Final Report

For

Process Improvement Study for
Restructuring and Improvement Functioning

of

Central Public Works Department

Submitted

by

ICRA Management Consulting Services
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Chapter 1 Introduction

The Central Public Works Department (CPWD), a 150 year old institution, is the principal agency responsible for creating assets for various ministries and departments of the Government of India, except, Railways, Defence, Communication, Atomic Energy, Airports Authority of India and All India Radio. In July 1854, CPWD came into existence as a central agency meant for carrying out the public works. However, it was in 1930, that the CPWD got organised into its existing structure. Over the years CPWD has executed wide variety of civil works ranging from building residential accommodation and office complexes to roads, bridges and border fencing, not only in India but also in neighbouring countries of South Asia.

CPWD role in a project commences right from the conceptualisation stage, continues throughout the design phase, the project execution/management and post construction maintenance phase. In other words it provides the services of an architect, a structural engineer, a project manager, and a facility manager to various government departments. CPWD has also emerged as an agency which has benchmarked construction costs and specifications in the country. It has well documented specifications and standards, schedule of rates, which are updated from time to time, and are used extensively by various construction agencies in the country be it in the public or private sector. It also assists the Income Tax department in implementing Direct tax Law in relation to immovable properties.

In past few years, owing to the paradigm shift in the economy and redefinition of the government's role in creation of assets, CPWD is facing certain challenges in terms of the processes and procedures adopted by it for achieving its stated objectives of creating and maintaining public assets. The participation of private sector in many of the activities hitherto undertaken by public sector, has led to a sea-change in the quality of service delivery as also in the expectations of people availing those services. In spite of the unique position of CPWD owing to its existing organisation and charter, there is a need felt by it to redefine its service standards, improve its processes and re-orient its practices in line with the changing expectations. In this context, some of the issues confronting CPWD are:

a. Necessity of improving the service standards in terms of specifications adopted, response time to address clients' needs and manage project execution.

b. Absence of a unified command impeding the integration of activities, which are being carried out in isolated silos.

c. Reorientation of CPWD as a service organisation as against any other government department.

d. Identification of benchmarks and tangible performance measurement parameters for the organisation as a whole, which can be internalised within the department.

In its endeavours of re-orienting and redefining its processes, CPWD invited ICRA Management Consulting Services (IMaCS), formerly known as ICRA Advisory Services, undertake a process improvement study and make recommendations to enhance performance and client satisfaction.

1.1 Scope of Work

The scope of work of the engagement was to undertake a process improvement study with a view to improve client satisfaction with specific focus on the following major areas

a. Project Management

b. Maintenance Management

c. Cash-flow Management

The process improvement study was carried out with a view to keep the recommendations within the existing legislative and policy framework governing the roles, responsibilities and activities of CPWD.

The current engagement excluded any assessment, analysis or recommendation on matters relating to choice of technology. The scope of this study did not include assisting CPWD in implementing the Process Improvement Plan.

1.2 Terms of Reference

Given the nature and structure of CPWD which has evolved over decades and the likely resistance to major /radical restructuring, IMaCS was asked to adopt a process improvement approach to improving CPWD functions and service delivery processes.

The terms of reference for the given for this study is as follows:

a. Identify and map major processes in the execution of a typical project in CPWD at the top level and break down the same into tasks primarily with respect to project execution, maintenance and cash flow management.

b. Study the effectiveness and operational problems of these processes (in terms of time and client satisfaction) – project execution, maintenance and cash flow management.

c. Study the organisation structure, the process of decision making, authority and responsibility relationships and delegation of powers at CPWD.

d. Analyse the interfaces/relationships that CPWD has with the Ministry of Urban Development, client ministries/departments, users of government accommodation and other government organisations.

e. Conduct a limited client perception study to assess client expectations from CPWD and how CPWD fares in meeting these expectations.

f. Assess the gaps in the existing operating processes of CPWD and identify reasons for client complaints.

g. Studying best practices in project management and facility management to formulate suitable framework for CPWD to adopt.

h. Formulate appropriate recommendations, primarily, for improving the following processes:

- Project Management
- Maintenance Management
- Cash-flow Management

i. Recommending models for outsourcing relevant tasks hitherto undertaken by CPWD, wherever required.

1.3 Approach

IMaCS undertook the engagement in two phases. The detailed approach that was adopted during each phase is as follows:

Phase I: Diagnostic Phase

This phase entailed understanding in detail the key processes at CPWD and their characteristics. The focus of this phase was on understanding the practices adopted by CPWD to undertake its various activities along with an overview of its operations.

This phase included study of the following:

a. Obtaining an overview of operations and structure of CPWD in context of

- Project Execution and Management
- Maintenance Management
- Cash Flow Management

b. Reviewing the practices and procedures followed by CPWD

c. Assessment of client expectations and perception through limited client survey and interaction.

Phase II: Synthesis Phase - Identifying areas of improvement and suggesting strategies to bridge these gaps.

IMaCS analysed the findings generated in Phase I to determine the following

a. The extent to which project management practices can be improved

b. Identify the issues related to maintenance function that are resulting in CPWD not meeting clients' expectations

c. Re-orientation of the cash flow management practices followed by CPWD.

1.4 Methodology

Inputs for our analysis were gleaned through interactions with key officials of CPWD, as well as perusal of process manuals, MIS reports and systems (IT) that are currently used by CPWD in carrying out its various activities. Previous reports on the restructuring of the CPWD were also studied.

The IMaCS team interacted with CPWD officials posted in the National Capital Region, identified in consultation with CPWD. During the course of the study, we visited the Bangalore Circle in South Zone II to study the model adopted there for maintenance of assets.

1.5 Report Structure

This report focuses on the three essential functional areas of CPWD, as per the terms of reference of the study:

a. Project management

b. Maintenance management

c. Cash Flow Management

Each of the chapters covering the above mentioned issues elaborate on the existing processes, identifies the critical issues and lists out short term and long term strategies/recommendations to address the existing problems. The following chapter is devoted to existing functions and organisational structure of CPWD for providing a perspective to the issues facing it, in terms of the above mentioned processes.

Chapter 2 CPWD – The organisation

2.1 Functions of CPWD

The Central Public Works Department is the principle construction agency of the Central Government operating throughout the country to undertake construction and maintenance of all works and buildings financed through the Union Budget. It also undertakes work on behalf of autonomous bodies and institutes, which have separate budget / financial resources, and are not funded through budgetary allocations.

In general functions of CPWD are as follows:

a. **Designing, constructing and maintaining Central Government non-residential buildings** other than those for Railways, Communications, Atomic Energy, Defence services, All India Radio, Doordarshan, Airports (AAI).

b. **Designing, constructing and maintaining residential accommodation** meant for Central Government Employees.

c. **Construction works for some public sector undertakings** (which do not have captive civil engineering division) and some autonomous organisations, as deposit works;

d. **Provide consultancy services in planning, designing and construction of civil engineering projects**, as and when required by public undertakings and other autonomous bodies;

e. The DG (W), CPWD is also the **principal technical adviser to the Government of India** on all technical matters within the Central Government purview;

f. **Construction in foreign countries of Embassy and other buildings/ projects** at the request of Ministry of External Affairs and other Ministries;

g. **Defence / security related works**, and other works as assigned to Government of India from time to time;

h. **Management of Central Government Estates**, which are not under the purview of Directorate of Estates.

Hence, CPWD offers essentially two core services viz; construction and maintenance, which are discussed below;

2.1.1 Construction services

CPWD builds its projects by expending public money within the framework of various rules and codes laid down in its manuals.. While CPWD has other functions (like consultancy, valuation of properties etc.) to perform, its primary activity is related to design, and construction of buildings-

be it be residential, non-residential or institutional- in various parts of the country. The specific activities undertaken by CPWD during execution of construction projects are detailed out in Chapter 3 of the report.

2.1.2 Maintenance services

CPWD is responsible for maintaining a large stock of Central Government residential and non-residential accommodation spread all over the country. It includes maintenance of prestigious buildings such as Rashtrapati Bhawan, Parliament House, North Block, South Block, Vigyan Bhawan, Hyderabad House, National Museum and various other buildings and also the residences of Vice President, Prime Minister, Union Cabinet ministers, Members of Parliament, and other officials. CPWD provides comprehensive maintenance services in respect of civil, electrical and horticulture work. It is also responsible for providing certain amenities in residences of VVIP/ VIP as per prescribed norms of the Government. The details of maintenance works rendered by CPWD are given in Chapter 4 of the report.

2.2 Organisation Structure of CPWD

CPWD, as an organisation, is under the administrative control of **Ministry of Urban Development (MoUD)** in terms of the Government of India (allocation of business) Rules, 1961. The Ministry of Urban Development interacts with CPWD on following matters:

- Transfers and posts ADGs and CEs on the recommendation of DG(W)
- Acts as member of the Central works board, which acts as an advisory body in the matter of acceptance of contracts, registration of contractors and other miscellaneous matters related to execution of works, which are beyond the powers of DG (W).
- Grants sanction to the construction and maintenance budget prepared by CPWD before it is sent to Ministry of Finance.

CPWD is headed by **Director General (Works) [DG(W)], who** acts as the chief professional advisor to Ministry of Urban Development in all matters concerned with public works. He is also the principal adviser to the Government of India on all technical matters related to civil, electrical and mechanical engineering, horticulture and architecture. He is responsible for full technical and supervisory control over all disciplines, its officers and staff. The DG (W) or his nominees are associated with various technical bodies or standing committees of different institutions and organisations. DG (W) exercises a concurrent control with the audit officer in connection with maintenance of accounts, preparation of budget estimates for works under his control and monitors closely the progress of expenditure against it.

The DG (W) is assisted by nine Additional Director General of Works [ADG(W)] . For effective administration and proper control of works, CPWD has been divided into four regions, each headed by an ADG. The regions have been further subdivided into zones headed by Chief Engineers (CE), zones into circles headed by Superintending Engineer (SE), circles into divisions, headed by Executive Engineer (EE), and divisions into subdivisions, headed by Assistant Engineers (AE). The AE/JE is responsible for management and execution of all works in a sub-division.

Apart from the four ADGs covering the four regional offices of CPWD, there are five ADGs looking after the functional aspects as listed below.

1. Additional Director General (Northern Region)
2. Additional Director General (Western Region)
3. Additional Director General (Eastern Region)
4. Additional Director General (Southern Region)
5. Additional Director General (Strategy and Planning)
6. Additional Director General (Technology Development)
7. Additional Director General (Architecture)
8. Additional Director General (Training)
9. Additional Director General (Borders)

2.2.1 Additional Director General (Northern Region)

ADG (NR) is responsible for works under Northern Region covering zonal offices located at New Delhi, Chandigarh, Lucknow, Jaipur for looking after works in the States of Uttar Pradesh, Punjab, Haryana, Himachal Pradesh, Rajasthan, U.T. of Chandigarh and NCR regions excluding National Capital Territory of Delhi. To perform his functions effectively, ADG (NR) is assisted by four CE (Civil), one CE (Elect), and one Chief Architect (CA).

2.2.2 Additional Director General (Western Region)

ADG (WR) is responsible for works under Western Region covering zonal offices located at Mumbai, Nagpur and Bhopal for looking after works in the States of Maharashtra, Chattisgarh, Gujarat, Madhya Pradesh, Goa, U.T. of Dadra and Nagar Haveli. To perform his functions effectively, ADG (WR) is assisted by three CE (Civil), one CE (Elect), and one CA (WR) who also assists ADG (SR).

2.2.3 Additional Director General (Eastern Region)

ADG (ER) is responsible for works under Eastern Region covering zonal offices located at Kolkata, Patna and Shilong for looking after works in the States of West Bengal, Bihar, Jharkhand, Orissa, Sikkim and all the North Eastern States. To perform his functions effectively, ADG (ER) is assisted by three CE (Civil), one CE (Elect). CA (WR) also assists ADG (SR)

2.2.4 Additional Director General (Southern Region)

ADG (SR) is responsible for works under Southern Region covering zonal offices located at Chennai, Hyderabad and Bangalore for looking after works in the States of Tamil Nadu, Andhra Pradesh, Kerala, Karnataka, U.T. of Pondichery and Andaman Nicobar and Lakshwadeep Islands. To perform his functions effectively, ADG (SR) is assisted by three CE (Civil), one CE (Elect), and one CA who also assists ADG (WR).

2.2.5 Additional Director General (Strategy and Planning)

ADG (S&P) is in-charge of works under New Delhi region. There are four CE (Civil), one CE (Elect), and one CA in this unit for all works undertaken in New Delhi Region. In addition to works there are two CE (civil) for looking after the Head quarter functions relating to vigilance, human resources development and personnel matters.

2.2.6 Additional Director General (Technology Development)

ADG (TD) is in-charge of works under Delhi region. There are two CE (Civil), and one CE (Elect), and in this unit for all works under Region at Delhi. In addition to works there are three CE (civil) for looking after the Head quarter functions relating to design, contract, standards and specifications, quality control functions and consultancy.

2.2.7 Additional Director General (Border)

ADG (Border) is responsible for co-ordinating the activities of various organisations, namely CPWD, Assam PWD, and Border Roads Organisation involved in border fencing, roads and lighting system along Indo-Bangladesh Borders and Indo-Pakistan Borders. Four CPWD zones are directly engaged in this work.

2.2.8 Additional Director General (Architecture)

ADG (Arch.) is advisor to MoUD on all matters of Architectural Planning within the country and Indian Embassies in other countries. He is ex-officio member of Council of Architecture and is technical advisor to all four Chief Architects.

