


<p>अपर महानिदेशक (प्रशि. कम आर एंड डी) राष्ट्रीय सी. पी. डब्ल्यू. डी. अकादमी कमला नेहरू नगर, गाजियाबाद (उ.प्र.)-201002 टेलीफोन नं.: 0120-2718761</p>		<p>Additional Director General (Trg. cum R&D) National CPWD Academy Kamla Nehru Nagar Ghaziabad (U.P.)-201002 Telephone No. 0120-2718761</p>
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No. NCA/Design Niti/2019-20/ 39 (E)

Date : 28/10/2019

Office Memorandum

Subject : CPWD Design Policy Regarding.

CPWD Design Policy has been finalized by the Competent Authority and released by DG, CPWD on 23rd October 2019 at Nirman Bhawan, New Delhi and the same is uploaded herewith for information and guidance of all officials.

20/10/19
28/10/19

(Santosh Kumar)

Superintending Engineer (Trg.)-I

Copy to:

1. All officers of CPWD. (through CPWD website)

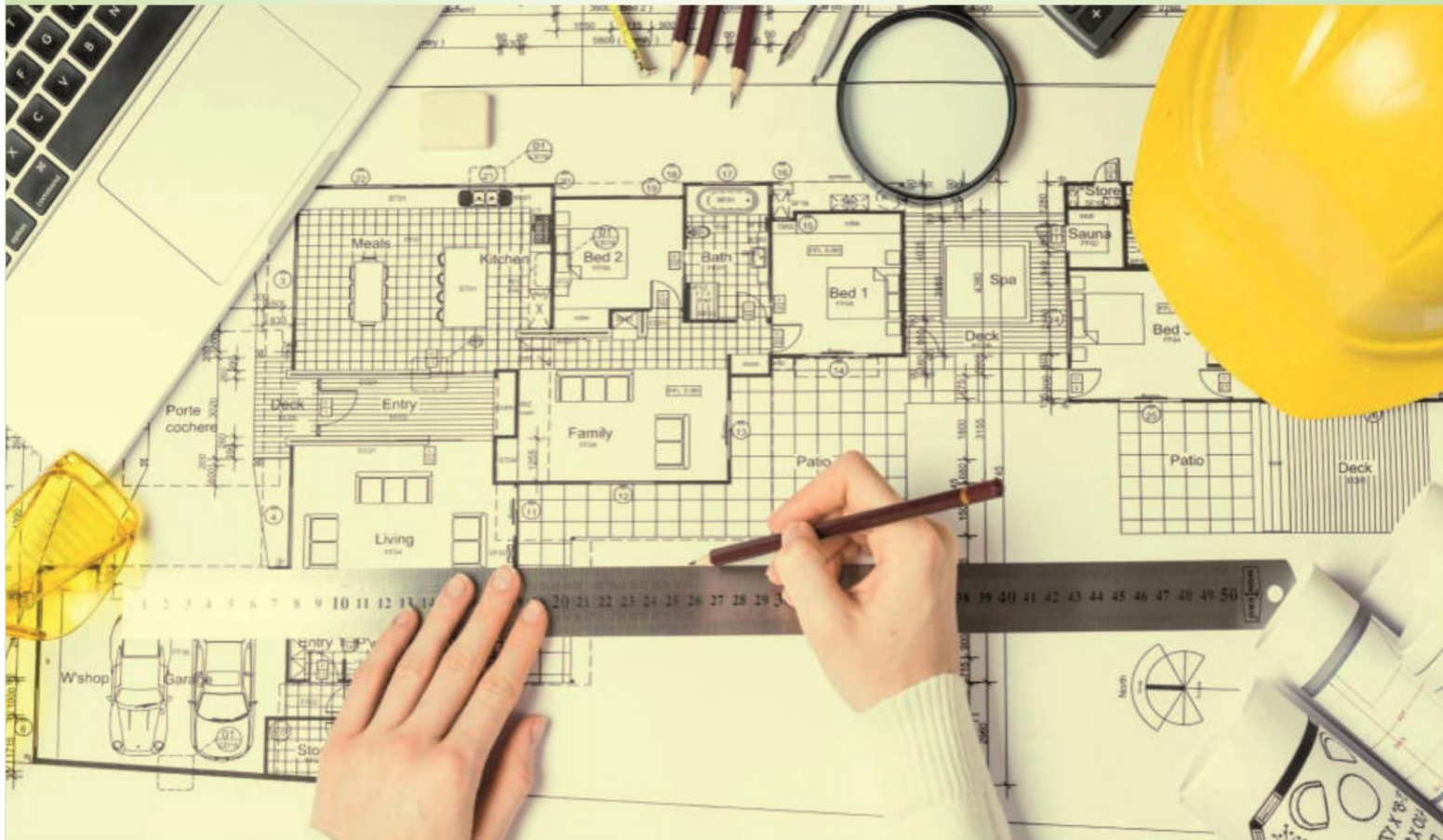
20/10/19
28/10/19

Superintending Engineer (Trg.)-I



design policy

OCTOBER, 2019



**DIRECTOR GENERAL
CENTRAL PUBLIC WORKS DEPARTMENT
NEW DELHI - 110001**





PRABHAKAR SINGH
Director General



भारत सरकार
Government of India



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FOREWARD

The Central Public Works Department is a Principle Engineering Organization and Technical Advisor to the Government of India. It is also the fore-runner in the repository of skills and knowledge in the construction field and in bench marking standards.

Since long, CPWD has had an expertise in design of all kinds of Public Works. To revamp the design capability & capacity building of the organization, it was felt that a comprehensive design policy must be brought out, accordingly a Committee headed by Shri M. K. Sharma, ADG (Research & Training) was constituted to formulate the Design Policy.

It gives me immense pleasure to note that Committee has formulated the Design Policy in a very lucid and comprehensive manner. I am confident that this Design Policy will help in strengthening individual design capability of all officers as well as in enhancing the organizational capacity of CPWD.

