lighting of Itanagar Secretariat Building on the occasion of Arunachal Day on February 20, 2020.

Shri Santosh Kumar Gangwar, Hon'ble Minister of Labour and Employment, lays the foundation stone of 100 bedded ESI Hospital at Kakinada, Andhra Pradesh on February 26, 2020.

100 bedded ESI Hospital, Kakinada, Andhra Pradesh

Dr. Ramesh Pokhriyal 'Nishank', Hon'ble Union Minister for MHRD, inaugurates Central Research Facility Lab, Shruti and Laya Apartments and also lays the foundation stone of CRF, COE Building, New Girls Hostel and New Boys Hostel at NITK Surathkal, Karnataka on February 25, 2020.

COE Building

48 Faculty Apartments, Type-V Block

Girls Hostel

48 Faculty Apartments , Type-VI Block

Proposed New Boys Hostel Building

Dr. Jitendra Singh, Hon'ble Minister of State (Independent Charge), Ministry of Personnel, Public Grievances and Pensions, performs bhoomi pujan ceremony for development of AIIMS Jammu campus on February 13, 2020 at project site Vijaypur, Jammu.

Shri Ramesh Pokhriyal 'Nishank', Hon'ble Minister for Human Resource Development, inaugurates IIT Tirupati Stage A1 (Transit) Campus at Tirupati on August 13, 2019.

Dr. Harsh Vardhan, Hon'ble Minister of Health and Family Welfare, lays the foundation stone for construction of Atal Bihari Vajpayee Institute of Medical Sciences and Super Speciality Block, Dr. Ram Manohar Lohia Hospital, New Delhi on August 16, 2019.

Shri Hardeep S Puri, Hon'ble Minister, Ministry of Housing and Urban Affairs, lays the foundation stone for Redevelopment of GPRA Colony at Kasturba Nagar, New Delhi on September 30, 2019.

Dr. Ramesh Pokhriyal 'Nishank', Hon'ble Minister of Human Resource Development, inaugurates 884 bedded girls hostel at NIT Jaipur on September 19, 2019.

Shri G Kishan Reddy, Hon'ble Minister of State, Ministry of Home Affairs inaugurates gymnasium building at NSG Manesar on July 29, 2019.

Shri Narendra Singh Tomar, Hon'ble Minister for Rural Development, Panchayati Raj, Agriculture and Farmers' Welfare, lays the foundation Stone of Grameen Vikas Bhawan, New Delhi on October 22, 2019.

Shri D V Sadananda Gowda, Hon'ble Minister of Chemicals and Fertilizer, inaugurates institution building of CIPET at Kochi on October 31, 2019.

Shri Narendra Singh Tomar, Hon'ble Minister for Rural Development, Panchayati Raj, Agriculture and Farmers' Welfare, lays the foundation stone of ASRB office building at IARI Pusa, New Delhi on November 04, 2019.

Prof. Ganeshi Lal Mathur, Hon'ble Governor of Odisha, inaugurates 'Innovation and Incubation Centre' building of Veer Surendra Sai University of Technology, Sambalpur, Odisha on November 30, 2019.

Shri Santosh Kumar Gangwar, Hon'ble Minister of Labour and Employment, inaugurates 100 bedded ESIC Hospital at Rudrapur, Uttarakhand on October 30, 2019.

Shri Narender Singh Tomar, Hon'ble Minister of Agriculture and Farmer Welfare, lays the foundation stone of 'Administrative cum lab Block' of IIMR at Ladhowal, Ludhiana on November 15, 2019.

Shri Conrad K Sangma, Hon'ble Chief Minister of Meghalaya, inaugurates Corona Care and Quarantine Facility Centre at IIM Campus, Shillong on May 7, 2020.

Shri Trivendra Singh Rawat, Hon'ble Chief Minister, Govt. of Uttarakhand, inaugurates dynamic façade lighting at Library and Shaheed Sthaal Mussoorie on November 15, 2019.

GLIMPSES OF COMPLETED PROJECTS

Administrative building for Himachal Pradesh Technical University at Hamirpur, Himachal Pradesh

Lady SOs Mess for CISF at Arrakonam, Tamil Nadu

Residential quarters for CISF at Ranchi, Jharkhand

E-Class room for National Institute of Technology at Hamirpur, Himachal Pradesh

Composite border out post at Dangipara, West Bengal

Teachers Learning Centre Building for IIT (BHU) at Varanasi, Uttar Pradesh

Remodelling and renovation of Transit Campus at IIM Jammu

Health Centre at IIT Indore, Madhya Pradesh

Girls hostel and faculty residential complex for IIT BHU at Varanasi, Uttar Pradesh

Administrative building for South Frontier at Kolkata, West Bengal

Kendriya Sadan at Jalandhar, Punjab

Head office building of Dredging Corporation of India at Visakhapatnam, Andhra Pradesh

Lecture hall complex and boys hostel at IIT Indore Campus, Madhya Pradesh

3 Storeyed Innovation cum incubation centre building for Veer Surendra Sai University of Technology at Sambalpur, Odisha.

EPFO at Salem, Tamil Nadu

500 bedded capacity boys hostel building for Osmania University at Hyderabad, Telangana

216 type-II, 2 type-III and 1 type-IV family quarters for RAF, CRPF, Jawaharnagar at Hakimpet, Hyderabad

Basic course training complex for SVP NPA at Hyderabad, Telangana

New indoor sports complex for SVP NPA at Hyderabad, Telangana

Combined administrative building and 120 men barrack for ITBP at Lucknow, Uttar Pradesh

22 type –V quarters for Indian Coast Guard at Visakhapatnam, Andhra Pradesh

Officers' mess for 46th Bn ITBP at Dalmau, Uttar Pradesh

Type-IV Quarters 46th Bn for ITBP at Dalmau, Raebareli, Uttar Pradesh

77 type- II family quarters for GC CRPF at Chandrayanguta, Hyderabad

575 bedded boys hostel and 150 bedded girls hostel at CIPET Institute of Plastic Technology, Ahmedabad

490 student capacity hostels at IIT Indore, Madhya Pradesh

Central Institute for Plastic Engineering and Technology at Cochin, Kerala

Girls hostel at
NIT Durgapur,
West Bengal

Climate chamber and animal house facilities for National Institute of Animal Nutrition and Physiology at Bengaluru, Karnataka

IISER administrative cum academic complex (Phase – II) at Kolkata, West Bengal

Boys Hostel for KU at Warangal, Telangana

720 men barrackat for 22 Bn ITBP at Tigri, New Delhi

180 men barrack for CRPF at Sambalpur, Odisha

50 bedded hospital for MCL at Basundhara, Odisha

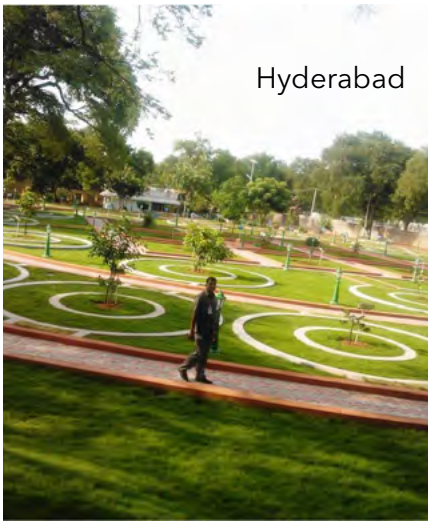
50 bedded hospital for MCL at Lakhanpur, Jammu