2.2.9 Additional Director General (Training)

ADG (Tr.) looks after training needs of workers and officers in the department and carries out important task of Human Resources Development. The department has a full-fledged training

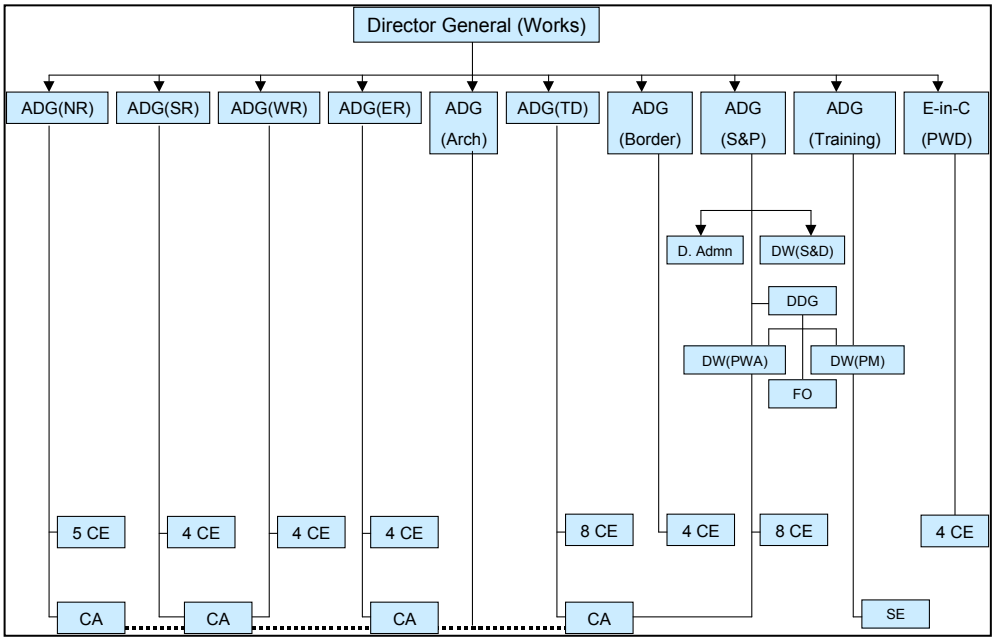
institute located at Ghaziabad, apart from Regional Training Institutes at Delhi, Mumbai, Chennai and Kolkata.

2.3 Central Works Board

Central Works Board acts as an Advisory Board in matters of acceptance of high value contracts. This board consists of DG (Works), CPWD as its chairman and two members, one being officer of Ministry of Urban Development (Director-Works)and the other an officer of Ministry of Finance (Chief Controller of Accounts of MoUD). The financial officer to the DG (works) acts as its secretary. The board has the authority to co-opt members, non-official experts' representatives of administrative ministries of GOI, when so required for advice on such matters as execution of specialised projects e.g. aviation works, factory works and bridges.

The organisation structure of CPWD is given in Figure 2.1:

Figure 2.1: Organisation structure of CPWD



2.4 Specialised units in CPWD

CPWD has following specialised units;

a. Central Design Organisation

b. Contracts, Standards and Quality Assurance Unit

c. Training Institute

d. Consultancy Services Organisation

Brief description of each of these specialised units is given below;

2.4.1 Central Design Organisation

Central Design Organisation (CDO), a specialised unit of CPWD is headed by a Chief Engineer. CDO is responsible for research and development activities in field of structural design, computerization, adoption of new material and construction techniques, material testing, soil investigation, repair and rehabilitation of structures in distress, development of software etc. To perform these functions, CDO has four sub units viz; Design unit, Computer Centre, Repair and Rehabilitation unit, Technology Application and Development cell, each headed by a Superintending Engineer.

This unit has four branches. Functioning of each branch is given below: -

a. Contract and Maintenance cell

This cell is responsible for registration and revalidation of contractors and updation of CPWD manual. It issues guidelines in respect of contracts, written procedures and delegation of powers to various officers of CPWD.

b. Quality Assurance cell

Quality Assurance cell is responsible for conducting independent inspection of various construction and maintenance works, issue of inspection reports for assurance of quality in the works. This unit carries out regular inspection of major works and guides the field unit on how to maintain regularly.

c. Techno-legal cell

Techno-legal cell is responsible for dealing with arbitration cases, court cases and approval of statement of facts in the arbitration cases, other litigation matters and issue of guidelines regarding all the above categories.

d. Standards and specifications cell

This cell is responsible for updating the specification of works, laying down specifications for new materials, approval of cost index, revision and updating of schedule of rates etc.

2.4.2 Training Institute

The training programmes for Group 'A' and Group 'B' officers are conducted in the main training institute of CPWD at Ghaziabad. The institute has regional training centres located at Delhi, Calcutta and Chennai for Group 'C' and Group 'D' employees of the department. Apart from short term training programmes, the institute also conducts foundation training programmes for direct recruit Group 'A' officers, and Junior Engineers. Orientation programmes for SEs, EEs, AEs on promotion are also conducted at this training institute.

2.4.3 Consultancy Services Organisation

CPWD provides consultancy services for various public sector organisations/ autonomous bodies for planning, design and execution of major building projects, complex structures and specialized services. CSO also provides consultancy services outside India for construction of Hospitals, Institutional buildings, housing, hostels and office buildings.

2.5 Human Resource Management in CPWD

2.5.1 Existing HR Management system in CPWD

The HR issues in CPWD are handled at two levels;

- Directorate (Central level)
- Regional level (at the four metros viz., Delhi, Mumbai, Kolkata and Chennai)

The following section outlines the existing HR management systems at these two levels;

Directorate level

At the Directorate level, *personnel functions* of CPWD is headed by ADG (S&P), who is assisted by three functionaries - CE(P&S), Director (Adm.) and Director (S&D). There are 11 sections, managing the following key functions. Each section is headed by a section officer and is assisted by several clerical and ministerial staff:

- Appointment/ Recruitment of Group A and Group B officers
- Cadre review and Promotions of Group A and Group B officers
- Transfers and Postings of Group A
- Processing of cases related to Transfers and Postings of SEs and above
- Confidential reports and Personnel cases of Group A and Group B officers
- General grievances and disciplinary actions of Group A and Group B officers
- Functions which involve inter-regional matters
- Promotion from head clerk to office superintendent
- Recruitment of JEs

Specifically for the *training function,* the Directorate office is headed by ADG (training) and performs the following functions. ADG (Training) is assisted by 5 SEs, 9EEs and 14AEs at Directorate level for performing following functions:

- Preparation of Training course and calendar for the year

- Nominate officers for mandatory and optional level training programs
- Organise Training programme for officers above AE level at Central Training Institute

Regional level

There are four regional ADG's (North, South, East and West) performing the following functions:

- Appointment of JE, Ministerial and work-charged staff
- Court cases/ CAT cases
- Promotions and Transfer and Posting of Group B, C, D staff
- Custody and upkeep of Confidential reports and dossiers of JE and Ministerial staff
- Address grievances and necessary disciplinary actions - Group C, D staff

The Regional ADGs are assisted by about 80 staff members, which include SE (Co-ordination), AE, OS, H/C, LDC, UDC and stenographers.

There are 4 Regional Training Institutes (RTI) for performing training functions at regional level. Each RTI has an EE as its course co-ordinator and it organises training programme for officers below AE level.

2.5.2 Manpower strength and mode of recruitment in CPWD

The responsibility of managing the vast human resources of the Department is with CE (P&S), Director of Administration and the Superintending Engineer (Co-ordination.) attached to each regional ADG. CPWD has a total sanctioned strength of about 42919 employees.

CPWD staff strength can be divided into Group 'A' and Group 'B' officers and Group C and Group D employees. Group 'A' officers in CPWD have a sanctioned strength of 1293 officers divided into three services of:

a. Central Engineering Services (871officers)

b. Central Electrical and Mechanical Engineering Services (249 officers)

c. Central Architectural services (173 officers).

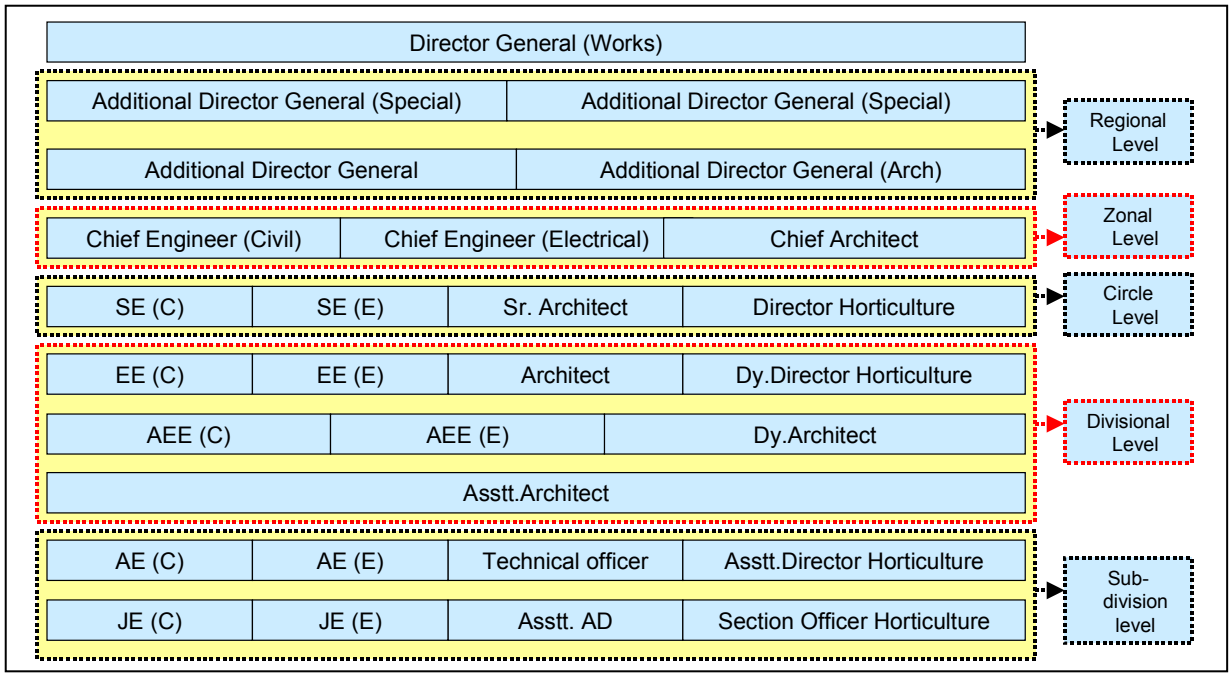
The sanctioned strength of the Group 'A' officers in CPWD is given in Table 2.1

Table 2.1: Sanctioned strength of Group 'A' officers in CPWD

Grade	Core CPWD strength	Encadered posts	Project Posts	Grand Total	Remarks
Central Engineering Services (CES)					
D.G	1	0	0	1	These posts are common for CES and CEMS
ADG(Spl)	2	0	0	2	
ADG	5	1	1	7	
CE (S.A.G)	26	13	4	43	
SE (J.A.G)	113	31	18	162	
EE (S.T.S)	415	100	61	576	
AEE (J.T.S)	80	0	0	80	
Total	**642**	**145**	**84**	**871**	
Central Electrical and Mechanical Engineering Services (CEMS)					
CE (S.A.G)	6	0	3	9	
SE (J.A.G)	36	1	5	42	
EE (S.T.S)	153	13	12	178	
AEE (J.T.S)	20	0	0	20	
Total	**215**	**14**	**20**	**249**	
Central Architectural Services (CAS)					
ADG(Arch)	1	0	0	1	
Chief Architect (S.A.G)	4	0	0	4	
Sr. Architect (J.A.G)	29	0	1	30	
Architect (S.T.S)	83	0	1	84	
Dy. Architect (J.T.S)	54	0	0	54	
Total	**171**	**0**	**2**	**173**	

The hierarchical structure of CPWD at various levels is given in Figure 2.2.

Figure 2.2: Hierarchical structure of CPWD



2.5.3 Recruitment in CPWD

As discussed earlier, there are three services in CPWD; Central Engineering services, Central Electrical and Mechanical Engineering Services and Central Architectural Services.

Combined Engineering Services

Direct recruitment to Group 'A' Engineering Services is made at the level of Assistant Executive Engineer (AEE) through UPSC on the basis of a Combined Engineering Services Examination. The positions for EE are filled in the proportion of 1/3rd by Assistant Engineers (AEs) who are Graduate engineers, 1/3rd by AEs who are Diploma Engineers & 1/3rd by Group 'A' direct recruit officers.

The subsequent posts (after EE) in the Group 'A' Engineering Services are that of SE and CE. A CE on promotion (subject to vacancy) becomes ADG, which is an ex-cadre Group 'A' post.

Through Group 'C' examination, an engineer is recruited at the level of a JE. A JE is also eligible to take departmental examination after completing service tenure of 4 years and move to the next level. Of the total JEs who move up to become AE, 50% move through the departmental exams & balance 50% through regular promotions.

Central Architectural Services

Recruitment to Group 'A' Architectural Services is made at the level of Deputy Architect, through direct recruitment through UPSC. The next higher post is that of Architect, which is

filled by promotion from Deputy Architects. As per recent revision in recruitment rules, a few deputy architects posts are filled by promotion from Assistant Architects.

2.5.4 Promotional and career planning process in CPWD

Detailed guidelines and criteria in terms of educational qualifications, experience required for promotion etc. are documented in the CPWD manual and revisions and modifications in the policy are issued from time to time.

Cadre scheme for different functional disciplines viz. civil, electrical, horticulture, architecture provides direction of vertical career movement, job specification, eligibility criteria and structure the promotional prospects of employees. The last cadre review of CPWD was done in 1995 (2nd Cadre review).

In CPWD, engineers continue to be part of their respective cadre till the CE position and separate seniorities are maintained which are considered at time of promotion in the respective cadre. Hence, the number of promotions an engineer gets in his service career depends on the number of vacancies in his cadre and the age at the time of joining service.

2.6 Conclusion

During the course of the study, it was found that the organisational structure of CPWD has significant bearing on the activities related to project management and maintenance management. The existing directorate and regional set-up seems to be sufficient to perform the HR functions, which consists of Appointment/ Recruitment of officers, cadre review and promotions, Transfers and postings, confidential reports and personnel cases, training and General grievances and disciplinary actions. However, there is a need for professionally trained HR managers to handle some of these functions in an effective manner.

Specific areas where the existing organisational structure impact the functioning while undertaking construction and maintenance works are elaborated in the subsequent chapters.

Chapter 3 Project Management of Construction Projects

3.1 Concept of Project Management

By lexical definition, project is a temporary endeavour undertaken to create a unique product or service. It is different from operations, which are ongoing and repetitive. *Project Management* is said to be the art and science of mobilising and managing people, materials, equipment and capital to complete the assigned project work on time within budgeted costs, pre-defined technical specifications and acceptable quality standards. Principally, it aims at managing human skills and optimising non-human resources available.

Managing a construction project requires multi-directional interactions of dynamic forces represented by time, human/non-human resources and associated costs. In spite of multiple and diverse activities, each project needs to be viewed as an entity in itself, organised in a manner wherein accomplishment of project objectives is entrusted to a single responsibility centre, commanded by the project chief / manager.