This Design Policy will also facilitate individual officers to be able to discharge their design related day to day work confidently and will also ensure that as an organization, CPWD has sufficient capacity to undertake majority of the design works in-house by the officers of all streams.

I wish to convey my deep appreciations to Shri M. K. Sharma, ADG (Research & Training) and the Members of the Design Formulation Committee - Shri D. K. Garg, CE(D&DM), Shri C. K. Varma, CE(CSQ) Elect., Shri Manu Amitabh, DDG(ERP), Shri Naimuddin, DDG(Pers), Shri Rajesh Khare, CE(HR-II), Shri Vimal Kumar, CE, NDZ-II, Shri Vivek Bansal, DDG(HR-I) and Smt. Indu G. Chaudhary, Chief Architect for their valuable contributions in formulation of the Design Policy. I also acknowledge the sincere efforts put in by Shri Manish Kumar, Director (S&D) and Shri Yashpal, Executive Engineer (S&D) in processing and finalization of the Policy in the Directorate.

I am sure that implementation of CPWD Design policy will help organization to retain its position of eminence and excellence in all aspects of built environment.

(Prabhakar Singh)



Sh. Anant Kumar
ADG (Tech)



सत्यमेव जयते

भारत सरकार
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PREFACE

CPWD being a premier government organization in respect of built habitat, has standardized various items of work like Schedule of Rates, General Conditions of Contract, Tender Documents, Works Manual, Maintenance Manual etc., which have become benchmarks in the construction industry and are followed as guidelines by the public and private entities.

However factors such as changing working environments, dismantling of planning and in house design offices at the zonal /circle levels and increased trend of outsourcing of Architectural and Structural Designs for the past few years have eroded the planning and design capacity of the department. Therefore to retain eminent position of the Department in all aspects of built habitat including planning & design work, the Design policy has been formulated. The design policy has two basic objectives:

- i) To enhance individual design capability of all officers
- ii) To enhance the organizational capacity of CPWD

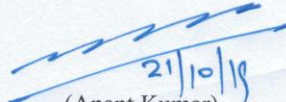
For enhancing individual design capability of all officers, it is proposed to impart suitable training in design at entry level posts at the time of foundation training for all streams. Such training will be limited to their domain specific work and a brief exposure to the role and requirements of other disciplines/streams and their contribution in the overall work flow of project. Training will be followed by examination which will be linked with the clearance of the probation period.

For enhancing the organisational capacity of CPWD, it is proposed to strengthen CDO by supplementary manpower from Architecture, E&M and Horticulture. It is also proposed to strengthen Regional Design Centres (RDCs), which are set up in the re-structuring of CPWD, by manning it with officers from all the disciplines. Well trained and experienced officers will be posted at these units along with fresh recruits. Selection of fresh recruits will be governed by qualification, past experience and performance in foundation training & examination.

Knowledge sharing and collaboration, digitization, training and creation of CPWD online knowledge bank are other initiatives proposed in the Design policy. Design policy also includes action points for its implementation.

I am sure the implementation of Design policy will retain the edge of Department from other Public works organizations as well as Private construction organizations.

Place : New Delhi
October' 2019


21/10/19
(Anant Kumar)
ADG (Tech.)

No. 1(2)/T&PR/2018
Government of India
Directorate General
Central Public Works Department
Technical & Public Relations Unit
Tel No. 23061897 Email: dirtech-pr.cpwd@nic.in

105-A, Nirman Bhawan,
New Delhi, Dated: **15.04.2019**

OFFICE MEMORANDUM

Sub: Regarding formulation of Design Policy for the Department.

It has been decided to formulate a Design Policy for the Department so that expertise of CPWD in undertaking all kind of designs related to Building Construction and Infrastructure Development could be revived at all levels.

2. A Committee under the Chairmanship of Sh. M. K. Sharma, ADG (Trg) with following members is accordingly constituted.

- (i) Sh. Manu Amitabh, DDG (ERP)
- (ii) Sh. C. K. Verma, CE(CSQ)(Elect)
- (iii) Sh. Naimuddin, DDG(Pers)
- (iv) Sh. Vivek Bansal, DDG(HQ)
- (v) Sh. D. K. Garg, CE(D&DM)

3. Above committee shall submit its recommendations / report to the Director General, CPWD within 30 days.

This issues with the approval of Director General, CPWD.

K. S. Gaur
15/4/2019
(K. S. Gaur)
Director (Tech&PR)

To (through CPWD website)

All above Officers.

No. 1(2)/T&PR/2018
Government of India
Directorate General
Central Public Works Department
Technical & Public Relations Unit

Tel No. 23061897 Email: dirtech-pr.cpwd@nic.in

105-A, Nirman Bhawan,
New Delhi, Dated: **18.04.2019**

OFFICE MEMORANDUM

Sub: Regarding formulation of Design Policy for the Department.

In continuation this Directorate OM of even No. dated 15.4.2019, it has been further decided to add following officers as the Members of the constituted Committee under the chairmanship of Sh. M. K. Sharma, ADG(Trg) for formulation of Design Policy for the Department.

- (i) Sh. Rajesh Khare, CE(HQ)
- (ii) Sh. Vimal Kumar, CE(NDZ-II)
- (iii) Smt. Indu G. Choudhary, DDG(eGov)

This issues with the approval of Director General, CPWD.


18/4/2019
(K. S. Gaur)
Director (Tech&PR)

To (through CPWD website)

All above Officers.

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Introduction

CPWD is a premier Public Works Organisation (PWO) of Government of India under Ministry of Housing & Urban Affairs and responsible for construction and maintenance of Govt. Works. It also acts as Technical Advisor to Govt. of India. Over a period of time it is felt that the technical edge particularly in designs has come down. In order to enhance the design capabilities, a committee was constituted under the chairmanship of ADG (Training & Research) to frame a design policy for CPWD vide Directorate OM issued vide no. 1(2)/T&PR/2018 dated 15.04.2019 and dated 18.04.2019.