Type-V quarters for GC, CRPF at Sambalpur, Odisha

GLIMPSES OF HORTICULTURE WORKS

Additional building complex of Supreme Court of India, New Delhi

New Delhi



Hyderabad

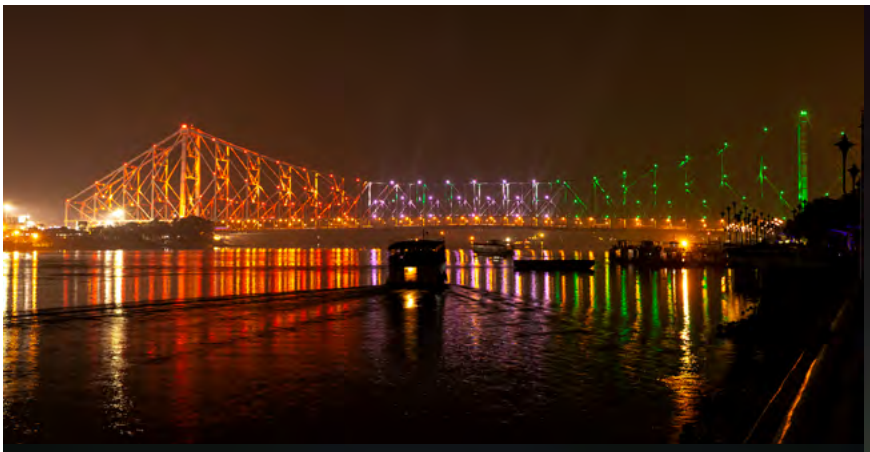
Hyderabad

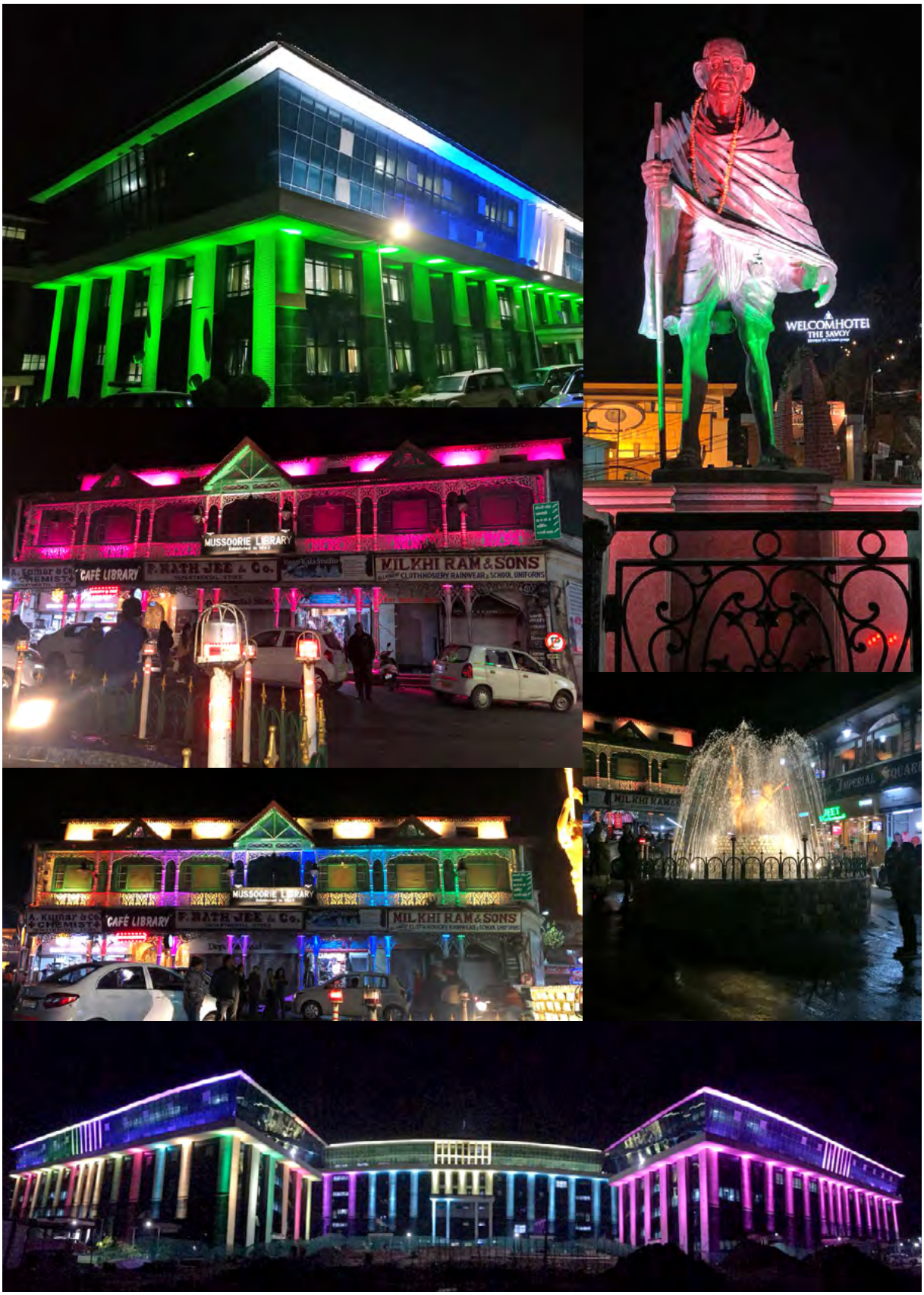
Hyderabad

Hyderabad

Hyderabad

DYNAMIC FAÇADE LIGHTING




WELCOMHOTEL
THE SAVOY
MUSSOORIE LIBRARY
CAFE LIBRARY
P. NATH JEE & Co.
MILKHI RAM & SONS
CLOTH HOSIERY RAINWEAR & SCHOOL UNIFORMS
MUSSOORIE LIBRARY
CAFE LIBRARY
P. NATH JEE & Co.
MILKHI RAM & SONS

GLIMPSES OF ONGOING PROJECTS

Administrative Building at IIT Indore, Madhya Pradesh

Construction of Zoological Park at Puthur, Thrissur, Kerala

Film and Television Institute at Itanagar, Arunachal Pradesh

Administrative, training cum hostel block for Canara Bank at Bengaluru, Karnataka

Type-II quarters for CISF at Bengaluru, Karnataka

Academic Block for Palamuru University, Telangana

Office cum laboratory complex of Geological Survey of India at Shillong, Meghalaya

Indian Institute of Management at Shillong, Meghalaya

New Hospital Block for STIMST at Thiruvananthapuram, Kerala

112 quarters for SVP NPA at Hyderabad, Telangana

93 type – III quarters for Indian Coast Guard at Visakhapatnam, Andhra Pradesh

AG Office at Bhubaneswar, Odisha

Aero Lab at IIT Kanpur, Uttar Pradesh

Research Park at IIT Bombay, Maharastra

Hostel building at IIT Bombay, Maharastra

Combined building of SINE, IRCC, IDC at IIT Bombay, Maharastra

78 type B quarter at IIT Bombay, Maharastra

938 family quarters for CRPF at Amethi, Uttar Pradesh

516 family quarters for CRPF at Siliguri, West Bengal

Library block at IIT Indore, Madhya Pradesh

Polytechnic College at MANUU, Hyderabad

PMCH building at Dhanbad, Jharkhand

286 family quarters for CISF at Ranchi, Jharkhand

SOME IMPORTANT NEW MoUs

MoU signed with IIM Lucknow for enhancement of infrastructure at IIM Lucknow campus in the presence of Chief Engineer, Lucknow Zone and Director, IIM Lucknow on August 6, 2019.

MoU signed with IIIT Ranchi on July 24, 2019 for construction of their new campus at Ranchi.

MoU signed with JIPMER Puducherry for the construction of another JIPMER campus at Sedarapet, Puducherry, costing approx Rs. 900 crore on August 14, 2019 in the presence of Shri Rakesh Aggarwal, Director, JIPMER and Shri Pramod Kumar Singh, Special Director General, Project Region, Chennai.

MoU signed with NIT Patna on August 14, 2019 for development of new NIT campus at Bihar by CPWD at a cost of Rs. 500 crore.

MoU signed with IIT, BHU for execution of new works at IIT, BHU Varanasi costing over Rs. 100 crore on September 02, 2019 in the presence of Director IIT, BHU and CPM BHU Project CPWD.

MoU signed with TERI SAS for capacity building on sustainable development and exchange of knowledge on various aspects of research in related fields on September 24, 2019 in New Delhi.

MoU signed with Delhi University for execution of their works costing around Rs. 130 crore by Shri Shashikant ADG, Project Region, Delhi CPWD and Prof. J P Khurana, Pro-Vice Chancellor, Delhi University on September 27, 2019.

MoU signed with NIT Puducherry on March 20, 2020 for construction of NIT Puducherry Campus at Karaikal costing approx. Rs. 300 crore in the presence of Dr. Sankaranarayanasamy, Director, NIT Puducherry and Shri P K Singh, Special Director General, CPWD Project Region Chennai.

MoU signed with Deutsche Gesellschaftfür Internationale Zusammenarbeit (GIZ) Germany on December 12, 2019 in New Delhi in the presence of Shri Prabhakar Singh, Director General CPWD for mutual cooperation in the field of energy efficiency.

MoU signed with Dehradun Smart City limited for construction of green building project of DSCL Dehradun, costing around Rs. 180 crore on October 21, 2019.

MoU signed with Mahatma Gandhi National Council of Rural Education (MGNCRE) for construction of various buildings at Hyderabad on October 23, 2019.

MoU signed between CPWD and Indian Institute of Petroleum and Energy, for development of their permanent campus at Visakhapatnam on October 18, 2019

MoU signed with IIIT, Bhagalpur for development of infrastructure works at IIIT, Bhagalpur on November 14, 2019 in the presence of Shri S K Garg Special Director General, Project Region Kolkata, CPWD and Director IIIT, Bhagalpur.

MoU signed with Canara Bank for construction of their residential flats at Chennai in the presence of Shri K V Singh ADG Region Chennai, Shri D C Goel Chief Engineer Chennai, CPWD and senior officers of Canara Bank.

MoU signed between Centre for Science and Environment, New Delhi and National CPWD Academy, Ghaziabad on February 17, 2020 to initiate capacity building program on sustainability of built environment for the year 2020-21 in the presence of Shri Shashikant, ADG, Project Region Delhi, CPWD, Ms. Anumita Roy Chowdhury, Executive Director, CSE, Shri N K Bansal, Chief Engineer and other officers of CPWD and CSE at National CPWD Academy Ghaziabad.

GLIMPSES OF UPCOMING PROJECTS

Proposed 800 capacity students hostel at IIT Roorkee, Uttarakhand

Proposed office building for Videsh Bhavan at Madhapur, Hyderabad

Proposed 300 bedded hospital and teaching block at Nahan, Himachal Pradesh

Proposed office building for Income Tax at Jubille Hills, Hyderabad

Utkarsha Bhawan, research and academic building at NIT Durgapur, West Bengal

Proposed department building at IIT Palakkad, Kerala

Proposed 200 bed ward, new OPD block at existing ESIC hospital/ medical college campus at Sanath Nagar, Hyderabad

Animal house at JIPMER campus at Puducherry

Proposed OTM and CGOM building for Coast Guard at Puducherry

Proposed building for IIIT Kota, Rajasthan

Proposed 600 bedded boys hostel at MNIT, Jaipur

AICTE camp office, guest house and training academy at AICTE, Jaipur

'GOLDEN PEACOCK AWARD FOR CORPORATE ETHICS - 2019'

awarded to Central Public Works Department by the Institute of Directors, Golden Peacock Award Secretariat, New Delhi in recognition to the innovative ethics management, e-Governance initiatives and several reforms initiatives taken by CPWD.

Partner in PROGRESS AWARD 2019 by CIDC

Indian Buildings Congress Award 2019 for Excellence for IIM Trichy Permanent Campus, Trichy.

Indian Buildings Congress Award 2019 for Excellence for NISM Campus, Mumbai

Shri Puneet Kumar Vats, Director General, CPWD conferred upon **'EMINENT ENGINEERING PERSONALITY AWARD - 2020'** by the Institution of Engineers (India) for his distinguished services to the engineering profession during a function organised on March 4, 2020 in New Delhi on the occasion of 'World Engineering Day for Sustainable Development'.