This Project Manager, as the overall incharge of the project, leads the project management team (the size being dependant on the nature, scope and size of the project) and is accountable for planning, mobilising, directing, coordinating, and controlling all the activities, which are necessary for achieving the project objectives of time, cost and quality.

3.2 Existing Project Execution Process in CPWD

CPWD was conceived to undertake public works ranging from irrigation facilities and bridges to public housing and government buildings. Over the years the responsibilities and jurisdiction of CPWD got re-aligned, however, the basic activity of civil construction still remains its raison d'être. The organisation structure and practices have also evolved largely to address the requirements of executing these construction projects. Therefore, in context of the present study, the project execution process is being analysed related to new construction works undertaken by CPWD for its clients.

A typical construction work or project involves three distinct phases – Preliminary Planning Phase, Detailed Design & Documentation Phase and Work Execution Phase.

3.2.1 Preliminary Planning Phase

Any construction work or project work gets initiated by a requisition from a prospective client, addressed to concerned Chief Engineer or any officer above this level. On receipt of the requisition, the concerned Chief Engineer initiates the process. This process typically constitutes of the following steps:

a. **Preparation of preliminary drawings by the architect's unit attached to the Chief Engineer's office.**

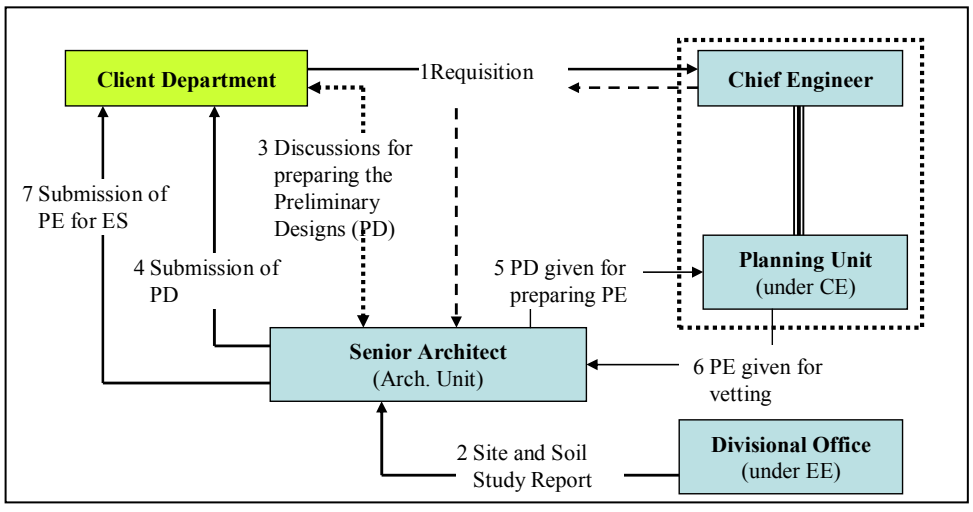
- Discussions with the client on their requirements
- On understanding the client's requirements, the field unit first prepares the feasibility report, including the site/soil data
- On the basis of this feasibility report, the Senior Architect heading the architecture unit prepares the preliminary drawings.
- These preliminary drawings are then sent to the client department to seek their approval

b. Preparation of preliminary estimates

- The preliminary drawings are sent to the planning unit under the Chief Engineer for preparation of preliminary estimates.
- These preliminary estimates are made on the basis of plinth area rates of CPWD and sent to the client department
- These preliminary estimates along with preliminary drawings form the basis for Administrative Approval and Expenditure Sanction (AA&ES) by the client department for the project.

A schematic representation of the preliminary planning process is given in figure 3.1.

Figure 3. 1 Preliminary Planning Process

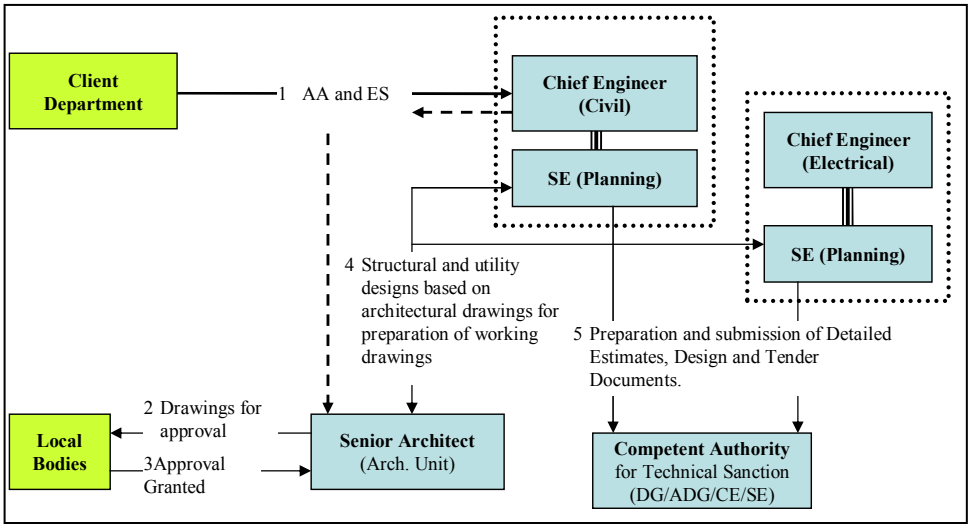


3.2.2 Detailed Design & Documentation Phase

The detailed designing activity starts after the Administrative Approval and Expenditure Sanction (AA&ES) is received from the client department. The concerned Chief Engineer, who receives

the administrative approval and Expenditure sanction, conveys it to the architecture unit. On receipt of AA&ES, following activities are undertaken. A schematic representation of the detailed design phase is given in figure 3.2:

Figure 3.2 Detailed Design Process



- Preparation of detailed architectural drawings by the architecture unit and preliminary structural designs and service drawings by design units for their submission to urban local bodies and other relevant regulatory bodies to seek their approval.
- Receipt of approval of plans from local bodies.
- Preparation of working drawings based on the structural designs and utility plans.
- Preparation of draft detailed estimate, design review with client and modifications of drawings, if any
- Preparation of detailed estimates for main buildings and all services (Civil, Electrical & Mechanical).
- Preparation of detailed structural drawings
- Preparation of draft schedules for work (NIT).
- Submission of the designs, estimates and draft tender documents to the competent authority within CPWD for seeking technical Sanction.

3.2.3 Work Execution Phase

Procurement of Works

Following the technical sanction from the concerned authority, the work execution phase begins with the approved structural drawings, detailed estimates and tender documents being sent to the concerned Executive Engineer (EE), under whose division the construction work falls. Thereafter, the following activities are undertaken for selection of contractor(s):

- Call of pre-qualification applications, wherever required.
- Selection of contractors from the pre-qualification applications.
- Call of tenders and pre-bid conference.
- Receipt of tenders.
- Decision of tender and award of work.
- Preparation of NIT, call and award of work

Post selection of contractor(s), CPWD is essentially responsible for construction supervision, testing & commissioning and obtaining completion certificate from local authorities before handing over the building to the client. The key tasks include taking possession of land, inspection of works, measurement of quantities and settlement of bills against progress of works, which are outlined below:

a) Possession of Land

After receipt of technical sanction, action is to be taken immediately for taking possession of land acquired by the Government. All the concerned units dealing with civil, electrical and horticulture work are immediately informed about commencement of work along with copies of relevant portions of estimates and plans furnished to them to initiate further action. For external services, Municipal Corporation/ local bodies, electric companies are written simultaneously.

b) Inspection of works

The various officers concerned with the work i.e. Senior Architect/Architect SEs / EEs (Civil and Electrical), AE and JE inspect the works periodically to ensure that the works are being executed in general according to design, drawing and specifications laid down in the contract. The officer, who records/test checks the measurements for an item of work, is responsible for the quality, quantity and dimensional accuracy of the work. The programme of inspection of all works in division is drawn up by Executive Engineer on quarterly basis. The minimum number of inspections for each work is 1 for every 2 bills for works at headquarters and 1 for each 3 bills for works outside the headquarters. A copy of this programme is sent to the Superintending Engineer.

Apart from this, AE also needs to make adequate surprise checks to ensure quality of work during concreting (especially, to ensure that the desired water-cement ratio is maintained).

An Inspection register is maintained at every site of work, duly issued by the Executive Engineer and docketed from the division office. The standard Performa for inspection register is prescribed in the CPWD works manual.

c) Measurements and Settlement of Bills

The payments to contractors for the work executed are made on the basis of measurements recorded in the Measurement Books. These measurement books are the basis of all accounts of quantities done by Contractors.

The Assistant Executive Engineer/Assistant Engineer needs to inspect and certify that the work has actually been carried out/completed in accordance with the terms and conditions of the contract before passing a bill for payment or before submitting it to the Divisional Officer for payment. Further, The pertinent EE checks 10% of the measurements recorded by his subordinates in at least every alternate bill for works at his headquarter and at least every third bill for works outside his headquarter. He, however, has to accept general responsibility for the correctness of the bill as a whole.

3.3 Roles and Responsibilities

According to the CPWD Works Manual, 2003, a **Senior Architect** is responsible for co-ordinating all the activities till the stage of preparation of detailed estimates/NIT for execution of a project. The preparation of layout, preliminary working and detailed drawings of buildings is the responsibility of the Senior Architect, which has to be carried out in consultation with the client Ministry/Department, Superintending Engineer (Planning), Civil, Electrical and Air-conditioning Engineers and the Directorate of Horticulture. The Senior Architect is required to send the advance copies of the drawings to all concerned officials and call for necessary comments on data (like wiring diagram etc.) as the case may be and finalise the drawings by taking such comments/data into consideration and further mutual discussion if necessary. However, on cases where architectural input is not required, such as road and bridge works, **Superintending Engineer (Planning)** is the co-ordinator up to NIT Stage.

During the actual execution of work, co-ordination is responsibility of the concerned ***Superintending Engineer (Civil)***. However, issue of NIT, call of tenders, award of tenders, work supervision and settlement of accounts is the responsibility of the concerned ***Executive Engineer,*** for respective civil and electrical components of the work in question. As soon as the work starts, the concerned ***Executive Engineer (Civil)*** is required to obtain a copy of the working drawings from the concerned ***Executive Engineer (Electrical)***, showing clearly the positions and sizes of the holes or chases, which should be left to accommodate the electrical fittings. Joint inspections

are also required with the concerned ***Executive Engineer (Electrical)***, to ensure that no mistakes are committed with respect to positions for ducting/wiring and other installations and also to arrange for any modifications, if any.

3.4 Stages / Milestones for a Typical Project

The pre-requisites or milestones, which are required to be fulfilled or achieved before CPWD can move to the next stage of the project, are as follows:

3.4.1 *Administrative Approval and Expenditure Sanction*

In order to undertake any construction work or project (as distinct from any repairs or maintenance related work), CPWD requires the concurrence of the competent authority within the concerned administrative department, which requires the construction to be undertaken. This concurrence of the concerned department is known as 'Administrative Approval and Expenditure Sanction' (AA&ES). This is based on the preliminary designs and preliminary estimates (derived on the basis of plinth area rates) and furnished by CPWD. These preliminary estimates are to be countersigned by the officer competent enough to accord technical sanction to the estimates, and are forwarded to the administrative department, which examines the costs indicated in the given estimates. At this stage, the countersigning authority is required to use own judgement on the appropriateness of the estimates prepared, and oppose, if required, any such items of expenditure, which may not be necessary in his/her opinion. In case the countersigning officer is not able to convince the appropriate officer, who prepared the preliminary estimates/designs, the matter is referred to the next higher authority.

The administrative Approval, once accorded to the project is then communicated to the officer responsible for executing the project in the concerned CPWD unit and a copy endorsed to the respective Account officer. One copy of the estimate, duly countersigned, is also required to be returned to the concerned CPWD unit responsible for execution of the work as a token of acceptance. In case of works for which demands are not administered by the Ministry of Urban Development, namely, heads other than "2059 – Public Works", "2216 – Housing", "4059 – Public Works", and "4216 – Capital Outlay in Housing", the Administrative Ministry/Department is required to endorse a copy of the administrative approval accorded to the estimate along with a copy of such estimates and plans to the Ministry of Urban Development.

Post administrative approval from the administrative Ministry/Department, Expenditure Sanction (ES) is required to be accorded, which indicates that funds for the project have been provided and a liability of undertaking the construction work can be incurred. In other words, it signifies the concurrence of the Government of India in the expenditure proposed. According to CPWD Works Manual, 2003, ES is required to be issued by the Ministry/Department/Administrator/head of Department as the case may be under their delegated powers and in other cases, with the

concurrence of Integrated Financial Adviser (IFA). In all case of minor works, as defined in the CPWD Works Manual, the act of appropriation or re-appropriation of funds operates as sanction to incur expenditure concerned and it is not necessary to issue any formal order conveying sanction to incur expenditure in such cases.

3.4.2 *Technical Sanction*

Having received administrative approval and expenditure sanction, detailed estimates are required to be prepared for Technical Sanction (TS). TS is the approval accorded by the competent authority of CPWD to the detailed estimates, based on essential drawings and structural and service designs. A technical sanction signifies that the designs are structurally sound, and the estimates are accurately calculated and based on adequate data. Before a TS can be accorded, following documents are required to be available:

a. Detailed architectural drawings and specifications.

b. Structural drawings for foundations.

c. Structural drawings of superstructure at least upto slab at level 2.

d. Detailed drawings of internal and external services.

An authorised officer of the administrative department (who has accorded the administrative sanction) for which the construction work is to be undertaken, needs to countersign the detailed designs and estimates, as a token of acceptance before technical sanction can be formally accorded to them by the competent authority of CPWD. However, subsequent to grant of technical sanction, all material structural changes (even if the sanctioned budget is not exceeded) need to be approved by the competent authority according the original technical sanction. The powers delegated to various officials of CPWD regarding accord of Technical Sanction is given in the following table.