The committee deliberated upon the historical design practices and evolution over a period of time. The experience of consultancy organisations of the public sector organisations was also studied. The design capabilities at individual officers as well as organisational level were also analysed. The committee submitted detailed report including recommendations on 17.05.2019 which was examined and approved at Directorate level. The salient features of the Design Policy of CPWD are as under:

1. The design capabilities are to be developed at individual officers level and organisational level. At individual level, officers are required to achieve basic design capabilities. At organisational level, Regional Design Centres (RDC) and Central Design Organisation (CDO) are proposed to be developed as Regional Design Hubs and Centre of Excellence respectively. The Central Design Organisation (CDO) is proposed to be strengthened to act as a integrated design unit and also as a consulting organisation to take up external works.
2. To enhance design capabilities by knowledge sharing and collaboration with eminent institutions, digitisation of existing design and drawings and creation of knowledge bank.
3. The modular training programmes and design skill enhancement of officers to be taken up in phased manner.
4. The posting and transfer policy for RDC and CDO to be aligned with the design objectives. Longer period of tenure are considered for RDC/CDO to facilitate expertise development in design domain.
5. Advisory Council has been setup for guidance and monitoring implementation of Design Policy.

Design Policy of CPWD

1.0 Background

CPWD enjoys the status of the premier government organization in various aspects of built habitats and technical matters. DG, CPWD is the Principal Technical Advisor to the Govt. of India.

The main reason for such an elite position is attributed to the origin of CPWD and the kind of work, it was entrusted with, during the pre independence as well as post independence era. For a considerable period, it had been the only central government organization engaged in execution of public works throughout India. The experience gained in executing public works of all kinds and size, spread across diverse geographical terrain and climatic conditions, culminated into standardization of design, best construction practices and work execution procedures laid down in the CPWD Specifications and Works Manual.

CPWD compendium of standard items for works i.e. Schedule of Rates, Design Manuals and Handbooks, detailed Specifications of various items, detailed Analysis of Rates, General Conditions of Contract, Tender documents, Maintenance Manual, Works Manual, CPWD Accounts Code etc. have gradually become benchmark in the construction industry and are being followed as guidelines by the public and private entities.

Changing working environment, change in government rules and regulations governing the execution of Public Works (GFR) etc. provided an opportunity to redefine our role in execution of Public Works adding PMC work as a new dimension.

Pressure to increase workload and to reduce response time from client departments and a shortage of skilled manpower led to outsourcing of almost all the activities right from the preparation of PE, DE, NIT, tender document, architectural drawings, structural designs and proof checking of structural design being done by private consultants leading to gradual dismantling of planning and in-house design offices at the Zonal /Circle levels, resulted in CPWD officers being deprived of the valuable experience in integrated planning and design which would have been otherwise gained.

Younger officers have now increasingly been found to be lacking in both the confidence and technical expertise required for taking decisions on even simple design issues faced by them on daily basis. This phenomenon has eroded both the quality of technical capability and stature of the department in its role as the Government's Principal Technical Advisor.

Many Govt. organizations like UP State Bridge Corporation, RITES, EIL, IRCON etc. having established expertise in specific fields are actively competing in open market for work. Hence, it is a fact that expertise builds a brand and is always in demand.

Therefore, the need of the hour is not only to develop the individual design capability of each of the CPWD officers to confidently handle day-to-day work, but also to revive and strengthen the role, capacity and capability of Regional Design Centers and the Central Design Organisation through regular enhancement of technical knowledge, design skills and expertise.

2.0 Objectives and its Achievement

2.1 The Design policy identifies the following two basic objectives –

- i. To enhance individual design capability of all officers.
- ii. To enhance the design capability of CPWD at organisational level by strengthening RDC and CDO to be manned by well trained and experienced officers.

2.2 Two essential benchmarks need to be set up to achieve the above objectives –

- i. All officers in each stream shall possess minimum essential technical knowledge of design.
- ii. Selected officers in each stream shall be mentored for higher qualification and experience in specific fields to man RDC/CDO.
- iii. CDO may be strengthened by addition of Architectural/Electrical & Mechanical/Horticulture officers. This unit shall be developed as centre of excellence at par with the best in the field. This centre will also be authorised to take up consultancy services for a fee.

3.0 History and Evolution of Design Practices

3.1 Architectural Units in CPWD had been undertaking design and drawing work since establishment of CPWD. Architectural Units headed by Senior Architects and Chief Architects with team of Architects, Deputy Architects, Asstt. Architects and support staff of Technical Officers and Asstt. (A.D.s) continue to handle the design and drawing work of various projects in-house.

3.2 The work of preparation of PE, DE, NIT, TS, processing and approval of tenders, structural design, E&M design and planning of bulk and internal services for a work was primarily handled in-house by the Civil and Electrical planning units under each zone. These units were headed by the Superintending Surveyor of Works (SSW (Civil/ Elect.)) with Surveyor of Works (SW) and Asstt. Surveyor of Works and support staff of JEs, Draughtsman and Chief Estimators.

The SSW units of Civil as well as E&M used to regularly interact and coordinate with the SA units to finalise the design related issues and specifications. The structural, electrical and services inputs were incorporated in submission drawings submitted for local body approval. Detailed estimates prepared by SSW units were vetted by SA units before finalisation of NIT. Final structural, E&M and services drawings were incorporated by SA unit before issue of working and construction drawings for execution. Senior Architects used to make regular site inspections to ensure that the execution work conforms to the drawings issued by them and also issued completion certificate.

3.3 After implementation of cadre review of CES and CE&MES in 1995-96, the SSW units were dismantled and SE(P&A) units under Zonal Chief Engineers were created. These units were equipped with the posts of EEs, AEs and JEs. However, the process continued for some time and with the times, the core work of designing was side-lined and the units were entrusted with more miscellaneous activities. After implementation of Cadre Review, the posts of SE(A)/SE(HQ) was combined with that of SE(P) and the practice of the outsourcing of structural design, Civil and E&M services design started in CPWD.