प्रशस्ति–पत्र

नई दिल्ली में आयोजित गणतंत्र दिवस परेड 2020 में

केन्द्रीय लोक निर्माण विभाग

द्वारा प्रस्तुत कश्मीर से कन्याकुमारी

नामक झांकी को भारत सरकार के मंत्रालयों/विभागों की श्रेणी में विशेष पुरस्कार प्रदान किया जाता है।

Certificate

The tableau titled ...Kashmir to Kanyakumari.... presented by Central Public Works Department..... in the REPUBLIC DAY PARADE 2020 in New Delhi, is awarded the Special.....prize amongst Ministries/ Departments of Government of india.

New Delhi
Dated the 26th January 2020

Joint Secretary
Ministry of Defence

Manoj Parida, IAS

Adviser to the Administrator
Union Territory of Chandigarh

D.O. No. B/AA-2020/314

19th June, 2020

Dear Sh. Jaiswal,

Our Principal Secretary Health recently visited newly constructed hospital i.e. Nehru Hospital Extension Block in PGIMER Campus, Chandigarh. I also saw a 3D presentation of this Platinum rated hospital. I am writing this letter to place on record my appreciation for the excellent work done in this building, which is now functioning as Dedicated Covid Hospital. Because of the Central Cleaners provided in the air-conditioning system there has been no cross-infection in the hospital building and our health workers are safe. The hospital has the facilities of 5 star hotel and has been constructed at a very economical cost.

I would like to request you to depute your Superintending Engineer-cum-Project Director, Sh. Rajeev Kumar Sao to informally advise Chandigarh Administration regarding construction of new hospitals and renovation of the existing buildings. I once again extend my appreciation for the great work done by Central Public Works Department.

With warm regards

Yours sincerely,

(MANOJ PARIDA)

Sh. V.K. Jaiswal
Director General,
Central Public Works Department
Nirman Bhawan,
New Delhi

Golden Peacock Awards®
A Strategic Tool to Lead the Competition

CERTIFICATE

This is to certify that

Central Public Works Department
New Delhi

was adjudged the

WINNER

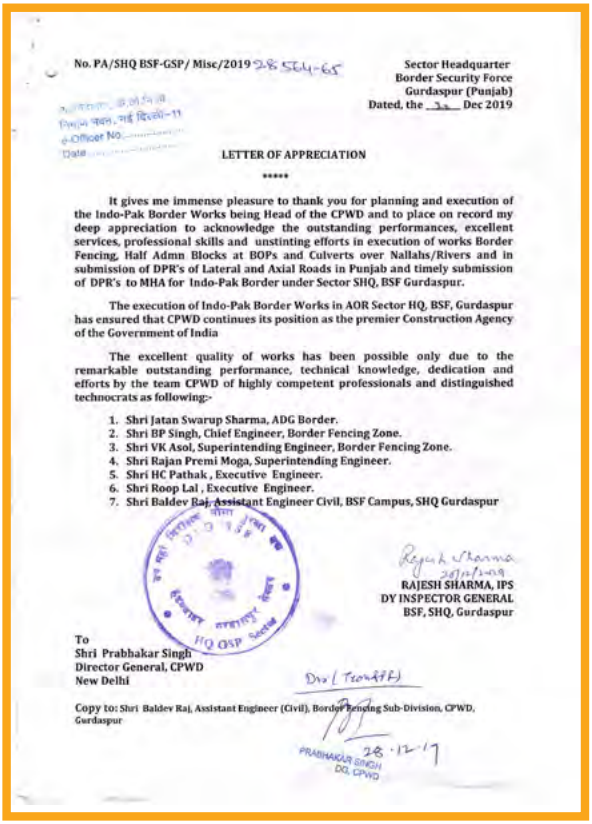
of

GOLDEN PEACOCK AWARD FOR
CORPORATE ETHICS
2019

given under the seal of Institute of Directors, India

IOD
January 16, 2020
Singapore
No: GPA/III/2019/CE/01

Justice (Dr.) Arijit Pasayat
Chairman, Golden Peacock Awards Jury
(former Judge, Supreme Court of India)



No. PA/SHQ BSF-GSP/ Misc/2019-28 564-65

Sector Headquarter
Border Security Force
Gurdaspur (Punjab)
Dated, the 3rd Dec 2019

निर्माण भवन, नई दिल्ली-11
e-Officer No.
Date

LETTER OF APPRECIATION

*****

It gives me immense pleasure to thank you for planning and execution of the Indo-Pak Border Works being Head of the CPWD and to place on record my deep appreciation to acknowledge the outstanding performances, excellent services, professional skills and unstinting efforts in execution of works Border Fencing, Half Admn Blocks at BOPs and Culverts over Nallahs/Rivers and in submission of DPR's of Lateral and Axial Roads in Punjab and timely submission of DPR's to MHA for Indo-Pak Border under Sector SHQ, BSF Gurdaspur.

The execution of Indo-Pak Border Works in AOR Sector HQ, BSF, Gurdaspur has ensured that CPWD continues its position as the premier Construction Agency of the Government of India

The excellent quality of works has been possible only due to the remarkable outstanding performance, technical knowledge, dedication and efforts by the team CPWD of highly competent professionals and distinguished technocrats as following:-

1. **Shri Jatan Swarup Sharma, ADG Border.**
2. **Shri BP Singh, Chief Engineer, Border Fencing Zone.**
3. **Shri VK Asol, Superintending Engineer, Border Fencing Zone.**
4. **Shri Rajan Premi Moga, Superintending Engineer.**
5. **Shri HC Pathak , Executive Engineer.**
6. **Shri Roop Lal , Executive Engineer.**
7. **Shri Baldev Raj, Assistant Engineer Civil, BSF Campus, SHQ Gurdaspur**

HQ GSP Sector

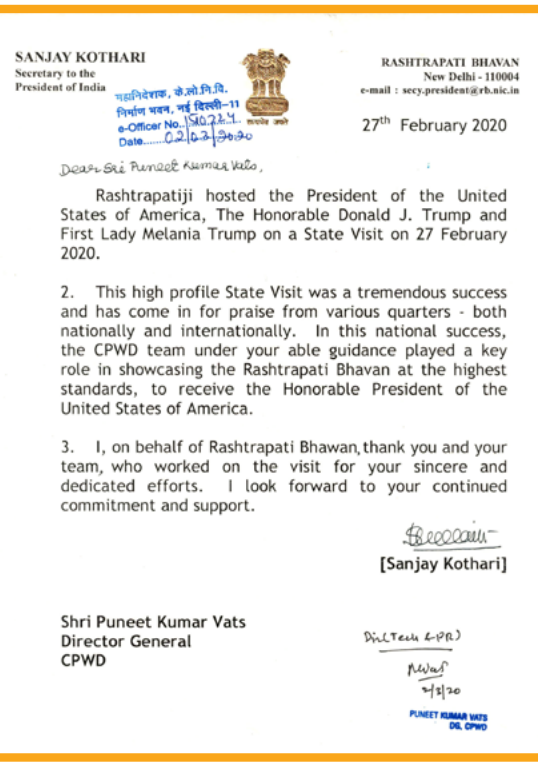
RAJESH SHARMA, IPS
DY INSPECTOR GENERAL
BSF, SHQ, Gurdaspur

To
Shri Prabhakar Singh
Director General, CPWD
New Delhi

Dir (Tech/AFD)

Copy to: Shri Baldev Raj, Assistant Engineer (Civil), Border Fencing Sub-Division, CPWD, Gurdaspur

28.12.17
PRABHAKAR SINGH
DG, CPWD



SANJAY KOTHARI
Secretary to the
President of India

महानिदेशक, के.लो.नि.वि.
निर्माण भवन, नई दिल्ली-11
e-Officer No. 1502224
Date 27/02/2020

RASHTRAPATI BHAVAN
New Delhi - 110004
e-mail : secy.president@rb.nic.in

27th February 2020

Dear Sri Puneet Kumar Vats,

Rashtrapatiji hosted the President of the United States of America, The Honorable Donald J. Trump and First Lady Melania Trump on a State Visit on 27 February 2020.

2. This high profile State Visit was a tremendous success and has come in for praise from various quarters - both nationally and internationally. In this national success, the CPWD team under your able guidance played a key role in showcasing the Rashtrapati Bhavan at the highest standards, to receive the Honorable President of the United States of America.

3. I, on behalf of Rashtrapati Bhawan, thank you and your team, who worked on the visit for your sincere and dedicated efforts. I look forward to your continued commitment and support.

[Sanjay Kothari]

Shri Puneet Kumar Vats
Director General
CPWD

Dir(Tech-CPR)
27/2/20
PUNEET KUMAR VATS
DG, CPWD

NEW e-GOVERNANCE INITIATIVES

1. **Launch of webpage on Construction Technology Year 2019-20**
   In view of the declaration by the Hon'ble Prime Minister of India, to commemorate the year 2019-20 as Construction Technology year, e-Gov unit developed in-house a webpage with facilities to upload the content (Image/Text) of recently held / upcoming seminars, exhibitions, sites visit, adoption of new technology in the upcoming projects, skilling of workers, technical publication and other construction activities carried out by CPWD.

2. **Online Hindrance Management System**
   An online module has been developed in-house for real time recording, tracking faster processing and overall transparent management of hindrance occurring in construction projects.

3. **Module for monitoring of Arbitration Case and Acceptance/Challenge of Award.**
   An online module has been developed in-house for monitoring/tracking the progress of post award progress of arbitration case and generating various types of reports.

4. **Online module for Contractor Enlistment**
   This module is underdevelopment for online enlistment of contractors. In this application, all process pertains to enlistment e.g. application for enlistment; depositing processing fee, enlistment processing etc. shall be done through online, in future.