Table 3.1: Delegation of powers for technical sanction

Competent Authority	Project Cost	Remarks
Assistant Engineer/ Assistant Executive Engineer	Rs. 60,000	
Executive Engineer	Rs. 10,00,000	Where AE (Planning) is provided.
Executive Engineer	Rs. 6,00,000	Where AE (Planning) is not provided
Superintending Engineer	Rs. 70,00,000	
Chief Engineer/ADG/DG(W)	Full Powers	

Source: CPWD Works Manual 2003

3.4.3 *Appropriation and Re-appropriation*

Appropriation means assignment of funds to meet some specified expenditure requirement. Re-appropriation means the transfer of funds from one unit of appropriation to another under such unit. This definition is based on the fundamental principle that no outlay on a work shall be incurred without funds having been allotted for it. In cases, where due to emergency, expenditure is authorised in anticipation of the allotment of funds, it has to be followed by a formal allotment of funds to the extent required. This allotment is intended to cover all the expenditure incurred in the current year and liabilities that were incurred in past years but are to be paid in current year. It is operative till the close of the financial year. Any unspent balance lapses and is not available for utilisation in the following year.

The demands for new capital works/works in progress chargeable to major expenditure heads, namely "4059 – Capital Outlay on Public Works" and "4216 – Capital Outlay on housing" are forwarded by the DG(W)/Chief Engineer to Ministry of urban Development by 31st October every year. These are confined to those works only, which have received expenditure sanction, wherever such sanctions are required.

3.5 Critical Issues

Based on our understanding of the project management process, as outlined in the previous sections, and has identified the critical issues that are currently affecting the overall performance of CPWD. These issues are as follows;

3.5.1 *Delays in project planning and execution:*

"Compliance to envisaged time-lines" is one of the most important elements of service delivery and the same holds good for CPWD in the context of project management.

An office order issued by C.E. (SWZ) (Ref #.WS-36/Misc/11 (80) 864), dated 1st January1980, defines the following time scales for various activities:

- From receipt of requisition to submission of line sketches to the client: Three months
- Preparation of 'working drawings showing wall thicknesses and layout of doors and windows: Two months
- Preparation of estimates: One month
- Preparation of structural drawings: Three months of receiving AA and ES.
- Preparation of detailed cost estimates: Three months post preparation of structural drawings
- Preparation of detailed working drawings: One month post preparation of structural drawings
- Preparation of tender documents and issue of NIT: Another Nine months

The above mentioned timeline allows a **total period of 21 months** (excluding the time taken for according the AA and ES from the client) from the date of requisition from client. However, our analysis has revealed that **a large number of projects do not adhere to even these time frames and there are inordinate delays in various project related activities**.

We carried out analysis of the MIS report of June 2004 to identify the extent of delays in the project planning stage. The data related to those projects for which requisition had been received but PE were not sent for approval till the end of that month. In the given MIS report, the requisition date was not available for 25% of the recorded projects. Of the balance 75% projects, the analysis revealed the following:

- 25% of the recorded projects were requisitioned within past six months.
- About 33% of recorded projects were more than a year but less than two years old, for which the PE were yet to be sent.
- Nearly 12% of the recorded projects were older than 3 years.

This means that for about 45% projects, the preliminary estimates were not sent even after one year from the date of requisition.

Similarly, MDI's analysis in an earlier report on CPWD restructuring revealed that average time taken for preparation of preliminary design and preliminary estimates is 72 weeks (about 17 months) and 19 weeks (about 5 months) respectively.

This clearly highlights the extent of delays even for activities, which are directly under control of CPWD. During our interactions with CPWD officials, it was conveyed that **dearth of adequate manpower and lack of co-ordination create such delays.** We believe that one of the prime reasons for these delays can be attributed to the project team structure, i.e. the way resources are allocated and work is organised within the department.

Another reason for such delays is due to **emphasis on "doing the work in-house"** with own resources. At present, CPWD opts for outsourcing only when the technical expertise is not available within the organisation and rarely (or never) to ease out work load pressure on departmental engineers / architects. Hence, **a project incharge, typically, prefers to wait for the departmental colleagues to deliver rather than opt for outsourcing the expertise from other public / private sector organisations.**

Hence, we believe there is a strong need to introduce a system which emphasises on 'accountability' and make officers responsible for overall delivery within the budgeted time frames.

We have initiated the process of benchmarking Our Recommendations with respect to defining timelines for pre construction activity the various project development activities against similar Government organisations, such as, Delhi Development Authority, Haryana Urban Development Authority, NBCC and Maharashtra Housing and Area Development Authority. The results of this exercise would be provided as a separate position paper. A letter from CPWD in this regard has been sent to these organisations, which is enclosed as Annexure 1.

3.5.2 *Delays in project construction stage*

The delays that occur during the project construction stage are due to the following reasons:

- Change in scope of work and / or any specification during the course of the construction is one of the major reasons for delay in project implementation. The typical problem is in fixation of rates for the new items with the existing contractor. Moreover, if the existing contractor refuses to carry out the additional/ changed scope of work at the rates recommended by CPWD / client, then CPWD has to engage a new contractor. However, this further leads to co-ordination problems and project delays.
- There are cases where the client directly appoints architects / consultants for preparation of drawings. Quite often, these drawings are not available in time and are sometimes incomplete. Hence, CPWD is forced to put in extra time and effort in order to push the construction activity.
- The contractors do not invest in modern tools and machinery that becomes a bottleneck in timely delivery or reducing the lead time for construction. A related issue is regarding contractor's unwillingness to recruit full time skilled labour / technicians. Deployment of semi-skilled labour also results in inefficiency and delay in projects.
- Funds from client department are not made available to CPWD on time resulting in project delay and sometimes stoppage of work. There are also cases of procedural delays in funds reaching from Client department to the pertinent contract engineer.
- Non availability of critical raw material (such as Steel, Cement) due to sudden demand-supply gap. In such cases, the raw material price shoots up and the contractor tends to delay the construction hoping for fall in prices.
- Non availability of labour due to seasonal variations (especially during agriculture sowing season, festivals, etc.)
- Delay caused by external agencies (such as, urban local body, or the utility concerned) in providing the requisite approval and even the final completion / occupation certificate.

3.5.3 *Compartmentalisation on cadre / functional lines*

The department has got increasingly compartmentalised on functional lines (cadres), which leads to co-ordination problems and duplicity of command chains thereby making it difficult to fix accountability. Till the level of Chief Engineers, one is directly identified with one's respective cadre. For instance, a particular Chief Engineer of Civil Cadre, heading a zone has a Superintending Engineer of Electrical cadre to assist on project issues (functional reporting), however, the latter reports to a Chief Engineer of Electrical Cadre (administrative reporting including writing ACRs). This dilutes the authority of the Chief Engineer managing the project under which the concerned Superintending Engineer is working. This also creates an environment, where the accountability and allegiance of engineers of different cadres lie with the superiors belonging to their parent cadre rather than towards the project objectives and the project leader responsible for implementing the concerned project.

3.5.4 *Career Stagnation*

A number of legal suits against the department on promotion issue have led to a large number of vacancies at the Executive Engineer's (EE) level. This has hampered the performance of the department, as an EE heads the field unit and carries out the project execution work. Additionally, this has led to the problem of stagnation in the department, thereby reducing the morale and motivation of engineers within the organisation.

3.5.5 *Flexibility in operations (Adherence to Manual and Procedures)*

CPWD has a very well laid down manual listing the procedures for the various tasks and all the employees are expected to adhere to them. The vigilance cell of CPWD comes into play whenever there is deviation from the laid down procedures, irrespective of the motive behind the deviation.

This has made engineers very cautious about deviating from the procedures as vigilance enquiries get quite cumbersome, apart from adverse remarks in the appraisal reports. This cautious approach, **more often than not, results in project delays, which ironically is not subjected to vigilance or departmental enquiries.** This is definitely an issue for CPWD in the context of project management.

It must be clarified that adherence to rules and procedures is not at all a bad practice; we are only highlighting the need for more operational flexibility to the engineers. We are buttressing the need for finding the reasons behind the deviations from procedures prior to initiating vigilance enquires.

3.5.6 *Absence of Knowledge Management System*

The organisation has not implemented any Knowledge Management System (KMS). Considering the fact that CPWD is the pioneer in the field of civil construction in this country, the vast pool of

knowledge that it has generated over the years should be captured electronically and be made available to the entire organisation.

Absence of a computerised knowledge management system available to all the units of CPWD, from central headquarters to field stations, hinders the proper utilisation of collective organisational knowledge for executing projects efficiently. This creates problems in the project execution to the extent that standardisation of designs does not take place, and the wheel is reinvented in most of the cases.

Such a system will also prove very effective whenever the engineers are transferred from one region or zone to another. At present, there is no system by which one can get familiar with the issues involved in designing, estimating and constructing a building, except for going through the archives of files of completed/on-going projects, which is a cumbersome and time-consuming process.

3.5.7 *Inadequate Project Monitoring System*

There is a directorate responsible for preparing project monitoring reports that complies monthly progress report of Central Police Organisation (CPO) works costing more than 10 lakh and Non-CPO works costing more than 1 crore. The directorate compiles four annual reports, 19 quarterly reports, and 8 monthly reports and submits then to concerned officer and clients.

Our analysis of a monthly report prepared by the existing Project Monitoring System, revealed the following:

- Out of 300 cases of CPO works which had been requisitioned and preliminary estimates were not submitted, 75 cases (25%) did not have the date of requisition.
- In case of non CPO works, 27% of similar cases did not have date of requisition.

This makes the task of assessing the extent of delays difficult, at the first place, thereby the task of taking any corrective action also tends to become ineffective. This problem arises, mainly because there doesn't exist an integrated computerised project monitoring system, which is linked to milestones or stages of project execution. At present, the information regarding status of various projects percolates up the organisation, through the levels of EE, SE and CE. Unless a system is devised wherein data can be fed in and information can be accessed at any level of the organisation (with varying access rights), it would always be difficult to devise an effective strategy for reviewing and correcting project delays.

3.6 Recommendations

Our recommendations to address the issues affecting project management function in CPWD are of three categories:

- Structural recommendations related to the organisation structure, hierarchy, reporting relationships and the way organisation & its employees gears itself to deliver the desired service.
- Systems related recommendations related to better project monitoring and archiving the wealth of knowledge created in the organisation, that would enable the organisation to manage their projects effectively
- Policy related recommendations

All these recommendations are detailed out in the following sub-sections.

3.6.1 Altering Project Management Structure

In an organisation like CPWD whose regular operations require it to undertake projects of various sizes, it becomes imperative to create an organisation structure, wherein the organisational resources are so organised that they are efficiently and effectively utilised to achieve the stated objectives of the projects undertaken. In other words, the organisation needs to adopt a project management structure, where the domain knowledge, skills, tools, and techniques are applied to project activities in order to meet or exceed stakeholder needs and expectations invariably involves balancing competing demands among:

- Scope, time, cost, and quality.
- Stakeholders with differing needs and expectations
- Identified requirement (needs) and unidentified requirements (expectations)

The objectives of project generally undertaken by CPWD had traditionally been oriented towards cost savings only and 'time' was rarely the criteria. As a result, the structure of project execution and the processes defined for execution are oriented towards minimising cost of projects, often compromising the quality of construction and time consumed. In last decade and a half, quality consciousness and timeliness of getting work done has gained importance owing to the general economic growth along with global exposure that the country has been subjected to.

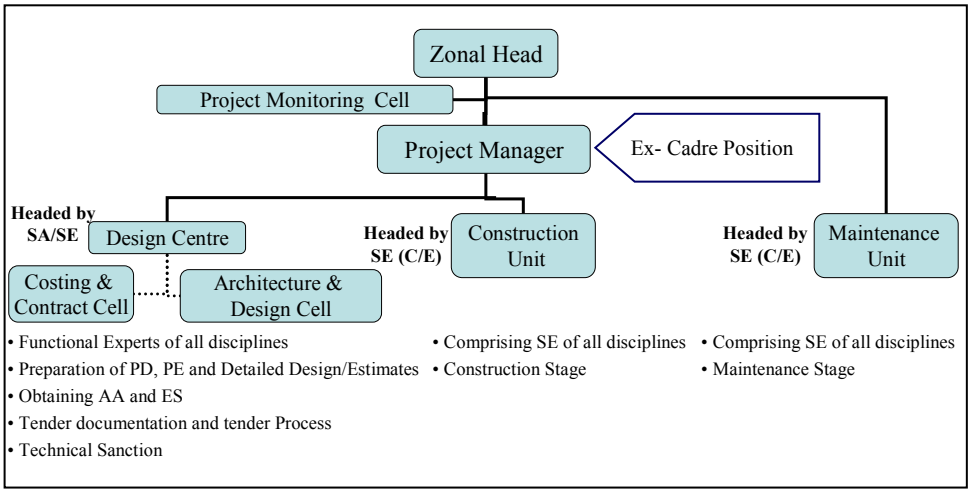
In this general backdrop of shift in paradigms governing the provision of goods and services, the structure in planning/executing/monitoring projects and the decision making processes involved therein needs a more accountable and specific orientation towards completion of projects in timely manner and achieving clients' expectations. Thus, **it requires clearly identified project manager, project team, deliverables and avenues for recognising success stories and fixing accountability for delays and inefficient functioning**. **The multi-disciplinary team need to work under a common project manager to achieve a common goal of completing the project within the pre-approved cost and time budgets, without compromising on quality of construction.**

In context of the existing levels of CPWD hierarchy, engineers of Superintending Engineer post are most suitable to assume the mantle of project manager. An engineer with 15 years of experience is more or less adequate to lead a project team. This is also corroborated by the fact that in construction industry, the general work experience sought for the position of project manager ranges between 15 to 20 years, depending upon the complexity of projects. However, even an executive engineer too can be considered for project manager's role, if the project is less complex in nature or smaller in project cost. This shall not only help in optimal utilisation of resources but also help in grooming future project leaders.

The recommended project management structure envisaged for CPWD is based on all the three functions undertaken while undertaking a typical construction project, i.e. planning, designing and executing. CPWD can adopt any of the following two alternative models to manage projects effectively.

- **Alternative 1**: The salient features of this first alternative project management structure are given below (Refer figure 3.2).
  - It is envisaged that there will be a new intermediate position, known as Project Manager, between the Superintending Engineer and Chief Engineer. The position of Project Manager shall be an ex-cadre position, and be picked from a pool of SEs who possess multi-disciplinary skills. The idea is to create a specialised function of project management, responsible for all activities of a project. However, to ensure career progression of such engineers, who may not like to be project managers, they may be allowed to grow within their functional areas and be made eligible for the position of Chief Engineer/Chief Architect.