As on date most of the structural, E&M design work and services design is outsourced. Many a times, these outsourced design/ drawings are prepared after award of work and drawings are not timely shared with SA units, thus coordinated drawings incorporating structural, Civil and E&M inputs/services drawings are rarely issued. This practice is the main reason leading to confusion at site, creation of extra items and also affecting the project timelines and quality.

3.4 The Central Design Organization (CDO) was established as the apex structural design office in CPWD during 1970's. The objective was to create a specialized unit, manned by highly motivated and experienced team of structural engineers, ready to take all kind of challenges and handle structurally innovative and complex buildings and large projects. CDO had enjoyed its fair share of glory by handling numerous such projects which time and again proved its track record of excellent structural performance during various natural disasters.

3.5 Just like CDO was established to handle structural design of specialised buildings/ projects, the Central Planning & Design Organisation (CPDO) was established in CPWD in 1989 at Delhi. Regional PDOs were to be established under regional Chief Architects to take up special projects in the four regions. The objective was to handle architectural design of special projects in CPDO/ PDOs. CPDO was headed by Senior Architect and had the posts of Architects, Dy. Architects, Asstt. Architects and support staff. Well qualified and newly appointed Dy. Architects and Senior officers possessing higher qualification and specific experience were posted in CPDO. It started functioning under CA first and subsequently under ADG (Arch.). Many important works especially the institutes located in and around Delhi i.e. CPWD National Academy, NITHE, National Academy of Customs, Central Excise & Narcotics etc. were designed in CPDO and appreciated by Clients. Many projects were jointly handled by CPDO and CDO.

PDOs were not opened and CPDO functioned successfully till implementation of the cadre review of engineering services (CES and CE&MES) in 1995-96. Subsequently during the restructuring of Architectural units to match with the engineering units after their cadre review, the CPDO was renamed as SA XIII, a regular unit and started handling all kinds of building design works.

3.6 A specialised 'Repair and Rehabilitation (R&R) Unit' headed by SE was created in CDO after the 1996 cadre review to undertake technical investigation of distressed structures from all over India in and outside CPWD. This R&R unit functioned till 2005 and handled about 50-60 works from CPWD and outside such as Sri Lankan High Commission, New Delhi, IIT Delhi, Jamia Milia Islamia, PGI Chandigarh, Patel Chest Institute, Delhi University, JNU etc. The R&R Unit also undertook damage survey of CPWD buildings during Bhuj earthquake at Bhuj, Gandhi Dham, Kandla and Ahmedabad and published a report. A comprehensive 'Handbook of Repair and Rehabilitation of RCC Structure' was also prepared and published by this unit, which is one of its kind even today, comprising basic technical knowledge as well as items, specifications and tender conditions of RR works and product catalogue.

3.7 Consultancy Service Organisation (CSO) was also created after 1996 cadre review to undertake planning and design of any project and having the entire setup consisting of officers from Architecture, Civil and E&M streams (it was a part of CDO earlier). CSO handled Embassy and Parliament work in Afghanistan, Road work in Bihar under RSVY and design of river jetties in Ganga and Brahmaputra at various locations. The Unit was closed after cadre review of 2012-13.

4.0 Design Policy of CPWD

4.1 Enhancing Individual Design Capability

- (i) Taking into account the fact that the fresh intake of technical manpower happens at two levels (a) at JE & equivalent level posts (b) at Group 'A' level posts in all streams in CPWD, minimum essential knowledge shall be stipulated for all the entry level posts. Suitable training modules imparting knowledge in design limited to their domain specific works need to be developed and made part of the foundation training for both the entry level posts of all streams.

A brief exposure to the role and requirements of other disciplines/ streams and their contribution in the overall work flow of project may also be included. The duration of such exposure will be minimum of 6 months who will be attached to CDO/RDCs for carrying out actual design of the projects/works. At the end of such training, they will have to pass the required test and in case they do not pass it, their training will be extended for another three months till they pass the required examination. In case, they do not pass the examination in first attempt, their probation period shall be extended by one year and in case they further do not pass in subsequent examination(s), the probation period will be extended by one year of each failure in the examination.

- (ii) The exams shall be conducted at the end of foundation training. It shall be made mandatory to pass this examination with minimum 60% passing marks for clearance of probation period.
- (iii) As a policy, the fresh recruits at both levels shall preferably be posted in the Central and Regional Design Centres after finishing foundation training. Their selection shall be governed by qualification, past experiences (if any, in design) before joining CPWD and performance in foundation training and examination.
- (iv) Though remaining fresh recruits at both levels would be posted in different field units as per works requirements; it shall be ensured as a policy that they should preferably be engaged in planning and design work being undertaken in their offices before actually starting the site supervision work.
- (v) These officers should be encouraged to seek the guidance and help of RDCs & CDO by bringing their live projects to these offices to complete the basic design and detailing work. This process would help them to gain not only the requisite experience in their field but also expose them to design issues related to other disciplines.
- (vi) Special training shall be imparted to officers eligible for promotion to the next level (AE/ Dy. Ar./ AD(H) and EE/Ar./DD(H)) to provide them requisite knowledge of inter-disciplinary aspects. Successful clearance of exam after such training shall be mandatory for promotion to the next higher level.
- (vii) The above strategy would ultimately ensure that CPWD shall have sufficient capacity to undertake majority of the design work in-house by the officers of all streams posted in the various units (i.e. Field units, Regional Design Centres and Central Design Organisation).
- (viii) All AEE level entry officers shall have to complete posting of minimum 3 years in CDO or RDC before promotion as SE.
- (ix) All JE level entry officers shall have to complete posting of minimum 3 years in CDO or RDC before promotion as AE.
- (x) The design shall be done by each unit. For outsourcing the design, approval of CE/ADG for the works under them or SDG in case of projects under them shall have to be taken. CE/ADG/SDG shall have to record reason of outsourcing.
- (xi) After the period of posting in CDO/RDC, the officers will be considered for choice posting.

In case, the officer desires posting in CDO/RDC, their tenure of posting shall not be counted against the station seniority.