5. **Online reporting module on resuming of construction activities**
   This module is developed on the requisition from DDG (works) unit for the purpose of monitoring of resumption of construction activities after the relaxation given by the Govt. to restart the construction activities, in lock down period.

6. **Module for Enlistment status of contractors**
   An online module has been created to display the information on CPWD website pertaining to contractors such as list of enlisted/ debarred contractors, date of enlistment/debarment, enlistment valid up to, class of enlistment, category of enlistment etc.

7. **Implementation of re-structuring in CPWD**
   Consequent to major restructuring in CPWD administrative structure, migration of employee's data in PIMS, projects data in WBPMS, re-distribution of territorial jurisdiction and service center data required to be updated in a possible shortest time.Accordingly, this unit revamped the PIMS & WBPMS modules, collected service centre and territorial jurisdiction data to accommodate requisite structural changes and delayering in the administrative hierarchy. About 14000 employees data in PIMS, 18500 of project in WBPMS, 800 of service center and 600 territorial jurisdiction details have been updated.

8. **Online reporting module for "Annual Workload Sheet for Field Officers and linkage with APAR"**
   An online module has been developed in-house for field officer to record the information pertaining to availability of budget, actual expenditure and surrender of budgets etc. for budgetary works, authorization and deposits works on quarterly basis. This annual work load sheet is linked to online APAR system.

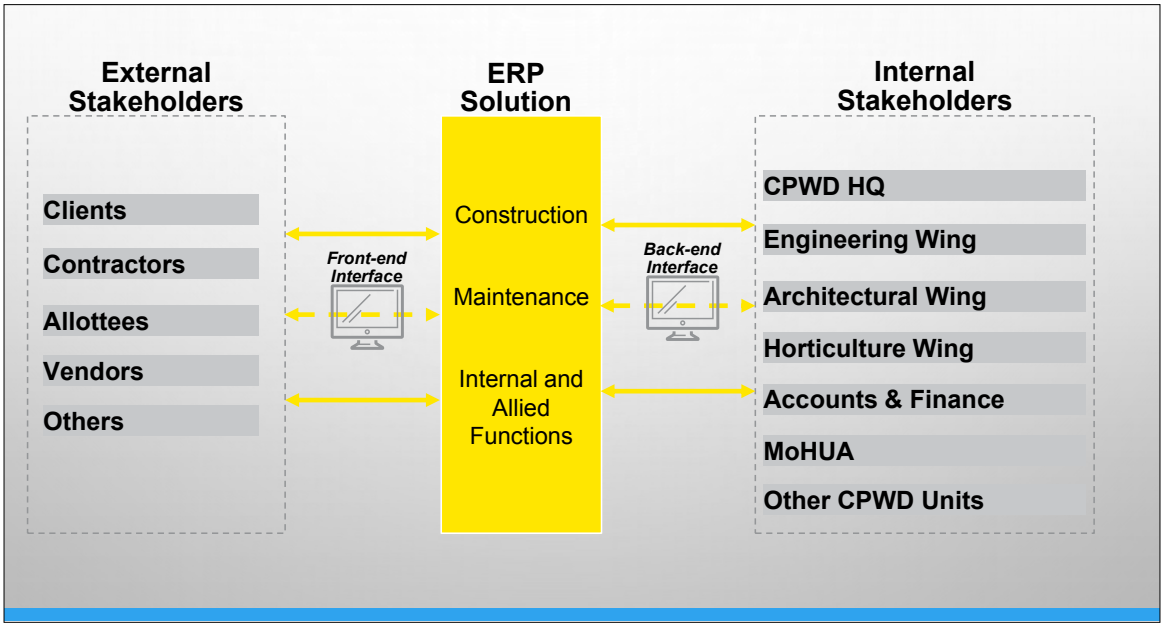
9. **Reflection of GeM utilization in APAR**
   As per DoPT guideline, GeM utilization reflection criteria have been incorporated in the APAR module from year 2019-20 onwards.

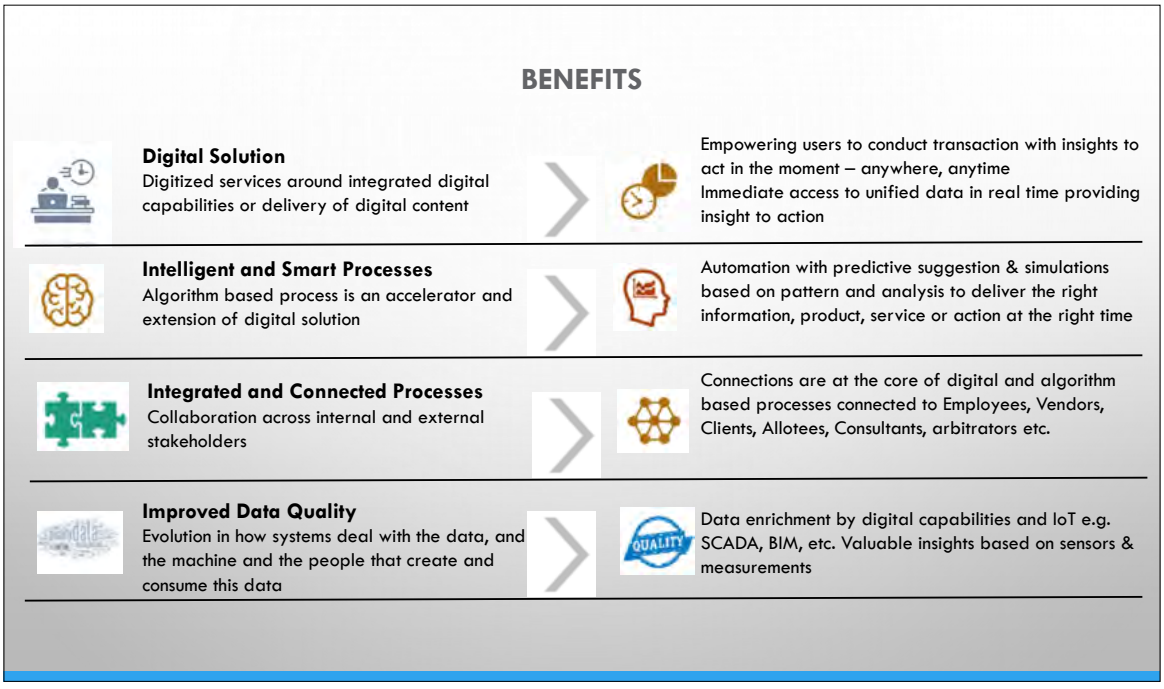
10. **Up gradation of CPWD sewa mobile application**
    A new CPWD sewa mobile application has been developed through NIC with upgraded features for both Andriod and IOS platforms. This new version of mobile application has facilities for monitoring by CPWD Officer (Dashboard with pendency status, service centre wise pendency, comments facility, uploading photos), for Resident (feedback for major complaints and photo uploading) etc. & shall be launched soon.

ENTERPRISE RESOURCE PLANNING INITIATIVES

Implementation of Enterprise Resource Planning (ERP) is going to revamp the functioning of the CPWD significantly by complete digitization of all activities in the department.

It is a modular software system designed to integrate all functional areas of CPWD's work processes and all its stakeholders into an unified system.





SUSTAINABLE DEVELOPMENT ACHIEVEMENTS

- Hon'ble Prime Minister declared year April 2019 – March 2020 as the 'Year of Construction Technology' in a bid to increase the use of modern technologies in the construction sector. CPWD took a leap in adoption of new technologies and introduced 49 new emerging and innovative technologies for its works.

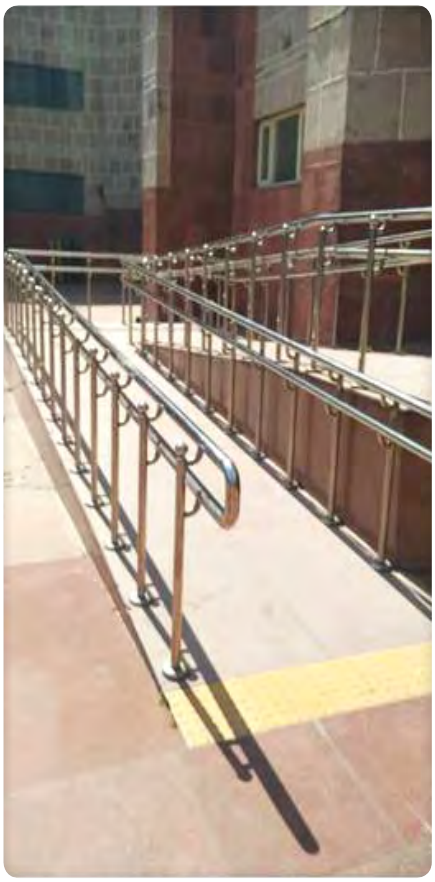
- CPWD started its own green rating system and all project exceeding 50 crore are being registered for in-house green rating. CPWD came out with its own Green Rating Manual.

- CPWD took firm initiatives for generation of renewable energy. Roof top solar PV plants have been made mandatory in all new projects of CPWD. Solar plants of capacity about 6.25 MWp have been installed in government buildings across the country.

- To address the problem of depleting ground water resources, CPWD made it mandatory to install rain water harvesting system and waste water recycling plant in all its major projects.CPWD has installed 650 rain water harvesting systems in different locations/ areas under its jurisdiction in the country.
- Towards greening, as a special drive, CPWD planted over 50,000 trees at various residential colonies and office complexes in Delhi and other places.

ACCESSIBLE INDIA ACHIEVEMENTS

- Under the 'Sugamya Bharat Mission' CPWD has undertaken the massive task of making public buildings accessible. 998 government buildings in the country has been fully accessible.



SKILL DEVELOPMENT ACHIEVEMENTS

- Skilling Mission has been taken by CPWD as a social responsibility for skilling of unskilled workers engaged at construction sites. Till now, thousands of unskilled construction workers have been skilled for increased output and quality by them.