Figure 3.2: Alternative Project Management Structure – 1



- A zone shall have distinct units addressing the planning, designing, costing, construction and maintenance functions. The **Design Centre**, headed either by a Senior Architect or Superintending Engineer, shall comprise of functional experts of all disciplines. The Design Centre shall have both Architecture / Design cell and Costing cell and be responsible for all the pre-construction stage activities (preparation of preliminary Designs, preliminary estimates, detailed designs, detailed estimates, liaison with clients, obtaining AA and ES, following up with regulatory bodies to get necessary sanctions, tender documentation, procurement of works and obtaining technical sanction). **The head of the design centre shall coordinate with the designated project manager in terms of allocation of suitable resources (for the project) and ensuring completion of tasks by his architects and costing engineers. In a way, the project manager becomes the "quasi-client" for the design centre.**
- A zone may have more than one construction unit depending upon the estimated workload. The construction unit(s) shall be headed by a Superintending Engineer of either cadre and comprise of Executive Engineers/Dy. Directors of all disciplines. **The head of the construction unit too shall coordinate with the project manager and be responsible for delivery by his team of engineers during the construction stage.**
- The zonal head (i.e. of CE rank) should **nominate a project manager** and he should be given a free-hand in managing the project within the allocated budget and time frames. This Project Manager will interact with the client as well as the Design centre and Construction unit and will be accountable for all activities till completion of construction. **As he is responsible for the overall delivery, he should also be given authority to decide on outsourcing of any activity in case the in-house engineers are constrained for time and / or expertise. The selection of outsourced agency can be done in consultation with the zonal head.**
- Similar to construction unit, each zone shall also have maintenance unit comprising of personnel from all disciplines and headed by a Superintending Engineer, whose responsibility will be to undertake maintenance works of all government assets, as has been carried out hitherto. One of the SEs of this maintenance unit will become the "project manager" of the asset during the maintenance stage, who in turn will lead a multi-disciplinary team of EEs / JEs / AEs for maintenance. **Each SE shall be given an area of jurisdiction, in which he shall be responsible for maintenance of all assets within the area.** All such heads of maintenance units shall report directly to the zonal head.
- At the Zonal level a **project monitoring cell** has also been envisaged, which will be responsible for monitoring the progress of works, prepare periodical monitoring reports,

seek clarifications on delays and undertake variance analysis of the ongoing projects in terms of time and cost over-runs, so that appropriate measures can be taken up to address these problems. This cell will **directly feed the status of the projects to the zonal head, who shall instruct the project managers for corrective action at the appropriate time.**

- The **Technical sanction should be accorded by a multi-disciplinary committee** comprising of atleast three zonal heads (preferably one each with civil, electrical and architecture background) and the regional ADG for all projects with contract value less than Rs 5 crores. The DG (W) can be an incremental member of this committee for projects larger than Rs 5 crores in size. All the project managers will be required to present their case to this committee that should meet every month in the respective region. The periodicity of the meeting may be changed based on the number of projects that need to be discussed. This is similar to the investment committee (IC) of a financial institution / bank, where investment officers present their projects to the IC for investment sanction. This mechanism will resolve the current apprehension of engineers who are hesitant in according technical sanction to the project components that are not of their functional specialisation.
- In order to streamline the reporting and performance appraisal system and in a situation where personnel have to be accountable to respective unit heads as well as project managers, it is suggested that the **unit head be the reporting authority, the project manager be the reviewing authority and the Chief Engineer (Zonal Head) be the accepting authority.**

In this structure, the roles and responsibilities of the two key positions, viz., Project Director / Zonal head and Project Manager are as follows:

- **Project Director / Zonal Head:** The position of Project Director shall be at the zonal level, as this officer will be required to manage the resources across various projects that may be undertaken in the zone. The primary task of the project director shall be of more of general managerial nature rather than of imparting any specific technical inputs to planning/designing/execution teams. The idea behind having a project director is to create a position which has all the available resources, and more importantly the authority to manage these resources across different processes involved in undertaking a project. The creation of a project team should also be the responsibility of the project director. In the existing organisational hierarchy of CPWD, the position of Chief Engineer shall be most appropriate for discharging the duties of a Project Director, generally the occupants of this position have more than 20-25 years of experience dealing with techno-administrative issues related to project execution. At this level they also have a good

understanding of the human resource requirement of various types of construction projects, having undertaken scores of such project throughout their tenure. A typical **Project Director (or Chief Engineer) will look after all the projects in his zone and will have all the Project Managers (in his zone) directly reporting to him.** The project director shall also lead the project monitoring unit, whose prime responsibility shall be to generate MIS reports regarding status of various projects, which are in different stages of completion in order to facilitate the project controlling activities. He may be assisted by an engineer of Executive Engineer rank for undertaking the routine activities of this unit. Recommendations regarding project-monitoring system have been elaborated in section 3.6.5.

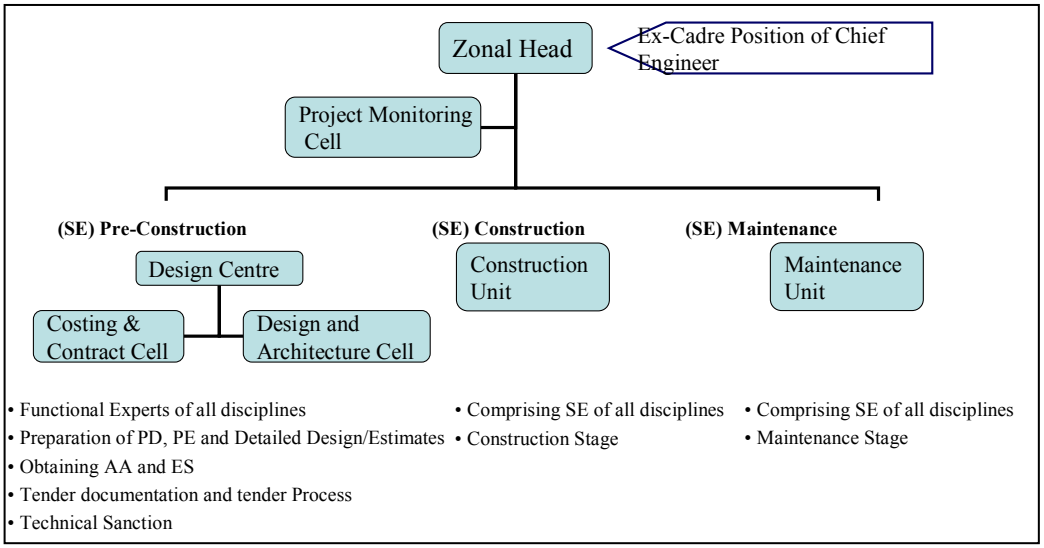
- Project Managers: The Project Management unit refers to the pool of such experienced and technically adept engineers within the ranks of CPWD who can take the mantle of a project manager. The idea is to identify a set of such professionals who are capable of handling people, resourceful, conceptualise solutions for problems and are dynamic enough take quick decisions. This person shall be responsible for integrating the interdisciplinary and inter-organisational efforts under changing environments for successful project execution. One important aspect that is required to be kept in mind is that the project manager must be allowed to work independently of the normal organisational chain of command, as at this position one needs to assume total responsibility and accountability for the success or failure of the project**. This includes powers to take decision on outsourcing of expertise, if the need arises.** The office of the project manager shall be responsible for identifying any design conflicts between structural and electro-mechanical services and integrating these designs by resolving such conflicts. For the purpose of overall managerial guidance, the Project Director shall be the immediate superior of all project managers of a zone.

➢ **Alternative II**: The structure for project management is presented in figure 3.3. The salient features of this second alternative structure are as follows.

- The second alternative proposes creation of functional managers in each of the units in the zone, as defined in Alternative I, viz., Design Centre, Construction Unit and Maintenance Unit. The structure envisages designation of separate functional managers at pre-construction stage (undertaken by the design centre), construction stage (undertaken by the construction unit) and maintenance stage (undertaken by the maintenance unit). The primary activities of these units shall be the same as defined in the previous alternative. In this structure, there will be handover of responsibilities from one stage/unit to the other stage/unit in accordance with the progress of work on a specific project.

- The fundamental difference between the two alternatives is that (in this alternative) role of project manager is played by a SE of the pertinent centre / unit and hence, the project manager changes with the stage the project is in. This means that there is no common project manager for the pre-construction and construction stages. The head of the design centre nominates a project manager for the pre-construction stage and subsequently transfers the project to the construction unit, where it is headed by a different project manager.
- The other key difference in this alternative is that the Zonal Head, i.e., the Chief Engineer's position is an ex-cadre position, so that he has both administrative and functional control on all SEs in his zone irrespective of the cadre.

Figure 3.3: Alternative Project Management Structure - II



The above two project management structures will provide the requisite command and control of the project to the project director and project manager. However, it is necessary to undertake a few more measures to enhance organisational efficiencies and creating more accountable systems. These recommendations are given in the following sub-sections.

3.6.2 Rationalisation of Command Chain

The key to a successful project management structure is the authority and responsibility conferred upon the project manager to undertake the given project. In the existing organisational hierarchy of CPWD, duplicity of command chains exists (in terms of different functional and administrative reporting structure), as described earlier. There is a need to remove this anomaly so that the activities become co-ordinated and accountability becomes more specific.

In this context, we recommend that the functional distinction between different specialisations must effectively end beyond the level of Superintending Engineer. The Management Unit comprising of the personnel most suitable for assuming the role of a Project Manager should not have any distinction between the cadres of such personnel.

As suggested earlier, the experience a SE generally possess, irrespective of functional specialisation, helps the person in understanding the issues involved in the project execution and skills required to resolve them. Given such a scenario, the head of various units (which are suggested in the recommended project management structure), irrespective of their parent cadre should report to the zonal head, who shall be the final authority in a particular zone and responsible for overall management of works. For the purpose of writing the Annual Confidentiality Report (ACR), which is the basis for performance assessment, suitable changes be made to accommodate the comments of the unit head of a particular engineer and also the project manager under whom that particular engineer worked on a given project.

3.6.3 Adherence to procedures and the role of vigilance cell

As stated earlier, the engineers (which incidentally is a widely prevalent phenomenon in Government) adopt cautious approach whenever it comes to decision making. This is solely to avoid vigilance enquiries against them.

Our view is that, prior to initiating vigilance enquires, a softer mechanism should be introduced to identify the reasons behind the deviations. This softer mechanism could involve referring the case to a "committee" for review and an opportunity could be given to the concerned engineer to represent his case. This committee, on merit of the case, could decide to squash the issue or refer it to vigilance cell for detailed enquiry.

3.6.4 Establishment of a Knowledge Management System

Absence of a credible *Knowledge Management System* (KMS) leads to repetition of designing activity, eliminating the opportunities of implementing projects on a fast track. Knowledge management involves identification and analysis of available knowledge within the organisation, and the subsequent planning and control of actions to develop knowledge assets as to fulfil organisational objectives. Absence of a knowledge management system also leads to concentration of knowledge in individuals and hinders the dissemination of the cumulative expertise gained over the years, across the organisation.

For improved productivity, where projects need to be completed in minimum time and optimal use of resources, it becomes imperative to develop and establish a knowledge management system. The key features of the knowledge management system shall be the following:

- KMS shall be an automated system of archiving and retrieving data, information and organisational knowledge, to be utilised by personnel across the organisation.
- The KMS should be the repository of standardised designs, contracts, specifications, and item rates that are developed by CDO and CSQ units. The KMS shall have to be integrated with the Project Management Information System, described in following sub-section, so that the project experiences regarding time taken for various activities, the changes in design imperatives, and cost implications get captured over a period of time. This shall help in standardisation of designs and processes, and make them closer to reality rather than a theoretical exercise.
- The information stored should be organised on the basis of geographical diversity, functional and technical differentiation.
- It should have pre-defined access rights for different levels of officers belonging to different units, for uploading, modifying and accessing the database belonging to the envisaged KMS. It should have a query based user-friendly interface, which facilitates easy retrieval of information.
- The KMS shall be effective only if the entire organisational set-up right from the head quarters to the field units get networked. In order to simplify the data storage procedures, central servers can be maintained either at the regional or zonal levels, which are then connected to respective field units. These regional/zonal servers shall be remotely connected to each other and the headquarters. The idea behind suggesting a regional servers rather than one single centralised server is to avoid network congestions. Periodically, the database of the zonal servers can be replicated at the regional and national levels for updating the database available in those servers.

3.6.5 Developing a Comprehensive Project Management Information System

The lacunae in the existing project monitoring system have been highlighted in section 3.5.7. The strengthening of project monitoring system shall require development of a comprehensive Project Management Information System, which integrates various activities involved in project execution right from conception to completion stage. More importantly **the monitoring activity has to be integrated with milestones for a particular project through an automated system**. In other words, achievement or non-achievement of a milestone gets automatically captured in the system and is reflected in the periodical status reports. A Project Management Information System or PMIS, conceptually, aims at collecting the right data, in requisite form at appropriate time, to be communicated to the concerned decision makers for taking corrective actions. The PMIS has to be an integrated and automated system that provides information to support operations, management and decision making functions relating to planning and control of project objectives.

In context of the project management framework suggested earlier in this chapter, the project monitoring and control activity needs to be addressed at three levels. First level being the preparation of preliminary design and preliminary estimates; from receipt of Administrative Approval and Expenditure Sanction up to the preparation of Detailed Design is the second level. The third level deals with the actual construction activity commencing with the call of tenders. Some of the basic activities that are required to be taken up for effective project monitoring are as follows:

- At the time of initial enquiry, the Project Director or the zonal head shall issue a unique identification number for every enquiry received and shall be called the Project Planning Order number. This will require a Project Planning Order format, which will include details like name of client, name of the project, likely work schedule till the submission of preliminary designs and the actual dates of various milestones achieved in this phase. This planning order format shall be prepared the Project Monitoring Unit in consultation with planning team and recorded in a computerised database. It shall be the responsibility of the Project Monitoring Unit to generate status reports and variance reports for appropriate actions to be taken by the Project Director.
- In the second phase, which shall start after the receipt of AA and ES from the client, the Project Director/Zonal Head, shall generate a Detailed Design Order through the Project Monitoring Unit, containing the milestones decided for completion of submission drawings, submission of these drawings to local bodies, completion of detailed designs/estimates, receipt of technical sanction and finalisation of NIT. These shall be prepared in consultation with all the relevant units, i.e., the Project Manager, the Architectural Unit, the Design & Costing Unit and the Electro-mechanical Unit. In this case too, the Project Monitoring Unit shall generate progress reports and variance reports, periodically (say, monthly or quarterly) for the Project Director's perusal.
- The Project Manager in consultation with the contract manager shall be required to prepare a project implementation schedule detailing out target dates for achieving various milestones involved in carrying out various construction related activities. This schedule shall then become the basis for monitoring the progress of work. This schedule shall be handed over to the project monitoring unit, to be recorded in the database. However, in order to ensure effective monitoring of project execution, there is a requirement for computerising the accounting system and integrating it with the proposed PMIS, in such a way that every bill raised by the contractor and admitted by the contract manager automatically gets captured by the PMIS. Unless this integration of accounting system and PMIS happen, through an automated system, the effectiveness of PMIS shall remain ineffective, as the monitoring shall not be possible in real time.