4.2 Enhancing Organisational Design Capability

The organisational design capability of CPWD shall be enhanced by strengthening RDC & CDO to be manned by well trained and experienced officers.

4.2.1 Central Design Organization (CDO)

- i. **Central Design Organisation (CDO)** at HQ shall be developed as a Centre of Excellence in integrated planning and design to deal with cases of higher technical complexities and specialised works. CDO shall take care of the present needs of the department and to guide the future course of development. Some specialised fields identified from various disciplines to initiate work in CDO have been listed at Annexure- I to IV
- ii. CDO shall be strengthened by supplementary manpower from Architecture, E&M and Horticulture fields for integrated design and planning of works and complex designs. This unit shall have a mix of fresh recruits at both entry levels and the seasoned and experienced officers at senior level. The officers posted in CDO shall be given world class exposure of latest developments in their field to enhance the level of knowledge, expertise and competence. The proposed hierarchy tree for CDO is at Annexure-V.
- iii. Standardisation of design procedures, standard detailing, design guidelines and manuals, performance aids and SOPs etc. shall be developed and published.
- iv. Officers shall also act as faculties in in-house training programme of National CPWD Academy.
- v. Officers shall also be nominated for professional bodies like BIS/IRC/IBC etc.
- vi. Works/ Projects of outside departments may also be taken up in CDO on consultancy basis for prescribed fee.

4.2.2 Regional Design Centres (RDC)

- (i) **Regional Design Centres (RDC)** under SDGs have been setup at Regional level under Chief Architect (Planning and Design) assisted by Superintending Engineer (P)(C). The RDC shall undertake the design works pertaining to Project Region under SDG/ ADG as well as the area under the jurisdiction of concerned ADGs of the Region. RDCs have been setup at Delhi, Chandigarh, Kolkata, Chennai and Mumbai to undertake design cases of technical complexities, specialised nature and higher magnitude work and related research work. A typical organizational setup of RDCs is at Annexure-VI.
- (ii) The RDCs shall handle works below Rs. 100 crore in a region referred by the field units. Projects of highly specialised and complex nature shall be referred to CDO.
- (iii) The officers shall also act as faculties in Regional Training Institutes (RTIs).

4.3 Deployment of Human Resource in CDO & RDCs

- (i) Suitable and selected officers at entry level and senior level shall be deployed in the CDO and RDCs. Selection of manpower in CDO and RDCs shall be based on qualification, knowledge and prior work experience in planning, design and research. The willing and competent officers shall also be given preference, except for the fresh recruits at both levels.
- (ii) Minimum tenure of posting in CDO/RDC shall be 3 years. The deserving and willing officers may be allowed to continue for longer period with no maximum limit. The posting period in the CDO & RDCs shall be considered zero period for tenure /outstation posting unless officer is found unsuitable for design work or the concerned officer submits unwillingness to continue after minimum tenure of three years.

4.4 Incentives for Human Resource in CDO & RDCs

- (i) Special incentives within Govt. frame work shall be provided to attract and retain talent in these units. Competent and performing officers may be allowed to continue working in CDO and RDCs for longer/ beyond normal period of three years by considering posting period in CDO/ RDC as zero period.
- (ii) They shall be groomed and encouraged to take lecture and present papers at various forums in CPWD and outside at national and international level.
- (iii) Officers interested in pursuing higher studies/ PhD shall be granted study leave with a bond signed as per extant rules.

4.5 Capacity Building

- (i) Regular and adequate training (as and when required) should be provided to officers from all streams deployed in CDO and RDCs for proper capacity building. All officers shall be trained in-house by involving eminent experts as well as nominated for outside courses, programs, seminars conferences etc.
- (ii) The Memorandum of Understanding (MoU) may be signed with the esteemed institutions to facilitate regular interaction, learning and sharing of knowledge and experience and imparting short term and long term training in selected fields. In case of complex projects, short term mutual working / collaboration agreement on case to case basis may be signed with specialized Technical Institutions like IIT/CBRI/SPA/SERC/CINTEF or eminent experts with the approval of competent authority, to enable CPWD officers to carry out work in partnership with them. RDCs may collaborate with IITs/NITs in their regions.
- (iii) CPWD shall become institutional member of important National/International technical and professional bodies like ACI, NICEE, IEEI, JICA etc. and officers of all streams from CDO and RDCs shall represent in these bodies.
- (iv) CPWD shall take corporate subscription of e-journals in relevant disciplines with access rights provided to the officers posted in the Design units. Other required journals may also be subscribed.

4.6 Finance

Adequate financial support needs to be provided to CDO and RDCs for procurement of required number of computers, necessary IT hardware, latest design software, standard codes, reference books, international and national journals and other resources etc. In case of inadequate budget, expenditure shall be allowed to be charged to contingencies of project.

4.7 Knowledge Sharing and Collaboration

- (i) Institutional membership of various professional bodies shall be subscribed like ACI, NICEE, IEEI, JICA etc.
- (ii) Networking/ collaboration with various eminent institutions like IITs/NITs/SPA/IIMs etc. shall be done for mutual knowledge sharing and collaboration in areas of common interest.

4.8 Digitisation

CPWD is the custodian of precious records of books, drawings and documents related to construction work undertaken during the pre-independence period like New Capital at Delhi and many buildings at other places and during the initial years of post independence. Thus a special drive for digitization of old drawings and other important records shall be taken up before they get damaged or lost. Many records are available in CPWD library and Archives in Nirman Bhawan, New Delhi.

4.9 Training

Existing design capability and required design capabilities shall be assessed by CDO to identify the knowledge gap. Training modules shall be developed by National CPWD Academy, to impart training to achieve desired level of design capabilities. A Three-tier training system is proposed and given in the Annexure-VII.