OTHER KEY ACTIVITIES

Swachh Bharat Mission Activities:

- Under SBM, 92 sewage treatment plants have been installed in the existing GPOAs and GPRAs maintained by CPWD.
- For solid waste management, 79 solid waste convertors have been installed in existing GPRAs/GPOAs.
- CPWD initiated waste segregation at source at different locations in Delhi and outside.

CPWD brought out much awaited 'Training Policy' and 'Design Policy' of the Department for implementation in the Department. Implementation of comprehensive design policy will help the individual officers of all streams to gain enough expertize to undertake majority of the design works in-house. Enactment of training policy of the Department will ensure that the legacy of the training that has been in place in CPWD continues to improve and grow to match the pace the industry is growing in.

In pursuance to directives of PMO for providing hygienic living conditions to construction workers, CPWD develops standard modules for workers shelter at construction sites.

CPWD being a principal engineering organisation of Government of India was given the task of developing standard designs and specifications for construction worker's shelters at the construction sites by the PMO.

CPWD undertook above task in most diligent and professional manner and developed standard modules of the shelters, which were seen by the PMO. These designs and specifications of shelters have been circulated to all CPWD field units for erection at their work sites. These shelters, when provided at sites will facilitate the workers comfortable and habitable living conditions at sites.

Participation of CPWD in Events held in India

- A National Contractor's Conclave was held by CPWD on February 3, 2020 at Vigyan Bhawan, New Delhi. The conclave was inaugurated by Shri P K Vats DG, CPWD. Members of the Builders Association of India and CPWD Contractors Association and other agencies participated in the conclave.

- A seminar on 'Goodbye L1-A Route to Sustainable Development of Works' was organised by International Consultants and Technocrats Pvt. Ltd. on March 4, 2020 in New Delhi. First business session of the seminar on the topic 'L1- A need for Change' was chaired by Shri P K Vats, Director General, CPWD.

- Shri P S Chauhan, Additional Director General (HR), CPWD and Shri O P Tripathi, Chief Engineer, CPWD participated in the Economic Time Global Business Summit -2020 held on March 7, 2020 in New Delhi as the eminent speakers for the focused panel discussion titled Design - Build the next generation solutions to transform the built environment.

- A National Level Business Meet organized by CPWD on December 12, 2019 in New Delhi, in which Hon'ble Union Ministers, Secretary, Ministry of Housing and Urban Affairs, esteemed clients and senior officers of the Department participated.

- Shri Prabhakar Singh, DG, CPWD graced the valedictory session on September 11, 2019, in an International Conference on "Augmenting Nature by Green Affordable New Habitat" jointly organized by Bureau of Energy Efficiency, and Indo-German Energy Forum (IGEF) in New Delhi. DG, CPWD in his address emphasized the need for conservation of water, energy, implementation of ECBC norms in building sector and the initiatives taken by CPWD in these areas.

Seminars organised by CPWD

- A national seminar on 'High Rise Buildings' organized by CPWD on December 13, 2019 at Vigyan Bhawan, New Delhi as a part of nationwide awareness campaign during ongoing 'Construction Technology Year'. Seminar was inaugurated by Shri Durga Shanker Mishra, Secretary, Ministry of Housing and Urban Affairs.

- As a part of nationwide awareness campaign during ongoing 'Construction Technology Year', CPWD organised a day long national seminar on 'Emerging Trends in Public Architecture' on September 18, 2019 at Vigyan Bhawan, New Delhi. The event was inaugurated by Hon'ble Minister, Ministry of Housing and Urban Affairs in the gracious presence of Secretary, MoHUA and Director General, CPWD.

Annual flower show and garden competition 2020

- Two days annual flower show and garden competition organized on 22nd and 23rd February, 2020 at Mehrauli Nursery, New Delhi.

Condition Assessment of RC Buildings

Vinit K Jayaswal, Director General

1. Introduction

The assessment of structural condition of a distressed reinforced concrete building is necessary to determine whether it can be repaired or retrofitted or upgraded economically or not. Visual inspection of the structural members, non-destructive tests and laboratory tests on concrete samples are the usual methods to ascertain the condition and feasibility of economic repairs to the building.

2. Reasons for distress in a building

Distress in a building may be caused by one or more of the following reasons.

- Its foundation is not properly designed or constructed.
- Its superstructure is not properly designed or constructed.
- Lack of maintenance of the building.
- The building experienced loading conditions (such as earthquake or wind force) for which it was not designed.
- Corrosion of rebars due to aggressive environment.

3. Process for condition assessment

The process for condition assessment includes the following.

- To record the distress.
- To ascertain the causes of the distress.
- To estimate the adequacy of the system for the expected loads.
- To determine whether the building can be repaired or retrofitted or upgraded economically or it is better to demolish it and construct a new building.
- To plan the repair or retrofitting or strengthening of the building, if feasible.

4. Procedure for condition assessment

4.1 The condition assessment is generally carried out in the following two stages.

- Preliminary investigation
- Detailed investigation

4.2 Preliminary investigation

The preliminary investigation consists of

- Collection of architecture and structural drawings
- Collection of geo-technical investigation report
- Collection of specifications of materials used in the construction
- Details of repairs or retrofitting carried out earlier, if any
- Details of change in usage of the building
- Details of loading conditions experienced for which building was not designed
- Visual inspection and recording details of distress at site
- Non-destructive testing (NDT) of concrete.

4.3 If some of the information required for preliminary investigation is not available, detailed investigation is required.

4.4 Detailed investigation

The detailed investigation consists of

- Conducting geo-technical investigation
- Measuring dimensions of structural members
- Ascertaining properties of concrete, rebars and masonry by conducting NDT and laboratory tests.

5. Tests for assessment of quality and strength of reinforced concrete

Some of the commonly used tests are described below.

- Rebound hammer as per IS 13311: 1992
- Ultrasonic pulse velocity as per IS 13311: 1992
- Core testing as per IS 456: 2000 and IS 516: 1959
- Penetration resistance
- Carbonation depth
- Air permeability
- Porosity
- Electrical resistivity

5.1 Rebound hammer

The hammer strikes the surface of concrete, and rebound distance is given in R-values. Locations with low rebound numbers indicate weak surface concrete, and likely corrosion. The quality of concrete may be interpreted from Table-1.

Table 1: Average rebound number and quality of concrete

S. No.	Average rebound number	Quality of concrete
1	>40	Very good hard layer
2	30-40	Good layer
3	20-30	Fair
4	<20	Poor and delaminated

5.2 Ultrasonic pulse velocity

Pulse waves are induced in concrete and its time of arrival at the receiving surface is measured. The velocity is influenced by the density, elastic modulus and strength of concrete as indicated in Table 2.

Table 2: UPV value by cross-probing and quality of concrete

S. No.	UPV value in km/sec	Quality of concrete
1	>4.5	Excellent
2	3.5 – 4.5	Good
3	3.0 – 3.5	Medium
4	<3.0	Doubtful

5.3 Core testing

The core test provides direct measurement of the compressive strength and visual inspection of the interior of the concrete. After core testing, the samples can be used for laboratory tests for density, chemical analysis, etc.

5.4 Penetration resistance

A specially designed bolt is fired into concrete with the help of a standardized explosive cartridge, and its depth of penetration is measured.

5.5 Carbonation depth

Carbonation is the formation of calcium carbonate in concrete by chemical reactions. As carbon dioxide from the atmosphere enters concrete, it reacts with

calcium hydroxide present in the concrete and reduces its alkalinity, thereby de-passivating ferric oxide layer on the rebar, which in turn initiates the process of corrosion in the rebar.

To determine the depth of carbonation, concrete is exposed and sprayed with a pH indicator (solutions of 1% phenolphthalein in 70% ethyl alcohol). The region of carbonation is where the pH indicator turns into magenta.

5.6 Air permeability

It is widely accepted that the permeability of the cover concrete is the most relevant property for measuring the durability of concrete. It is measured using an instrument called torrent air permeability tester. It has a two chamber vacuum cell and a pressure regulator which ensures air flow at right angles to the surface and into the inner chamber. This permits the calculation of the permeability coefficient kT on the basis of a theoretical model. The quality of cover concrete can be determined with the help of following table.

Table 3: Air permeability and quality of cover concrete

S. No.	kT (10^{-16} m^2)	Quality of cover concrete
1	>10	Very bad
2	1.0-10	Bad
3	0.1-1.0	Normal
4	0.01-0.1	Good
5	<0.01	Very Good

5.7 Porosity of concrete

The porosity of concrete is evaluated by mercury intrusion porosimetry technique. The instrument employs a pressurized chamber to force mercury in a porous substrate. As pressure is applied, mercury fills the larger pores first. As pressure increases, the filling proceeds to smaller and smaller pores.

5.8 Electrical resistivity

The resistivity of concrete is a measure of corrosion susceptibility of concrete. The higher the concrete resistivity, the lower the current flowing between anodic and cathodic areas and therefore lower the corrosion risk. It is measured with the help of resistivity meter, which uses a probe with four terminals, two of which introduce current while the other two measure voltage. The relation between resistivity and risk of corrosion is given in the following table.

Table 4: Concrete resistivity and corrosion risk

S. No.	Resistivity in kΩcm	Risk of corrosion
1	<10	High
2	10 – 50	Moderate
3	50 – 100	Low
4	>100	Negligible

6. Corrosion of rebars

6.1 Location of rebars

The rebars may be located in concrete and the cover may be measured by using cover meters or pachometers, which work on the principle that steel affects the magnetic field of the probe.

6.2 Corrosion of rebars

The corrosion of reinforcement in concrete structure is a complex electromechanical process. The factors influencing corrosion are

- Cover thickness
- Quality of concrete in the cover region
- Environmental conditions
- pH value and chloride level in concrete

6.3 Some of the commonly used tests to determine the extent of corrosion in concrete are described below.

- pH value of concrete
- Half-cell potential
- Chloride concentration
- Depth of cover

6.4 pH value of concrete

The following table gives the correlation between corrosion of rebars and the pH value of concrete determined from core samples.