The efficacy and efficiency of a PMIS can only be ensured if all the field units get computerised and networked with zonal, regional and national headquarters. Otherwise, the systems shall remain isolated and create problems in standardisation and integration of information

3.6.6 Scope Change control

CPWD is often blamed for delay in project execution even if there are extraneous factors, like mid-term change in scope of work by the client department. The project cost and the estimated time frames change even of there are any changes in specifications during the construction stage.

It is recommended that CPWD should implement ***"scope change control system"***, which should be linked and synchronised with the proposed project management information system. This scope change control system should capture the proposed change in scope and, most importantly, cost and time implications of change. This system would define the procedure by which the project scope may be changed including the approval levels for authorising changes.

CPWD should ensure that the MoU signed before start of a project should clearly outline a common understanding of the scope of project among CPWD and the client department. This MoU should also define project cost and the time taken to complete the project, and should be signed by the project manager (CPWD) and the nodal officer from the client department.
As the project progresses and if there are changes in the scope of work, they should be captured along with the changes in the project timelines and the cost. Both the parties should sign this document. Linkage of the Scope change control system with the proposed project management information system would ensure that it is a well-defined task of the project manager and the cost / time extensions are formally captured in CPWD's PMIS.

This system would ensure that CPWD is not blamed for delays in project execution due to change in scope of work by the client department.

3.6.7 Devising a focussed and regular skill up-gradation (training) programme

The matrix organisation suggested for project management aims at creating multi-disciplinary teams cutting across functional lines, functioning under a common leader. This requires certain general managerial skills, to enable handling the issues of project planning, resource allocation, inter-personal skills and negotiating skills. Moreover, the concept of task leaders warrants grooming of engineers in technical as well as managerial skills to lead various tasks on one's own initiative. The CPWD Training Institute needs to devise the following specialised programmes:

- Programme on Project Management Techniques, targeted at the Executive Engineer and Superintending engineers, who may be required to assume the role of project manager.

Programmes can be devised to train the engineers on specialised or custom-made software packages on project planning, project scheduling, and project controlling.

- Specialised training programme on Contract Management comprising techno-commercial and techno-legal issues are required to enable the prospective contract managers handle arbitration proceedings, devising of agreement clauses and objective tender evaluation procedures. These programmes can be based on procedures and documents standardised by FIDIC for construction project management.
- Specialised training programmes on engineering issues like structural designs, utility designs, electro-mechanical devises, the latest innovations therein and technological advancements, targeted at those engineers who are going to staff the design and costing units as well as the electro-mechanical unit.
- A training programme on economic evaluation and financial control of projects also needs to be devised to orient senior engineers and top management of CPWD towards these issues. This shall help in enabling the top management to take strategic decisions regarding project prioritisation, resource allocation and resource management.
- Exchange programmes with reputed private sector companies and / or Government construction departments of other countries for select engineers so that they are exposed to best practices in construction industry
- An orientation and training programme shall also be required to acquaint the CPWD personnel in using and managing the proposed Knowledge Management System and the PMIS, once they become operational.

Chapter 4 Maintenance Activity

4.1 Maintenance activity in CPWD

Maintenance activity is defined by BIS as "*A combination of many actions carried out to restore an item in, or restore it to an acceptable condition*". Building maintenance is thus "*work undertaken to keep, restore or improve every facility i.e. every part of a building, its services and surroundings to a currently acceptable standard and sustain the utility and value of the facility*".

Maintenance of capital assets of the Central Government of India is one of the core functions performed by CPWD. It includes maintenance of residential and non-residential buildings, including civil, electrical, mechanical, air-conditioning, horticulture, and other services. Maintenance activity is very important not only for the client departments, whose assets are maintained by CPWD, but also very significant for CPWD as a large percentage of its work force is deployed in this activity and forms a very large percentage of the work load being handled.

The equivalent maintenance workload[1] has increased from 45% of CPWD's total workload in 1990-1991 to 48% of the CPWD's total workload in 2003-2004. In 2002-2003, CPWD handled work of about Rs 2200 crores, of which Rs. 1600 crores were from project execution/ construction activity. The balance work of Rs 600 crores is related to maintenance activity. The extent of maintenance being carried out by CPWD may be gauged from the fact that the department is maintaining about 64,000 dwelling units under the GPRA (General Pool Residential Accommodation) in Delhi and 33,208 dwelling units outside Delhi besides other pool accommodation. A number of office buildings are also being maintained by CPWD. The total GPOA (General Pool Offices Area) area being maintained is approximately 4,20,000 sqm. Besides this a large area of buildings outside the pool is also being maintained.

The type of maintenance works carried out by CPWD can be classified in various categories as mentioned below:

- Day to day repairs/ service facility: Day to day repairs carried out by CPWD in all buildings under its maintenance on the basis of day to day complaints received at the service centre.
- Annual repairs: To maintain the aesthetics of buildings and services as well as to preserve their life, some works like white washing, distempering, painting, cleaning of lines, tanks etc are carried out periodically. These works are planned on year to year basis.
- Special repairs: Such works are undertaken to repair the existing parts of buildings and services, which get deteriorated on ageing of buildings. It is necessary to prevent the

[1] *Equivalent maintenance workload = Maintenance expenditure * 2.25*

structures and services from deterioration and restore it back to its original conditions to the extent possible.

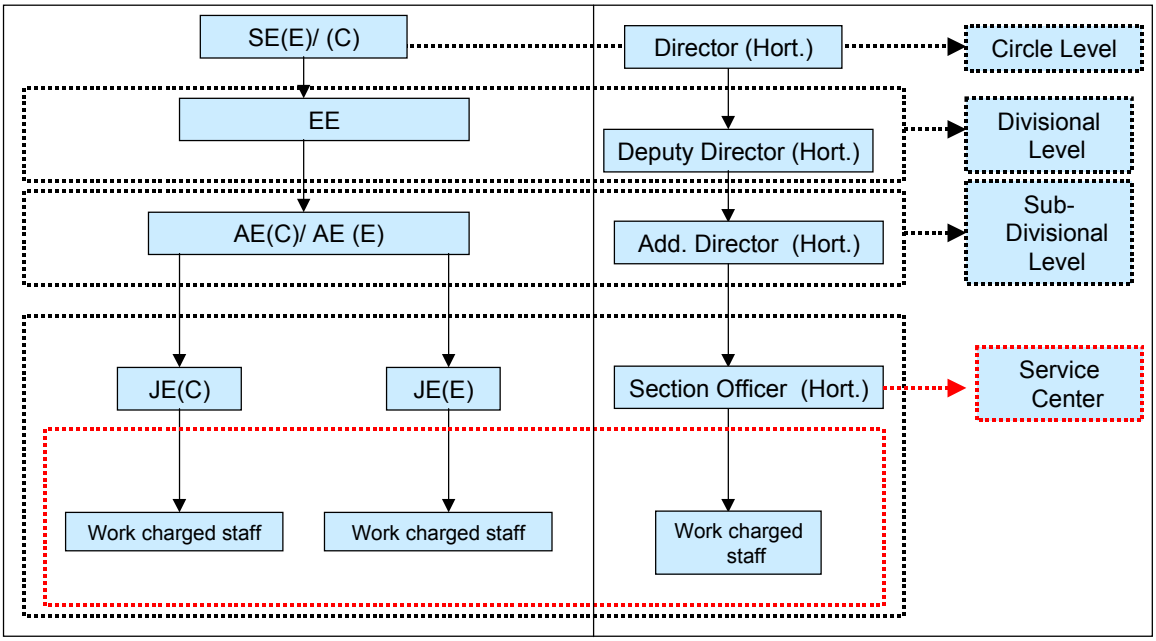
- Additions and alternations: The works of additions/alterations are carried out in buildings to suit the special requirements of occupants for functional efficiency. Norms for facilities in government residential and non-residential buildings are revised from time to time. The facilities are upgraded by carrying out such works.

- Preventive maintenance: Preventive maintenance is carried out to avoid breakdown of machinery (such as pumps and elevators) and occurrence of maintenance problems in buildings and services. Works of preventive maintenance are carried out on the basis of regular inspection/survey.

4.2 Institutional set up for maintenance activity

In CPWD, the overall direct control of maintenance activity for different items is with respective Executive Engineers of each discipline. Each division has been given a geographically defined area for effective control and management of maintenance activities. *JE (Civil)* is responsible for maintaining the buildings and civil services, *JE (Electrical)* is responsible for maintaining the electrical services and *SO (Horticulture)* is responsible for maintaining the green areas. The structure of a maintenance circle/division/ sub division level is given in Figure 4.1.

Figure 4.1: Organisation structure of a maintenance circle/division/ sub division level



The estimation of manpower requirement for undertaking maintenance activities in different parts of the country is done based on the existing geographical and functional structure of organisation

having civil, electrical and horticulture streams. The *basic strength of staff is fixed in a division as per the yardsticks laid down by the Department of Personnel and Training, Government of India from time to time based on detailed Staff Inspection Unit (SIU) studies*.

In maintenance, as much as 75% work is handled in-house and about 25% work (annual and special repairs) is contracted out. Out of the total CPWD work force of 42,919 employees, of which 37,500 are work-charged staff, 24,000 of them (64% of the total work-charged force) are involved in maintenance activities. The composition of basic manpower strength of Divisional unit is given in the Figure 4.2.

Figure 4.2: Basic sanctioned manpower strength in CPWD maintenance offices

S. no	Post	Divisional office
1.	Executive Engineer (EE) / Surveyor of works	1
2.	Assistant Engineer (AE) / Asstt. Surveyor of works	1
3.	Head Clerk	1
4.	SAS or Divisional accountant	1
5.	UDC	4
6.	LDC	7
7.	Stenographer	1
8.	Junior Engineer	
9.	Daftry	1
10.	Barkandaz	1
11.	Peon	3
12.	Chowkidar	1
	Total	**26**

Source: *CPWD Manual I*

4.3 Existing Maintenance Process

The existing maintenance process comprising preparation of maintenance budget and compliant registration and redressal process of CPWD can be divided into eight activities. The activity wise maintenance process is detailed out below and also shown in Figure 4.3;

Activity 1: Preparation of Maintenance Budget

At the beginning of the year, the concerned JE/AE is expected to conduct a survey of buildings under his charge to identify the items of day to day repairs, annual repairs, and special repairs, which are required in their division /sub-division. On the basis of plinth area rates and manpower yardsticks as mentioned in the CPWD manual, annual budget estimates are prepared. The annual maintenance budgets are prepared at each division level, and then compiled at circle, zonal and regional level. The budget, which is approved by competent authority at each level, is then

complied and submitted as maintenance budget for the entire CPWD for approval to MOUD/ Ministry of Finance along with budget for construction activity. However a maintenance division is often allocated a reduced budget in comparison to the original estimates, as is evident from the trends in last few years.

Activity 2: Registration of complaint by an occupant

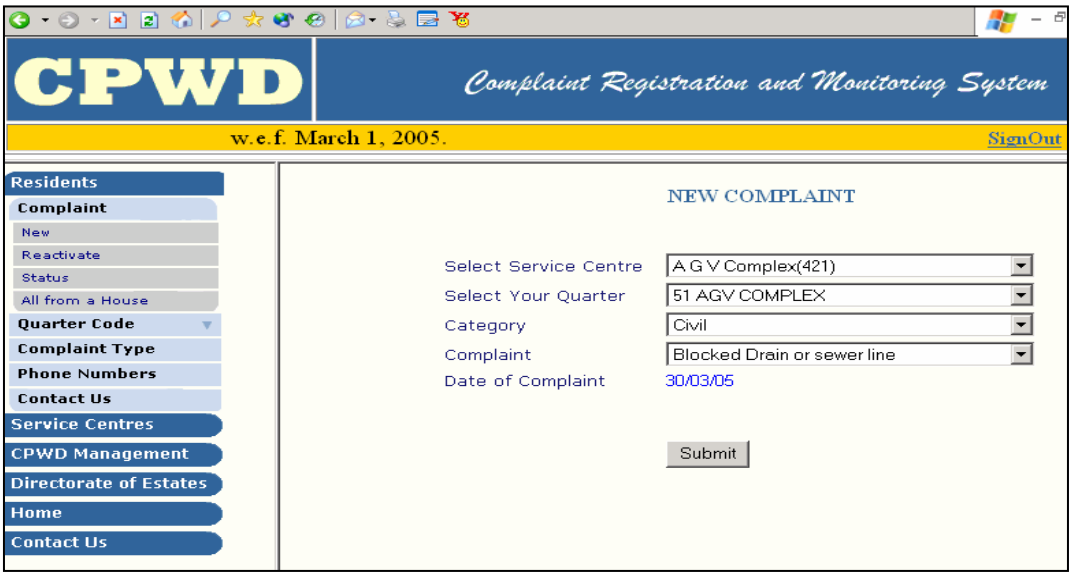
In the residential areas maintained by CPWD, the tenants have following options for registering their complaints.

- In a service centre either over a phone or in person.
- Through IVRS- available in Delhi only
- Online complaint (though internet) - available in Delhi only

In order to enable occupants/residents to lodge their complaints, **service centres** have been set-up, which were previously known as enquiry offices. A service centre is generally located at a centre point in each neighbourhood covering 1,500-3,000 houses per centre.

CPWD and NIC have developed a complaint registration and monitoring system for Delhi. A complaint can be logged in at the web-site (`http://cpwdsewa.nic.in`) where one can select service centre, type of quarter, category of complaint and type of complaint. The complainant can also monitor status of his complaint online and get contact details of e-service centre where complaint has been registered. A snap shot of complaint registration and maintenance system for Delhi is given in Figure 4.3

Figure 4. 3 : Snapshot of Complaint Registration and Monitoring System in Delhi



Activity 3: Recording of complaints by clerk at service centre

The complaints are registered in a complaint register maintained by the enquiry clerk in service centre. In Delhi, the service centre also records the compliant it receives through online or IVRS system. An acknowledgement slip is given to the complainant along with a complaint number.