- List of topics and training modules for each level of training shall be finalised later. However broad topics for basic level training and advance training are given in Annexure-I to IV.
- Also identification of resource persons and professional bodies/institutions need to be done.
- Training need of officers posted to CDO/RDC may be identified and special modules may be developed, which can be arranged through some IITs/NITs/Special bodies by signing MOUs.
- Officers of CDO/RDC will be encouraged to take lecture at CPWD Academy and other such bodies and publish and present papers in various forums.
- Study tours within country and outside country shall be essential part of increasing exposure to the officers of CDO/RDC.
- Field studies about damages/failures during some natural or manmade disaster are the best learning situation for Civil Engineering works. Hence special teams shall be constituted and send to study the failure of civil infrastructures after Major EQ, Cyclone, Tsunami, Flood etc. and a report may be published as was done in past after 1991 Uttarkashi EQ, 1997 Jabalpur EQ and 2001 Bhuj EQ.
- Organising seminars/workshops on topic of CPWD's working area may be done at regular interval by CDO/ RDC.
- Research topics related to CPWD's working areas shall be identified and may be done in partnership with reputed Institutions. Some of such research studies done in the past are study on durability of RCC structures made using PPC cement done by SERC, Chennai; study on polymer modified mortars done by NCCBM, Ballabgarh; study of Cement Polymer based coating from CECRI, Karaikudi; and making of seismic retrofitting handbook done by IIT, Chennai.
- Programmes with distance and e-learning mode can also be developed and arranged for convenience of time and distance learning by National CPWD Academy in consultation with CDO/RDC. Online evaluation modules can be developed for skill certification.

4.10 Creation of CPWD Online Knowledge Bank

- (i) CPWD online knowledge Bank shall be populated with relevant information. It shall contain all the technical information related to different type of works planned and executed by CPWD such as buildings of national importance, significance and stature, technically complex buildings/structures /special projects including those having new technology and new ideas / stadium, galleries/ bridges/ flyovers/ jetties etc. The data shall be categorised according to the nature of the project for ease of retrieval.
- (ii) Officers shall have the facility to upload authenticated content in the online knowledge bank for their domain and competency.
- (iii) All CPWD officers and those posted in the different design units shall have the facility to download content from the online knowledge bank.

5.0 Implementation of Design Policy - Action Points

- (i) ADG(Tech.) & ADG(T&R) may be included as members of the Transfer & Posting Committee constituted for selection and posting of officers in the CDO and Regional Design Centres.
 - (ii) Finalisation of topics/ subjects and course material by CPWD National Academy for imparting basic training to JE level officers and Group 'A' level officers from four streams.
 - (iii) The Advisory Council may be constituted under ADG(Tech.) /ADG(T&R) with co-opted members to guide and monitor the implementation of design policy in the various design units in CPWD. The functions of the Advisory Council may include but not limited to the following –
 - (i) Setting broader goals and missions under Design Policy,
 - (ii) Advisory Council will hold a review meeting in each quarter to monitor the progress of the activities and advising for any corrections,
 - (iii) Suggesting relevant issues / concerns from time to time, prioritizing the problems and recommending the strategy / solutions,
 - (iv) Taking notice of the ongoing research that may be of interest to the CPWD.
- The tasks to be followed for implementing the above recommendations are listed at Annexure-VIII.

Civil

Topics for basic level of knowledge for individual level

Components Design + Detailing

- Foundation – Shallow & deep
- Columns –
- Beams –
- Slabs --
- Stairs –
- Water Tank, UG & OHT.
- Retaining Wall

Services design for buildings

- (1). Water Supply (2) Sewer (3) Drainage

Topics for Middle level (ii) and Advance level

Structural design of specialised structure

1. Bridge, flyovers, culverts - (for road works)
2. Jetties (for works of Coast Guards & Andaman etc. & river jetties).
3. Structural wall and slabs system (Monolithic construction).
4. Pre cast structures.
5. Road & pavement design (Border Road, hill roads etc.).
6. Planning design and construction of building and campuses in hill areas.
7. Planning design and construction in coastal area and sea.
8. Base Isolated structure (some building done by CPWD/PWD).
9. Nonlinear seismic analysis for seismic retrofitting.
10. Large size Exhibition halls (For exhibition pavilions, Airport Lounges, convention centres etc.)
11. Pre-stressed building components.
12. Pretension slab system.
13. High rise buildings/Tall buildings

Specialised area -

1. Water proofing design of building envelop.
2. Planning & treatment of joints.
3. Design of Facade glazing.
4. False work design (for specialised situation like large span, higher loads, larger height).

Service Design

For campus

- | | | |
|---------------------------|---------------------------|-----------------|
| (1). Water Supply | (2) Sewer | (3) Drainage |
| (4) Rain water harvesting | (5) Recycled water supply | (6) STP design. |

Architecture

Topics for basic level of knowledge for individual level

2. Project Feasibility study
3. Understanding of Master plans, zonal plans, National Building codes and local building byelaws
4. Understand significance of site survey plans and soil investigation reports
5. Coordination with other disciplines and incorporating their inputs in submission drawings and execution drawings.
6. Green building rating system & methodology & application software
7. Design of School buildings
8. Design of buildings for Central Police Organizations
9. Design of low-rise Housing & General Pool Residential accommodation
10. Design of Office Buildings and General Pool Office buildings
11. Design of Internal and external signage

Topics for middle level (ii) and advance level

12. Urban Design
13. Urban / Town Planning
14. Green Buildings and Sustainable Architecture
15. Housing / Redevelopment Projects
16. Heritage Conservation
17. Landscape Architecture
18. Interior Design
19. Hospital Design
20. Design of Viewing Galleries, Sports Stadia and Convention Centres
21. Design of Multi-storey
22. Visual Aspects of Roads, Flyovers, Underpass etc.