Table 3: Correlation between pH value and corrosion

S. No.	pH value from chemical analysis of concrete	Corrosion status
1	> 11.5 and very low chloride content	No corrosion
2	High pH value and high chloride contents, greater than 0.4%- 0.6% by weight of cement	Corrosion prone
3	Low pH value and high chloride content greater than 0.4% - 0.9% by weight of cement	Highly corrosion prone

6.5 Half-cell potential

The Half-Cell Potential measurement is based on the principle that corrosion, being an electro-chemical process, induces certain voltage in the reinforcement steel that is corroding. This method involves the estimation of electrical half cell potential of rebar to determine corrosion activity using reference electrode copper and copper sulphate half-cell. Criteria for deciding the status of corrosion according to ASTM C-876 is given in the following table.

Table 4: Half-cell potential and corrosion probability

S. No.	Potentials over an area	Corrosion probability
1	Less negative than -200 mV	>90% probability of no corrosion
2	-200 to -350 mV	Uncertain
3	More negative than -350 mV	> 90% probability of corrosion

6.6 Chloride concentration

Chloride content, sulphate content and pH value of reinforced concrete are determined from the powder samples prepared from extracted concrete cores. Corrosion of rebars due to chloride concrete is one of the most common reasons for deterioration of concrete structures. Chloride content is expressed in kg per cubic meter of concrete. It should be within the limits prescribed in Table-7 of IS 456: 2000. Sulphates are present in cement and aggregates. Excessive amount of water soluble sulphate can cause expansion of concrete. The sulphate content should not exceed 4% by mass of cement in the mix. The pH value of concrete should be above 12.5 to maintain alkaline environment around the rebar to prevent corrosion. A reduction in the pH value of concrete indicates loss of passive layer around the rebar.

6.7 Depth of cover

The concrete must have the minimum specified thickness to protect the rebars from fire and atmospheric action to prevent corrosion. The depth of concrete cover to rebars is measured using an electromagnetic cover meter at site on safe and accessible locations. The instrument is based on the magnetic technique and is calibrated for different purposes.

7. Repair method with polymer modified mortar

- Removing loose concrete: All the loose or honeycombed concrete in the RCC members shall be removed carefully by manual or low impact frequency hammer and the surface shall be cleaned by compressed air jet, completely removing loose carbonated concrete around the reinforcement.
- Cleaning of reinforcement: Loose scales shall be removed from corroded rebars giving totally rust free surface by manual methods like steel wire brush or sand blasting and using alkaline rust remover.
- Application of rust inhibitor: Anti corrosive treatment shall be applied on exposed rebars in two coats.
- Application of bond coat: To ensure bond between old and new concrete, structural grade two component epoxy bond coat shall be applied.
- Application of polymer modified mortar: The damaged area shall be repaired with 20mm thick polymer modified mortar using SBR latex. Polypropylene fibres may be added to reduce shrinkage. If the thickness of damaged concrete is more, second layer of mortar shall be applied next day, after the application of bond coat.

8. Other methods of repair

Other methods of structural repair include shotcrete, jacketing and application of CFRP. Shotcrete or guninting involves spraying a mix of mortar or concrete on the affected surface with the help of a spray gun. The mix typically has proportion of 1 cement: 3 coarse sand. Jacketing is the most commonly used method for strengthening of columns. It consists of placing concrete with additional longitudinal and transverse reinforcement bars around the existing columns. Carbon fibre reinforced polymer (CFRP) is used for strengthening of concrete members like beams and columns.

9. Conclusion

It may be seen that detailed visual inspection, non-destructive testing and chemical analysis of the concrete samples play very important role in condition assessment of distressed buildings. A great deal of expertise is also required to interpret the field observations and test results to make a proper assessment of the condition and evaluation of safety of the building.

10. Acknowledgment

This article is not an original work. It is based on the information contained in 'Guide for Condition Assessment of Buildings for Repair and Upgrading' prepared by Professor Anand S Arya and Ankush Agarwal. The author gratefully acknowledges the same.

Common Trees, Uncommon Benefits

Vinit K Jayaswal, Director General

1. Introduction

Since the dawn of civilization, trees have provided us two basic necessities of life: food and oxygen. They continue to provide additional necessities such as home, furniture, medicine and equipment as our requirement increases. Thus, trees are an important part of our life. They contribute to environment by releasing oxygen, improving air quality, preventing soil erosion, conserving water and controlling climate by mitigating the effects of the sun, rain and wind. Trees can also help achieve energy efficiency as tree-shaded spaces need less energy for cooling.

Thus, trees are essential to sustain life. In addition, some trees provide immense health benefits. According to an estimate by the World Health Organization, about 80% of the world population relies on herbal medicines for its health care needs. The health benefits of some common native trees are described here.

2. Drumstick

The drumstick tree or Moringa olifera of the family Moringaceaeis native to India, and is often called miracle tree due to its medicinal properties. It contains many healthy compounds such as vitamin A, B1, B2, B3, B6, C, calcium, potassium, iron, magnesium, phosphorous, zinc, and is extremely low in fats.

Moringa reduces high blood pressure, improves eye health, protects against kidney disorders, reduces the severity of asthma attacks, prevents diabetes, and protects the cardiovascular system. The moringa leaves may either be consumed in natural form or in powder form or may be incorporated in the diet as soup, paste, etc.

3. Amla

The word amla has been derived from Sanskrit word 'amlaki' meaning nectar of life. The botanical name of amla tree is Phyllanthus emblica, and it belongs to the family Phyllanthaceae. Its fruit, also called amla or Indian gooseberry, is a powerhouse of nutrients, and often referred to assuper food. The translucent green fruit can be eaten raw, though drinking fresh juice is the best way to reap its benefits.

The antibacterial and astringent properties of amla boost the immune system. Its anti-inflammatory properties relieve arthritis related joint pain or other pains. It is loaded with chromium which aids in reducing bad cholesterol and also helps stimulate insulin production, thereby reducing the blood glucose levels. Amla also improves skin, beautifies hair and improves eyesight.

4. Neem

The neem tree is native to India. Its botanical name is Azadirachtaindica and it belongs to Meliaceae family. Its bark, leaves and seeds are used to make medicine. It contains chemicals that help reduce blood sugar levels, heal ulcers in the digestive tract, prevent pregnancy, kill bacteria, and prevent plaque formation in the teeth. Crushed neem leaves may be taken with a glass of water to increase immunity.

A paste of neem leaves combined with turmeric can be used to treat itching, eczema, ring worms and some mild skin diseases. Neem flowers can be used to treat anorexia, nausea, belching and intestinal worms. Neem oil extracted from seeds is rich in medicinal properties and essential ingredient of many cosmetics.

5. Peepal

The peepal tree is native to the Indian subcontinent. Its botanical name is Ficus religiosa and it belongs to Moraceae family. It is a symbol of the never ending expanse of the universe and revered amongst the Hindus, Jains and Buddhists as the 'Tree of Life'. Unlike other trees, it releases oxygen even at night.

The bark and its ripe fruits are helpful for treating asthma. The bark can also be used for preparing tea, which is helpful in treating itching and eczema. Drinking an infusion prepared from leaves can treat heart related issues. About 2 gm of seed taken with honey purifies the blood. Eating ripe fruits is helpful in treating poor appetite and burning sensation in the stomach.

6. Teak

Teak is a native of Asia. The word 'teak' is derived from Tamil 'tekku' meaning full or replete. It is botanically known as Tectonagrandis Linn and belongs to the family of Lamiaceae. It is a large deciduous tree that grows about 30m tall. Teak is very popular for its timber due to its durability, resistance to weathering, strength and texture.

Studies reveal that teak contains antiasthmatic, anti-oxidizing, anti-diabetic, anti-microbial, anti-ulcerogenic and anti-inflammatory properties. Thus, extracts from all parts of the tree are useful for preventing and treating asthma attacks (bark extract), for inhibiting the deleterious effects of free radicals (leaves extract), for cure of diabetes (bark extract), for destroying microbes (bark, leaves and fruits extract), for treatment of gastrointestinal disorders (decocted wood), and for reducing the inflammation of the skin (decocted leaves).

Hence, teak is useful not only for high quality timber for building construction and furniture, but also for its medicinal properties.

7. Deodar

Deodar is found in outer Himalayas at altitudes ranging from 1800m to 3000m. Its botanical name is Cedrusdeodara, and it belongs to Pinaceae family. Its wood is moderately hard, durable, aromatic and fine grained. When properly seasoned, it is also resistant to termites. Deodar timber is used for manufacturing furniture, frames and shutter of doors and windows, and for building construction.

Deodar has many medicinal uses. A decoction of the wood is used in the treatment of pulmonary and urinary disorders, rheumatism, piles, kidney stones, insomnia, diabetes, etc. The resin obtained from the wood is useful in the treatment of skin diseases and wounds.

8. Mango

Mango originated in India, and is widely cultivated in South Asian countries. Its fruit is very delicious and healthy, and is popularly called the king of fruits. Its botanical name is Mangiferaindica and it belongs to Anacardiaceae family. The fruit is rich in carbohydrates, and vitamin B, C, E and K. The wood obtained from mango tree is hard, heavy, and strong. Although not very durable, it is used in building construction and furniture due to its low price.

The various parts of the tree have anti-oxidant, anti-diabetic, anti-diarrheal, anti-inflammatory and anti-microbial properties. Anti-oxidants present in the fruit prevent leukemia, colon, prostate and breast cancers, and lower cholesterol levels. Consuming decoction of mango leaves in the morning helps in management of diabetes. Roasted kernel taken with lemon and black salt is remedy for diarrhea. Consuming boiled pulp of raw green mango helps prevent sun stroke and dehydration.