Activity 4: Categorisation of complaints

The service centre is responsible for maintenance of premises including the services within it. These service centres cater to complaints relating to *civil, electrical and horticulture* disciplines in the department. The complaints received are then categorised in the above three categories.

Activity 5: Recording of complaints in respective registers- JE(C), JE (E), SO (Horticulture)

There are different registers maintained at each service centre for different disciplines for convenience of concerned Junior Engineer/ Section Officer (Horticulture). The complaints are recorded in the register of the respective JE or the equivalent officer of each discipline.

Activity 6: Classification of complaints

The service centre segregates the request of users in the following categories:

- No delay: These include complaints of electricity failure, short circuiting, blowing of fuse, failure of water supply, blockage of drains etc. These complaints are to be attended earliest in any case within 24 hours. (Day to day repairs)
- Minor: These include complaints pertaining to replacement of damaged electrical fittings, carpentry work, and works requiring service of a mason. These complaints are to be attended earliest in any case within 48 hours. (Day to day repairs)
- Major: These complaints pertain to items such as replacement of doors, windows, overhead tanks etc. These are normally attended to through contracts for specific items. Separate registers for major complaints are maintained for monitoring the disposal of such complaints. These are attended on first cum first serve basis and within the constraints of the budget available. (Annual/ Special repairs)

Activity 7A: Attending to day to day complaints by the work-charged staff

Day to day repairs is carried out by CPWD in all the buildings it maintains. The purpose of this facility is to ensure satisfactory and continuous functioning of various services in the buildings. These services are provided on receipt of complaint from the users at respective service centres. Day to day repairs are attended by work-charged staff of CPWD, which are supervised by the concerned JE. Each work-charged staff is required to maintain a diary to indicate the complaints

attended by him and record the signature of complainant certifying that the complaint has been attended to satisfactorily. The JE and AE are required to check the complaint register and each work charge staff's diary on a regular basis to ensure that complaint are attended to promptly, methodically and completely.

Activity 7B: Attending to Annual/Special repairs to be done in 1 to 3 years based on annual contracts

A separate register is maintained at service centres for recording complaints of periodical nature. The complaints that cannot be attended on daily basis are transferred to this register. From this register/ records of the particular premises appropriate information is passed on to the complainant about admissibility of the request and likely time it shall take for the compliance. To undertake maintenance work either of **annual or special repairs**, same procedure is followed as is done for construction work.

Detailed estimates and drawings if necessary are made and the technical sanction is obtained from the competent authority (EE, SE or CE depending on the size of the project). CPWD has laid down detailed rates for expenditure for maintenance and repairs of buildings based on the plinth area. There are different plinth area rates for civil and electrical engineering maintenance for residential and non-residential buildings of different ages as given in the CPWD Manual. Detailed estimates and drawings if necessary are made and technical sanction is obtained from the competent authority. Tenders are called for either by advertisement or by public notice on the notice board. Tenders are evaluated and the contract is awarded usually to the lowest bidder.

Any work of special repair to be undertaken in the division as intimated by JE has to be certified by the EE with prior approval of higher authorities depending on the nature of the repair work to be undertaken.

Activity 7C: Attending to additions/alterations to be done in 1 to 3 years based on annual contracts

Apart from annual and special repairs, additions and alterations are also carried out by CPWD for non-residential and residential buildings.

Two types of **additions/ alterations** are carried out in **non-residential buildings,** as mentioned below:

- Additions/ alterations carried out to suit the special requirements of the occupying department for functional efficiency. Such works are carried out at the cost of occupying department after ascertaining the technical feasibility.

- Additions/ alterations carried out by CPWD themselves as a general requirement for better functioning of offices. Such works are carried out at the cost of the Ministry of Urban Development.

Works of additions/ alterations are also carried out in *residences at the request of the occupants*. Such request after due scrutiny and consideration are carried out on payment of certain percentage of the estimated cost of providing the facility.

Activity 8A: Obtain feedback from the complainant on complaints attended by the work-charged staff

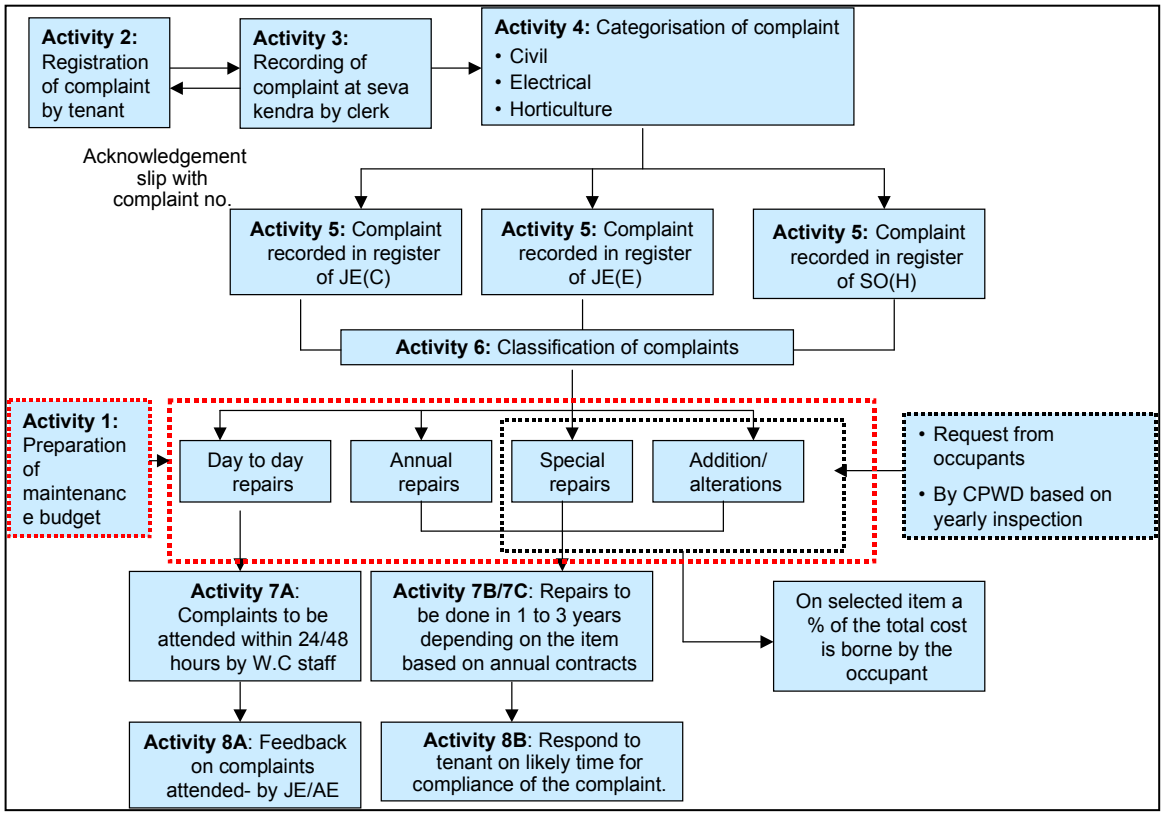
The service centres are daily attended by Junior Engineer/ Section Officer (Horticulture) and Assistant Engineer/ ADH every day and by Executive Engineer/ DDH at least once a week in general and twice a week where the service centres cater to maintenance need of VIP residences. *As per the CPWD manual, the service centres are required to should address at least 90% of the complaints within 24 hours of their being lodged with it and the balance within 48 hours unless they are of special repairs or periodical repairs*. The concerned JE/AE has the responsibility for getting feedback from the complainants on complaints of the nature of day to day repairs, attended to by the work-charged staff.

Activity 8 B: Respond to tenant on likely time for compliance of the compliant

If the complaints registered by the complainant are of annual repairs/ special repairs, the concerned enquiry clerk/ AE/ JE responds back to the complainant on the likely time for compliance of the compliant.

The process of registering complaints, recording and attending the complaints, and tasks and responsibilities of the attending clerk and the JE/ AE/ SE and CE with respect to the service centre is well detailed out in the CPWD maintenance manual.

Figure 4.4: Existing maintenance process



4.4 Perception survey on maintenance activity of CPWD in residential areas

A survey of about 100 residents was conducted in Delhi (as maximum maintenance activity is concentrated in Delhi) to ascertain views and opinion of residents on their perception regarding maintenance of residential quarters by CPWD. The following residential areas were covered during the perception survey.

- Lodhi Road
- R K Puram
- Netaji Nagar
- Pushp Vihar
- Moti Bagh
- Bapa Nagar and Kaka Nagar
- Kali Bari
- Minto Road
- Gole Market

The Various types of residential quarters were covered during the survey. Sample size of various types of houses is given in Table 4.1:

Table 4.1: Sample size of perception survey

Type of Houses	No of samples covered
Type I	23
Type III	19
Type V	12
Type II	26
Type IV and IV (Special)	21
D-II	6

The summary of the feedback received from the residents are summarised below:

- **Complaint Registration**
  - 86% people appreciate the proximity of service kendras near their house
  - 76% are not familiar with web-based complaint registration system
- **Quality of Service**
  - 47% feel that CPWD's average response time is unsatisfactory (they had little or no knowledge about CPWD's internal guidelines)
  - 71% were satisfied with CPWD's response time during emergency situations (especially during electrical faults)
  - 12% went to 'market' for specific maintenance jobs in the last one year (mainly plumbing & electrical jobs)
  - 42% think that staff at service kendra and work charge staff are rude
  - 45% not satisfied with the maintenance of parks and green areas
- **Miscellaneous parameters including suggestions for CPWD**
  - 36% of people not happy with the quality of houses
  - 62% of people feel that CPWD should upgrade the specifications of the houses
  - 54% of people would like CPWD to hand over day-to-day maintenance to private agencies

The results of this survey clearly indicate the need for changes in the manner maintenance function is carried out today. It is well understood that the responses of the residents are essentially based on perception and not necessarily on facts and statistics. However, this still calls for 'public relations' or 'image' management by CPWD.

4.5 Existing Complaint Monitoring System

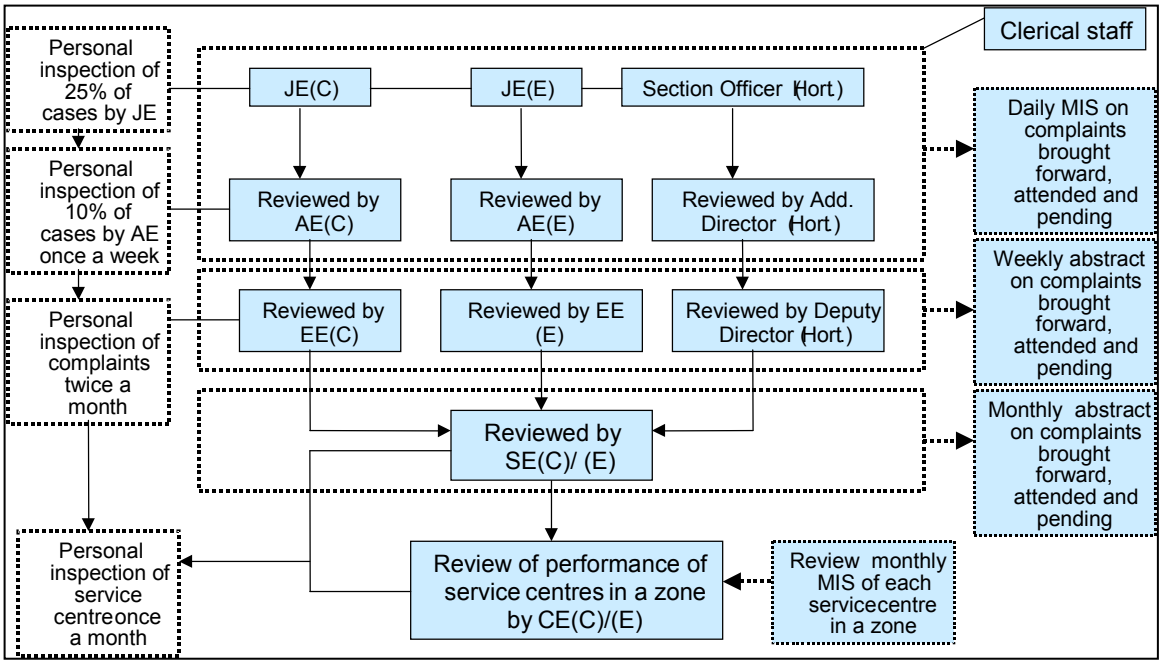
The management of CPWD through query system can monitor the complaints registered online at these service centres, number of complaints which have been attended to or are pending with a concerned officer/ work-charged staff. Through this online system of monitoring the maintenance system, officers at various levels can monitor the performance of the service centre.

Apart from the computerised online compliant registration and monitoring system, following procedure is followed for monitoring the complaints at the service centre.

- **Activity 1: Preparation of daily abstracts of complaint register**: At the end of the day an abstract of the complaints brought forward, attended and balance pending is prepared in the complaint register by the enquiry clerk, which indicates the date wise complaints pending.
- **Activity 2: Review of daily abstracts of complaint register**: The JE and AE will review this extract to ensure that all complaints of essential nature have been attended to within 24 hours of receipt of the complaint. The concerned JE/AE has responsibility for getting feedback from the complainants on day to day repair complaints attended to by the work-charged staff. A JE is required to personally inspect 25% of the cases/ complaints attended to by the work-charged staff every day to ensure that work has been carried out satisfactorily.
- **Activity 3: Review of weekly complaints abstracts by the EE**: The EE reviews daily abstract of complaints at least once a week in normal case and twice a week in VVIP/VIP areas. The EE is expected to carry out personal inspection of the complaints attended other than those checked by the JE and AE at least twice a month and spend at least half a day in each service centre at least once a week to examine records maintained by the enquiry clerk and have first hand information about the efficiency of the service centre.
- **Activity 4: Review of monthly complaints abstracts by the SE:** The SE reviews the complaint-registered at least once a month in general and once in fortnight in case of VVIP/VIP complaints. At the end of each calendar month, a statement showing details of complaints are prepared by EE and submitted to SE and CE, who review the complaints and suggest measures to minimise the total number of complaints received at the service centre.
- **Activity 5: Review of monthly complaints abstracts by the CE:** The Chief Engineer reviews the report submitted by their SE and identifies the service centres whose performance has been found to be below mark. A CE is expected to personally inspect these service centres to suggest necessary corrective and remedial measures and keep a close watch on future performance of these service centres.