E&M

Topics for basic level of knowledge for individual level

1. Internal and External EI
2. Fire Alarm system
3. Firefighting system (Water based)
4. Sub-station
5. D G sets
6. HVAC (At least basics and systems upto 30 TR)
7. Water supply pumping systems
8. EPABX and LAN (Wiring at least)
9. Green building concepts
10. Energy efficiency measures

Topics for middle level (ii) and advance level

1. CCTV
2. Uninterrupted Power supply systems
3. Solar based systems like PV systems, Solar water heating systems, Solar AC etc
4. Lighting Design like road, facia,, internal, architectural etc
5. HVAC Design of complex or higher capacity systems
6. Complex EPABX (IP based) and Networking Systems
7. Security and surveillance systems
8. Building management systems, SCADA
9. STP, ETP and water treatment systems
10. Water supply pumping system with automation and or hydro pneumatic systems
11. Energy efficiency measures
12. BIMs , 3D modelling
13. Audio video systems and Acoustics
14. Smart class room systems
15. Conferencing and Interpretation systems

16. Projection systems
17. Stage lighting systems
18. Gas based firefighting systems
19. Access control systems
20. Kitchen equipment
21. Hospital services
22. Medical gas pipe line system
23. Modular Operation Theatres
24. Pneumatic Tube systems
25. Nurse Calling systems
26. Incinerators
27. Boilers
28. Laundry
29. Que management system

List of Topics for Basic/ Advanced Training

Horticulture

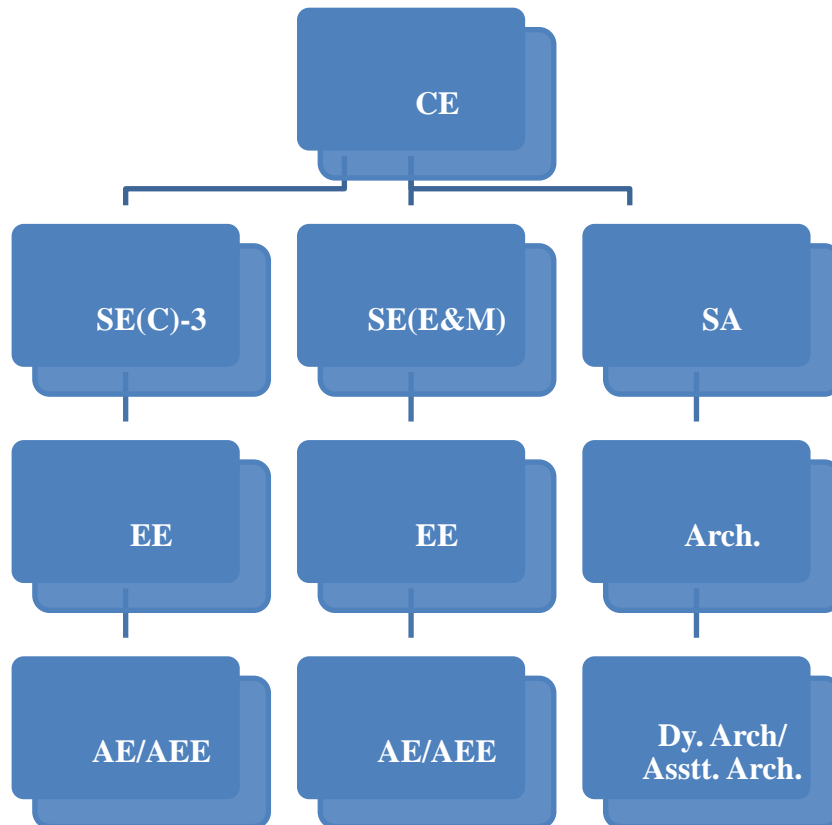
Topics for basic level of knowledge for individual level

1. Local species may be preferred for the plantation in landscape designing
2. Indoor and outdoor landscape techniques
3. Residential and Non- residential designing
4. Designing for Road side, Central verge, Flyovers, underpass etc.

Topics for advance level

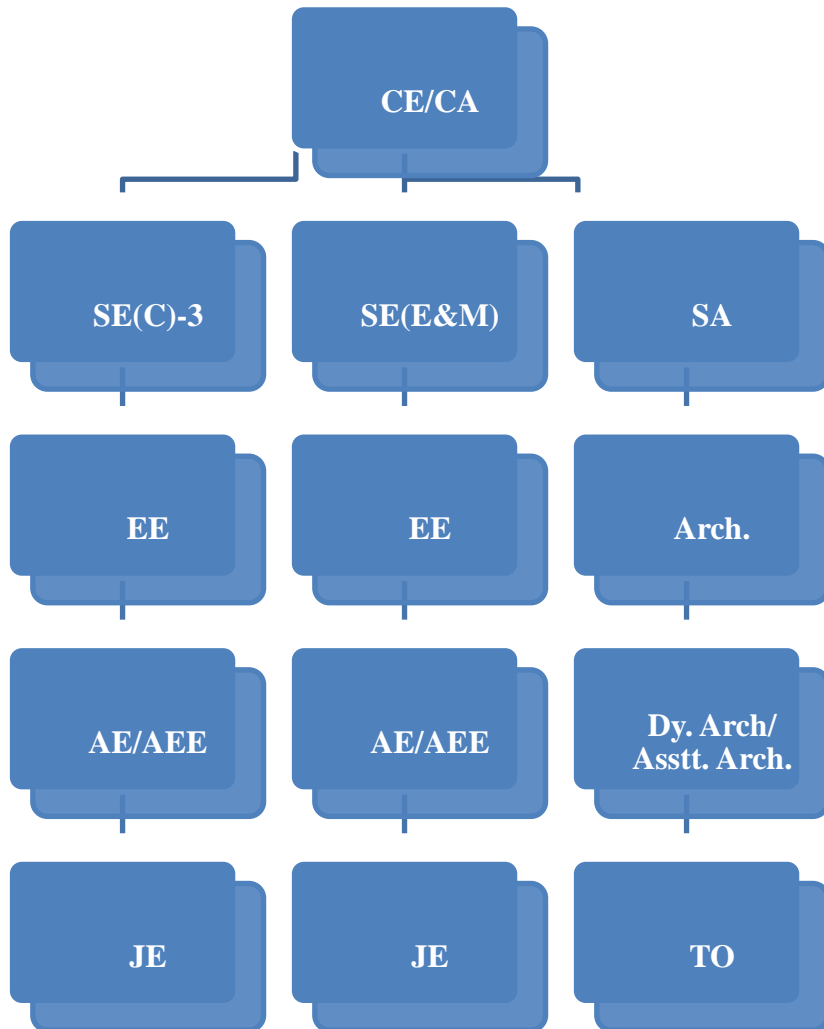
1. Theme based designing
2. Comprehensive development plan incorporating other elements i.e. water fall, pathways, rockeries, hedges design, topiary work, indoor gardening etc.
3. Types of gardening – Water Gardening, Terrace Gardening, Rock Gardening, Roof Gardening