9. Coconut

The coconut tree grows mostly in the tropics, and is one of the most versatile trees since every part has a use. Cocos nucifera is a member of the palm tree family called Arecaceae. It is often called the tree of life – it provides food, milk, oil, fuel, coir, husk, shell, and timber. The timber is used to make houses, small bridges, light furniture, boats and canoes. Leaves are used as roofing materials and for storage of rice. The coconut shell and husk are used for making handicraft items and musical instruments.

The tender coconut water is a good source of sugar, fiber, anti-oxidants, proteins, vitamins and minerals, making it a popular drink. The coconut oil is a natural skin softener and moisturizer. It reduces joint pain and inflammatory conditions as in arthritis. The coconut oil contains saturated fats which help prevent high blood pressure and cardiovascular disease.

Cryogenics of Concrete

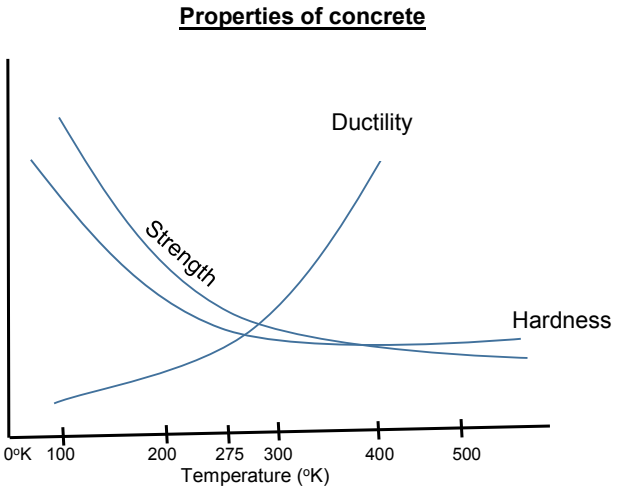
Manoj Kumar, Director , P&WA

Introduction

Study of material properties at low temperature (-160 degree C) knows as cryogenics. Cryogenics is useful for industrial sector in dealing with storage of liquefied gases at low temperature.In building construction it useful in planning of structures located near polar region or at high altitude above or around snow lines. So far metals or their alloys are preferred material in field of cryogenics because of consistent properties.However cost aspect and chemical reactivity with respect to the service environment are major limitations in application of metals or their alloys. On other hand concrete being an inert material with respect to service environment taking lead with respect to metals.

Properties of concrete at Low temperature and Applications

Properties of concrete are dependent to temperature.Data base available through code of practice is usefulfor working around room temperature. But in case of working,around cryogenic range (-160 degree C or below) the temperature dependence of properties play important role in design. At low temperature Ductility of concrete decreases on other hand hardness, brittleness and strength increases significantly. At low temperatures ductility of structures sacrificed. Increased values of strength provide an advantage for selection of thinner sections thus helpful in reducing dead loads.



Indicative diagram showing variance in properties w.r.t. temperature

In case of constant service temperatures life of concrete doesn't negotiated but in case of cycles of freezing and thawing,life ofconcrete considerably reduces. Water available in pores of concrete converted intoice crystals causing expansion of pore size duringthawing andwater melt out leaving larger pores behind. These larger size pores hold more quantity of water and causes more expansion than to previouscycle. This cycle continue and concrete becomes porous unable to withstand design loads. To check this phenomenon it is important to reduce permeability of concrete cover, as the smaller size of pores comprises higher surface energy and capable to sustain the stress of expansion.

Thermal expansion coefficient of concrete varies with minerals of aggregate. Concretecomprises lime stone aggregates have lower thermal expansion coefficient in comparison to quartzite as aggregate. So the volumetric changes in plain concrete are less when lime stone aggregate are used. In case of RCC the concrete should have matching expansion coefficient with steel reinforcement in order to decrease thermal stress induced, so for RCC quartzite is a better option as aggregate. Performance of plain reinforcement barsare better in comparison deformed barsas ribs of reinforcement acts as source stress concentration points within material.

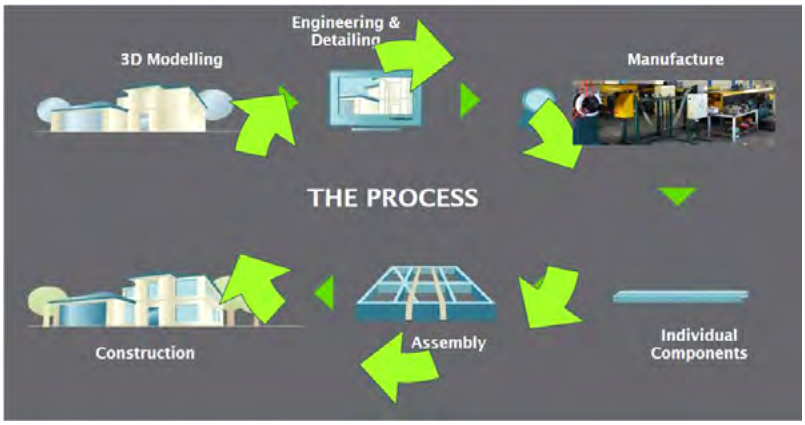
Solution to Rapid growth: Pre-Engineered Steel Buildings

Akhelesh Kumar, EE | Shieney Singhal, AEE

India is aspiring for $5 Trillion economy, which cannot be achieved without an inclusive growth in each and every sector. Construction industry has to play a vital role in it. The conventional methods of construction of buildings has been witnessing delayed completion more often than not. Longer wait for buildings not only causes cost overrun but loses its relevance too. Such uncertainties of delivery of projects adversely impact the economy and poses hardships for policy makers of the country. Indian construction sector needs a complete transformation where projects are completed at faster pace and so with high quality standards which are second to none on the globe. The advent of Pre-engineered Steel buildings can give an edge to civil engineering to handle the necessity of infrastructure demand to take the country in the bracket of developed countries.

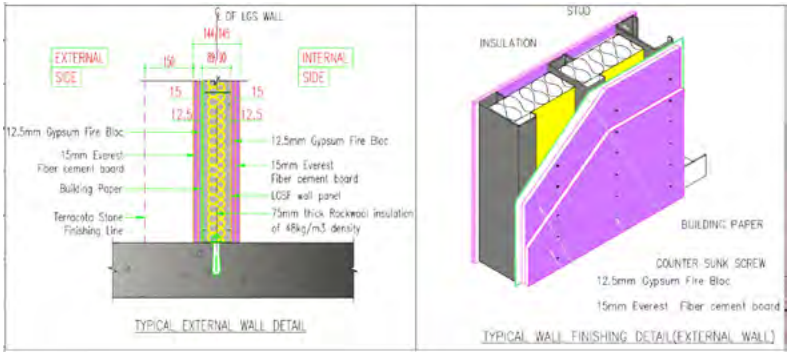
The most of the work of "Pre-Engineered steel buildings"(PEBs) is carried out off site. PEBs need accurate and detailed planning and designing, therefore, more time is spent on drawing boards rather than in execution. The fabrication of steel members is done in controlled environment with the latest technology in the factory. After that, these members are shipped to site in completely knocked down (CKD) condition; and all components are assembled and erected at site with nut-bolts, thereby reducing the time of completion. Thus, the impact due to construction on environment in and around site is minimum possible.

The foundation work is completed during the time while fabrication of steel structure is completed in the workshop away from the site. The construction process of Pre-Engineered Buildings is shown in the flow chart:



Structural System

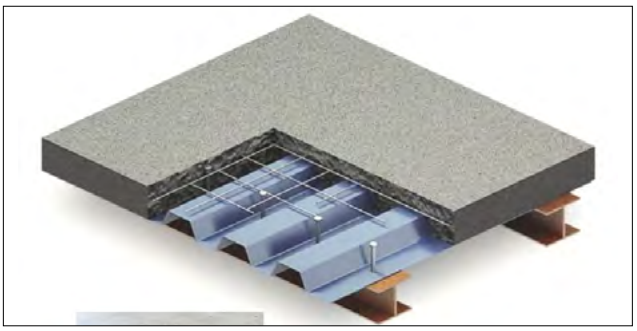
- Pre-engineered steel buildings use a combination of built-up sections, which provide the basic steel frame work.
- The wall panels are generally made with a frame of LGSF (Light Gauge Steel Frame) system and a drywall system consisting of cement and gypsum boards with added insulation. The concept is designed to provide a complete



building envelope system which is optimum in weight, cost and is also designed to fit user requirement.

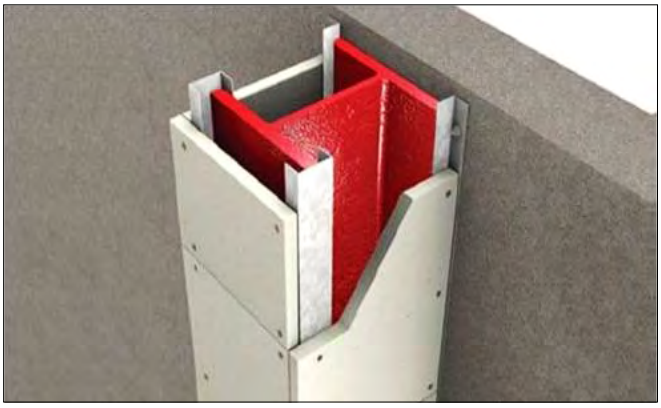
Composite Floor System

The floor system comprises of reinforced concrete slab laid over steel decking sheets. The decking sheets are connected to steel beams by studs. Besides steel beams, slabs are also connected to shear walls by providing the adequate reinforcement in the shear walls through the slabs.



Advantages:

- Reduces reinforcement by 50%
- Concrete volume reduction by 30%
- 2 hour fire rated tested metal deck
- Reduction in foundation load
- Ease of construction.
- Simultaneously other work can be carried out



Fireproofing

Given steel's lack of inherent fire resistivity, fireproofing material is often applied to exposed surfaces of structural steel in order to preserve and protect the structure. There are various systems that can be adopted for fireproofing of steel members like encasing of steel members in concrete which is a time consuming process. Fire intumescent paints are available which can give fire resistance of up to two hours.

Advantages of Pre-Engineered Buildings

- Pre-engineering building is on the average 30% lighter because of the efficient use of steel. Primary framing members are tapered built up section with the large depth in areas of higher stress.
- In this type of construction, the assembly of building or their components is done at a location other than the building site. The method controls construction costs economizing on time, wages and material.
- Plant casting allows increased efficiency, high quality control and greater control on finishes.
- The speed of construction increases since no curing period is necessary
- The use of prefabricated steel construction can significantly reduce the amount of construction waste generated on construction sites.
- Prefabricated units may include doors, stairs, window wall etc.

A challenge came up to CPWD to construct approximately 10 lakh sqft office space at two locations in the capital city for redevelopment of Central Vista. This office space with top class office features and furniture are to be handed over within eight months. The followings were the challenges:

- World class office infrastructure
- Elevations in tune of Lutyens zone
- No tree cut/transplantation
- Construction within 7-8 months
- Increased life cycle of building
- Minimum work at site, no inconvenience to neighborhood
- Least impact on surrounding environment

Floor Joist

Service holes in the wall for conduits etc.

Considering such tough task, it was decided to go for PEBs. In spite of pandemic, the planning and designing work could be completed during the lock down period and rest of the work has been resumed at site right after the opening of lock down because this type of construction does not require large number of skilled/un-skilled workers. The salient specifications of this building are:

- RCC foundation with increased life cycle
- All frames of E450 structural steel for linear sections and easy to handle
- Slabs of profile deck sheet resting over steel frames and filled with concrete
- Dry insulated walls with gypsum board interior finish
- Wooden floors in offices and granite in common areas
- Terracotta tiles as rain-skin walls enveloping the building for permanent look
- Modular furniture
- Automatic/semi-automatic parking to avoid basements
- Rainwater harvesting, roof top solar panels
- Gas based generators
- TV surveillance system
- All contemporary smart features required for offices

Though this is a beginning but no doubt, in future, CPWD may find its clients to go only such kind of office spaces which are aesthetically vibrant and delivered on time with least disruption at site.

ACTIVITIES OF 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 & D 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 & D 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 & D employees of CPWD with the object 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 & D 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 & D 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 being 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

AWARDS FOR BEST PERFORMERS AND BEST PROJECTS

REGION ACHIEVING HIGHEST WORK LOAD

Category	Region	Recipient of Award
Region performed best in generating workload during 2019-20	Delhi Region	ADG(RD)

BEST PROJECTS

ARCHITECTURE

Best Architectural Planning & Design

S. No.	Category	Unit	Name of building	Prize
1	Institutional	CA, PR Chennai	National Coral Reef and Research Institute at ZSI, Port Blair	1st
2	Institutional	ADG, PRDelhi	Proposed School of Open Learning for Delhi University at Dilshad Garden, New Delhi	2nd
3	Institutional	CA-II, PR Chennai	Proposed Medical College for JIPMER at Karaikkal Campus, Chennai	3rd
4	Office	ADG, Hyderabad	New state-of-the-Art Office Building for Income Tax building at Jubilee Hills, Hyderabad	1st
5	Office	CA-II, PR Chennai	Common Central Secretariat at Domlur, Bangalore	2nd
6	Office	SA, Central Vista Project	Steel Structure Non-Residential (GPOA) Building, Curzon Road Barracks campus at KG Marg, New Delhi	3rd
7	Others	SA, Mumbai	Proposed campus for IDEMI and MSME at Sion, Mumbai	1st

CIVIL

Best Completed Projects

S. No.	Category	Unit	Name of building	Prize
1	Residential	CE, NDPZ	Construction of "36 Nos. duplex houses for Hon'ble MPs at North Avenue, New Delhi	1st
2	Residential	ADG, Region Hyderabad	Construction of 144 Staff Quarters, 48 Officer Quarters for JNIBF Staff College at Gachibowli, Hyderabad	2nd
3	Office	CE, Bangalore	Construction of New Chemical Laboratory Complex for GSI, Bangalore	1st
4	Office	CE, Jaipur	Construction of Administrative Block for Rajasthan Sector Headquarter CRPF at Nayala, Jaipur	2nd
5	Institutional	ADG Project Region Delhi	Construction of Additional Office Building Complex for Supreme Court of India	1st

S. No.	Category	Unit	Name of building	Prize
6	Institutional	CE, Bangalore	Construction of Skill Development Centre and Hostel Blocks for Indian Institute of Sciences, Challakere, Karnataka	2nd
7	Institutional	ADG, Region Hyderabad	Construction of Academic Building at University PG College at Osmania University, Secunderabad, Telangana	3rd
8	Others	ADG, Region Bhopal	Construction of (Central Drug Standard Control Organization) Sub-Zonal Office and Central Drug Testing Laboratory at Indore	1st

Best Interior Completed Works

S. No.	Unit	Name of building	Prize
1	ADG, PR Delhi	Additional Office Building for Supreme Court of India, New Delhi	1st

ELECTRIAL

Best E&M Services

S. No.	Unit	Name of building	Prize
1	CE, Bangalore	NMTC for CMTI, Phase-2 Bangalore	1st

HORTICULTURE

Best Newly Developed Horticulture Campus/Lawn/Garden/Parks

S. No.	Unit	Name of work	Prize
1	Hort. Division II	Additional office complex for Supreme Court of India, New Delhi	1st

OTHERS

Best Region in Adoption of New Technologies Innovations and Advance Project Management Tools in its Works

S. No.	Unit	Name of Building	Prize
1	ADG, Project Region Delhi	Adoption of New Technologies under ADG, Region Delhi	1st

Best Service Centre

S. No.	Unit	Name of Building	Prize
1	CE, Jaipur	GPRA Service Centre, Sector-10, Vidyanagar, Jaipur	1st

Best Maintained Building

S. No.	Unit	Name of Building	Prize
1	CE, NDZ-I	Vayu Bhawan, New Delhi	1st

BEST PERFORMERS

(A) Officers Selected for Director General Medal

S. No.	Name of the Officer	Category	Post held
1.	Shri Manu Amitabh	Chief Engineer	Deputy Director General (ERP), New Delhi
2.	Shri Ajmer Singh	Superintending Engineer	Superintending Engineer, Supreme Court Project, New Delhi
3.	Shri Shashi Singh	Executive Engineer (Civil)	Executive Engineer, N-Division, New Delhi
4.	Shri Anwarul Haque	Architect	Architect, O/o CE, Jaipur

(B) Officers Selected For Commendation Certificates

S. No.	Name of the Officer	Category	Post Held
1.	Shri Dharmesh Chandra Goel	Chief Engineer	Chief Engineer, Chennai
2.	Shri Surendra Singh	Chief Engineer	Chief Engineer, Dehradun
3.	Shri Ashok Kumar Sharma	Chief Architect	Chief Architect, Project Region Delhi, New Delhi
4.	Shri Devendra Prakash	Superintending Engineer	Superintending Engineer, Shimla Circle, Shimla
5.	Shri Satyendra Prasad Gupta	Superintending Engineer	Director (ERP), O/o DDG (ERP), New Delhi
6.	Shri Neeraj Kumar Bansal	Superintending Engineer	Superintending Engineer, O/o ADG Region Chandigarh
7.	Shri Pradeep Kumar	Senior Architect	Senior Architect, O/o ADG Region Hyderabad
8.	Shri Ahijit Roy	Executive Engineer (Civil)	Executive Engineer, Border road project division-2, Chungthang
9.	Shri Rohit Meena	Executive Engineer (Civil)	Executive Engineer, Itanagar
10.	Shri Debashish Choudhary	Executive Engineer (Electrical)	Executive Engineer, New Delhi Project Zone, Delhi
11.	Smt M Jegathambiga	Executive Engineer (Electrical)	Executive Engineer, Karaikal, Chennai
12.	Smt K Saraswathi	Architect	Architect, O/o Chief Architect, Chennai
13.	Ms.Nayan Milind Zodape	Architect	Architect, O/o Chief Engineer, Nagpur
14.	Smt Swati Talwar	Assistant Architect	Assistant Architect, O/o ADG Central Vista Project, New Delhi
15.	Shri Ram Singh Bhawaria	Section Officer (Hort.)	Section Officer, O/o Horticulture Division-2, New Delhi

Five Year
VISION DOCUMENT
of CPWD

The Central Public Works Department being a Principal Engineering Organization and Technical Advisor to Government of India strives to position itself with global presence and to become the most coveted destination for the Central and State Governments and other Clients/Stakeholders.

The following key transformations are envisaged

- Adopt best construction practices and new technologies in construction and expand the Technical Advisory Role of the Department.
- Make presence of CPWD Engineers in various Ministries/Departments of Government of India for rendering technical advice and works management.
- Discharge regulatory functions for the construction sector on behalf of the Central Government.
- Create and maintain the built environment by attaining highest standards of sustainability, quality and clients satisfaction.
- Construct all buildings as green and barrier free.
- Implementation of the ERP in CPWD and complete digitization of all activities in CPWD.
- Establish a dedicated research, development and innovation center at National CPWD Academy.
- Establish Green Rating, Energy Rating and Heritage Conservation Cell in the Department.
- Comprehensive career development and HR up-gradation through global exposure to enable Engineers and Architects to imbibe state of the art construction and management practices.
- Periodic Updation of CPWD Works Manual, General Conditions of Contract, Delhi Schedule of Rates, Specifications and other publications of CPWD.
- Comprehensive outsourcing of maintenance to provide highest users satisfaction.

CPWD made excellent arrangements for **Republic Day Celebrations** at Rajpath, New Delhi on January 26, 2020.