HIERARCHY TREE OF CENTRAL DESIGN ORGANISATION (CDO)



Annexure - VI

HIERARCHY TREE OF REGIONAL DESIGN CENTRE (RDC)



Three Tier Training System

Tiers of training	To be provided by	Target Officers	Domain of training
Basic level	Regional Training Institutes of CPWD/ National CPWD Academy	<ul style="list-style-type: none"> • JE, AE & equivalent level officers at entry level. • Officers at entry level of Group 'A' post 	This training will be part of foundation training for these posts. It will cover topics listed for minimum basic knowledge for different disciplines.
Mid level	National CPWD Academy/any other technical bodies or institutions	<ul style="list-style-type: none"> • JE, AE & equivalent level officers after five year of service. • Group 'A' Officers before their promotion to next level. 	It will include inter-disciplinary training.
Advance level	National CPWD Academy/any other technical bodies or institutions	Officers posted to CDO /RDOs	Advanced & Highly specialized training based on needs of these offices

Implementation of Design Policy - Tasks to be followed

1. To enhance the capabilities at Individual level

- i. Identification of topics for basic training for each discipline, course content and course material to be prepared, Identification of faculty and tie up with them are to be done by National CPWD Academy in consultation with CDO/RDC. These course/ programmes shall be made part of foundation training from coming batches of JE level officer and Group A level officer. Some of the topics suggested are shown in Annexure – I to IV.
- ii. For training of existing stock at JE level and Group ‘A’ level, special drive may be conducted to train them at National CPWD Academy/ RTIs.

2. To enhance the capabilities at organization level.

- i. Organisational set up of CDO & RDC shall be finalised first and notified. This set-up shall be finalised, keeping in view of restructuring as well as proposed cadre review exercise.
- ii. Various activities to be taken up in CDO & RDC shall be defined and manpower shall be assigned accordingly.
- iii. Various infrastructures in terms of office space, equipment, furniture, computers, printers, plotters and software shall be identified for procurement by CDO/ RDC.
- iv. Training module based on training need of officers posted at CDO & RDC shall be identified and prepared by CPWD Training Academy in consultation with CDO & RDC.
- v. List of Technical Journals to be procured in electronic form shall be prepared by CDO & RDC and their type of subscription shall be finalised.
- vi. List of professional bodies/Technical Institution shall be prepared by CDO & RDC to which it can be member and to which it can have working partnership by signing MOUs.
- vii. For CDO, officers shall be selected by a team nominated by DG, CPWD and posting orders shall be issued accordingly.
- viii. For RDC, options from interested officer shall be called and selection shall be done by a committee nominated by DG, CPWD based on their qualification and past experience except the freshly recruited officers. Posting order for these shall be issued after the selection process.

3 Creation of CPWD Online Knowledge Bank

- i. A team headed by SE/SA level officer with members from all streams shall be set-up at CDO to manage the affairs related to Knowledge Bank.
- ii. Standard format for data collection for knowledge bank shall be devised by CDO.
- iii. List of completed projects / special buildings to be included in the knowledge bank shall be prepared by CDO/ RDC.
- iv. Required technical content/ details in standard format in soft copy of completed projects/ buildings shall be collected from the concerned design and execution team / unit by CDO/ RDC.
- v. Drawings/ details of all the current projects shall be uploaded in the online project data bank by CDO/ RDC. Content of identified current projects in the standard format shall be included in knowledge bank by CDO/ RDC.
- vi. Level of officers to have access rights to view/ download and print content / documents / drawings from the knowledge bank shall be decided by CDO.

4 Digitisation

- i. Documents for digitisation shall be identified by a committee headed by SDG/ ADG and collected at CDO/RDC.
- ii. Process of digitisation of sensitive documents may be decided by the committee headed by SDG/ ADG.
- iii. The digitisation work may be outsourced.
- iv. Appropriate space may be provided to digitisation agency at central and regional offices.
- v. Timeline / targets shall be fixed for completion of digitisation work by ADG(Tech).

5 Training

- 1) CPWD National Academy shall play a major role in implementation of the design policy.
- 2) The topics for the Basic, Middle and Advance level training in all streams shall be advised / recommended by CDO /RDCs.
- 3) Based on the advice and recommendations of CDO /RDCs, the CPWD National Academy shall develop and finalise appropriate training modules in close coordination with CDO / RDCs including the following –
 - a. Total duration of each training module/ course

- b. Resource Institutions /persons to impart training
 - c. Details of module covering duration and number of lectures on each subject.
 - d. Preparation of course material for each training module
- 4) Tie up with the resource Institutions /persons may be done either in the form of MoU or need based working agreement.

6 Frontier Areas to venture

1. Repair, rehabilitation, retrofitting - No experts & specialised agencies available in market,
Analysis of already prepared, repair items, (SOR, specifications and analysis of R&R and retrofitting related items need to be done). The earlier existing R & R unit under CDO can revived.
2. Heritage conservation - SOR, specifications and analysis of item required for this purpose need to be developed. Material & techniques – guidelines. One group of specialist may be formed for this.
3. New materials and technologies are coming every day for all the domains like architectural, civil, E&M and horticulture. One unit under ADG(Training and Research) is required to examine these and ratify and issue guidelines.
4. Similarly CPWD has done road work in Bihar, High altitude roads in Uttarakhand, J&K, Sikkim etc and more such projects are lined up. We can create some standard documents, guidelines, design and drawings, regarding making DPRs, estimates, specifications, NIT, methodology, use of specialised tools and machinery etc. A pool of experts can also be created for this area.