The existing complaint monitoring process is given in Figure 4.5

Figure 4.5 Existing complaint monitoring process



4.6 Problems and Issues in Maintenance Process

The importance of maintenance activity in CPWD is not only due to increasing workload or large number of work-charged staff involved in maintenance, but because it is dealing with a large number of customers, who are occupants of residential buildings. Currently, the CPWD maintenance department has a poor image among the customers, as CPWD is not able to provide good quality of service due to a number of limitations. The problems and issues in the maintenance process are given below:

4.6.1 *Rising expectations among residents, client departments on condition of the buildings.*

The residents/occupants of the residential buildings compare the present level of service provided by CPWD with that being provided by the private sector developers in the housing sector

Most of the government buildings (when compared with the private office buildings that have come up in the NCR region in the last five years) do not have the "modern or glamorous look". We believe, it is a perception problem and the way private sector developers have introduced rich/superior finishes and better fixtures in their buildings, it has raised the expectation level of residents and client departments.

4.6.2 *Residents and client departments expect good quality of service to be provided by the CPWD maintenance staff*

Users expect many works to be done in their house, which are not covered under the scheme of maintenance as per specifications in the CPWD manual. Refusal to carry out these jobs by the work-charged staff such as repairing of personal fittings/ fixture/ gadgets of the customer leads to dissonance, resulting in creation of a negative image.

An enquiry clerk is the first point of contact between tenant and the CPWD. It is often cited that the attending clerk is not courteous or sensitive to the needs of the customer. Further, delayed *response in attending to requests* due to either lack of manpower or non availability of items in the store also leads to creation of a negative image. The residents often complaint that the concerned officers do not come regularly for periodic inspection of the premises, and condition of the building.

4.6.3 *Shortage of adequate skilled manpower*

In CPWD for maintenance activities, work-charged staff is employed for day to day repairs and only annual and special repairs are given on contract basis. Due to rigid labour policies of the Government, CPWD does not have flexibility to outsource activities for performing day to day repairs, for which either skilled expertise is not available in-house or where adequate number of workers is not available. Further, non-recruitment of staff over last 18 years has resulted in an ageing work force.

4.6.4 *Prohibition on employment of contract labour*

As per the Gazette notification issued by the Labour Ministry in 2002, CPWD is prohibited from employing contract labour in processes, operation or work as specified in 15 activities, which include:

- Air conditioner mechanic
- Air conditioner operator
- Air conditioner khalasi/ helper
- Electrician
- Wiremen
- Khalasi(Electrical)
- Carpenter
- Mason
- Fitter
- Plumber
- Helper/ Beldar
- Mechanic

- Sewer man
- Sweeper
- Foreman

4.6.5 *Lack of adequate maintenance budget*

About 75% of the maintenance budget goes towards servicing the salaries of large work charge staff, leaving a very small percentage of money for actual repairs. In the remaining 25% of the budget, emphasis is laid on meeting day to day repair and annual maintenance cost, thus leaving very less budgetary support for any special repairs, or making additions or alterations to the building. As the buildings grow old they need more money to maintain them.

In addition a maintenance division is often allocated a reduced budget in comparison to the original estimates, since there is a decline over the years in overall budgetary support to CPWD and Government in general

4.7 Recommendations

The possible options that might be considered by CPWD/ MoUD for improving image of CPWD maintenance staff are given below:

4.7.1 *Ensure better customer interface and service delivery*

- *Posting of officials with requisite 'people friendly' skills in maintenance unit*: Posting of CPWD officials in maintenance area should be done keeping in view their ability/capacity to interact with the public and respond to their requirements in a positive and friendly manner. Extensive training should be imparted to the EE, AE and JE to enhance their interpersonal skills and improve motivational levels.
- *Introduce system of periodic preventive maintenance inspection:* To introduce a system of effective periodic preventive maintenance inspections. In this system, AE, JE from civil and electrical division along with Additional Director (horticulture) and Section Officer (horticulture) should inspect buildings within their division/ sub division at an interval of six months and detect buildings which require repairs, so that annual periodic maintenance can be done on time. For housing stock, the Residents Welfare Associations (RWA) could be involved as part of this periodic preventive maintenance inspection unit.
- *Co-ordination between various disciplines while attending the complaint*: To enable effective co-ordination between various disciplines of civil and electrical services, while performing maintenance activity, it is proposed that work gangs be formed at each service centre comprising of work charged staff from various disciplines. The interdisciplinary work gang

would move together, while attending a complaint to ensure that all types of complaints (irrespective of it being of civil or electrical nature) are attended to without any delay

- *Introduction of incentives for better performance:* To improve motivational levels among the maintenance staff, a system of annual incentives/ rewards could be introduced for best managed service centres. These service centres and their officer in-charge (JE) should be judged by the concerned CE in-charge along with assistance from the SE based on following parameters:
  - Physical inspection of cleanliness of buildings and area maintained by the service centre
  - Number of complaints successfully addressed
  - A customer satisfaction index based on sample survey of clients and residents.
- *Revisit the specifications and upgrade them in the CPWD manual:* The specifications in CPWD manual need to be revisited and updated, wherever required, for upgrading the buildings and residential apartments as per prevalent norms. Currently, CPWD is constrained by the specifications prescribed in the manuals for the various types of buildings. By upgrading the specifications, CPWD will atleast be in a position to service the needs of the clients.
- *Handing/ taking over of vacant houses:* The concerned officer JE/AE should meet the new occupant and discuss the changes / upgradation that he wishes to have at his house. At this time, JE/AE should clarify on the expectations (of the occupant) that are not permissible as per the CPWD manual. By doing this, the occupant will atleast be able to understand the reasons for CPWD's limitations & constraints. In a way, this will also act as a 'customer friendly' initiative of CPWD.
- *Upgradation of specifications of old buildings:* A time bound programme for upgradation of specifications of old construction work of buildings should be made and submitted to Government for obtaining a one time technical approval and the requisite budgetary support. This would enable CPWD to carry out necessary upgradation in form of special repairs and give better appearance to the building, thus reducing subsequent maintenance requirements.
- *Creation of a dedicated maintenance unit:* To enable officers to concentrate on maintenance activity and improve quality of service provided by CPWD, it has an option to de-link, wherever possible, maintenance from construction activity. Separate maintenance units should be created with exclusive manpower concentrating only on this activity. However, these activities should be segregated in circles/ divisions where there is large workload of maintenance activity and work for a separate unit can be fully justified. A maintenance unit could be created at division level/ sub-division level. A division could have more than one maintenance unit, depending on the maintenance workload involved in the division. SE in-charge of the circle along with CE in charge should decide on the number of maintenance units to be created within a division.

4.7.2 *Strengthen monitoring of compliant redressal mechanism*

Although CPWD has a well-laid down mechanism of monitoring the complaint registration and redressal system. CPWD would have to ensure that it is effectively implemented especially by the concerned JE/ AE and EE. The IVRS and online complaint registration and monitoring system introduced in Delhi should also be replicated and implemented in other cities across India.

Presently, the concerned JE/AE/EE only submits a complied MIS report to his seniors giving status of complaints pending, taken forward and attended by the concerned staff of the service centre. The concerned officer (JE/AE) should also send to his seniors (EE/SE) an **Action Taken Report**. The report should highlight the steps taken by the officer (e.g EE) on the MIS report received by him from AE/JE on performance of a service centre/s (in attending to the complaints of the customer). The Action Taken Report should also contain briefs of personal inspection of maintenance work in service centre carried out by the concerned officer and measures suggested by him to improve performance of the service centre.

4.7.3 *Outsourcing of Maintenance Activity*

- *Outsource the reception of service centre to a third party (private sector):* CPWD could outsource the reception of service centre to a third party (private sector). Trained, well-mannered qualified staff could receive the complaint at the centre, and after making proper record of the complaint, they could pass it on to relevant staff of CPWD who takes action on receipt of the complaint. The staff on the reception centre would also follow up with the complainant on whether the compliant has been handled to the satisfaction of the client.

- *Outsourcing of entire maintenance activity:* Presently, CPWD contracts out the annual or special repair activities. CPWD presently has a large percentage of work charge staff for undertaking day to day maintenance activity and approximately 75% of the maintenance budget is spent on their wages and salaries.

  It is recommended that outsourcing be pilot tested in a few select service centres in Delhi prior to replicating the model in other parts of the country. This model of outsourcing maintenance activity may not be applied in VVIP/ VIP maintenance areas, because of security reasons. It is proposed that CPWD should outsource all its maintenance activities (including day to day repairs) on an annual contract basis. Citizen's survey / feedback to assess the agency's performance for replication in other areas. In the case of office buildings, specialised facility management companies could be engaged.

  Following issues as mentioned in the Box 1 must be considered before CPWD outsource its maintenance activity.

Box 1: Issue to be considered for outsourcing maintenance activity

- **A single contract should be given for a particular service centre and the responsibility of managing all maintenance activities in the area falling under the jurisdiction of this service centre should rest with this contractor**. In case, the area managed by service centre is very large, and beyond functional capacity of a single contractor, two contractors could be given an annual contract based on geographical division of the service centre. Similarly, when the number of residential houses under a service centre is few, three or four of such service centres could be combined to give a joint maintenance contract to a single agency.
- The principal contractor should be given at the beginning of contract, a charter mentioning the type of complaints, a contractor is supposed to attend within 24 hours, 48 hours, once on six months or on annual basis. The contract conditions should focus on specifying the service parameters and extent of mechanisation instead of the number of people to be deployed by the contractor.
- Failure on part of the deputed staff in meeting this condition should attract financial penalty from the bills payable to the principal contractor.
- The contractor should also be responsible for manning the reception of the service centre. For this**, trained, well-mannered qualified staff need to receive the complaint (as a contract condition)**, and after making proper record of the complaint, they should pass it on to relevant principal contractor who takes action on receipt of the complaint.
- A system should be introduced for **suspension/ blacklisting of contractors** not performing at the acceptable levels. It should be ensured that staff of the principal contractor attends service centres on all seven days in a week during a stipulated time period.
- For **maintenance of electrical works** (such as for lift maintenance, generator maintenance, substation, fire fighting), **pertinent specialised agencies should be engaged.**

The salient features of the outsourcing concept are as follows:

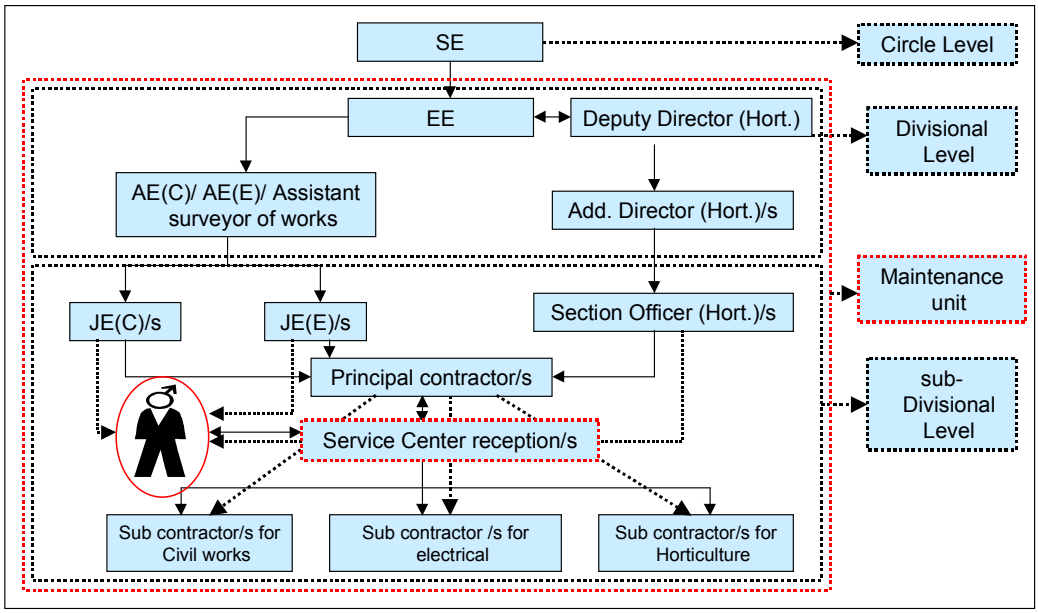
a. Payment of maintenance fee (User charges): **It is well understood that mere outsourcing will not enable CPWD in performing maintenance function effectively.** The real issue is availability of insufficient maintenance budget, for which the concept of user fee is proposed.

b. Based on CPWD schedule of rates, CPWD should issue a unit rate list of repair items and labour charges that the contractor would be allowed to charge from occupants of houses for day to day repair work. The contractor would also be paid from the maintenance budget an agreed amount (bid out amount) for maintenance of common assets such as parks, common spaces, building elevators, and other items covered under annual and special repairs.

c. Role of CPWD officials: CPWD officials at the level of AE/ JE would continue to monitor activities of the concerned service centre as is the current practice. The JE/AE on a daily/ weekly basis would monitor activities of the service centre, ensuring that the private contractor regularly maintains all registers and documents, the complaints received and action taken on the complaints.

In case, CPWD decides to choose the option of outsourcing maintenance activity, CPWD (anyway no fresh recruitment has been made in CPWD work-charged staff for last 18 years) could gradually phase out the work-charged staff over a period of time. This work-charged staff could be shifted to maintenance divisions in VVIP/VIP areas.

Figure 4.6: Proposed structure of a maintenance unit based on outsource model



To be able to facilitate outsourcing, CPWD should take up this issue with the MOUD and the Ministry of labour to repeal the Gazette notification.[2]

[2] The Government of Andhra Pradesh has amended Section 10 to remove non-core activities from the purview of the Contract Labour Act. Specifically, the Andhra Pradesh amendment prohibits employment of contract labour in core activities of any establishment but also provides that the principal employer may engage contract labour or a contractor to any core activity, if:

- The normal functioning of establishments is such that the activity is ordinarily done through contractors, or
- The activities are such that they do not require full time workers for the major portion of working hours in a day or for longer periods as the case may be, or
- There is any sudden increase of volume of works in a core activity, which needs to be accomplished in a specified time.

Chapter 5 Cash Flow in CPWD

5.1 Background

Cash Flow is an indication of a company's financial strength. It is the difference of cash inflow into the system by means of revenue and the cash outflow from the system by means of various expenditures incurred. Cash flow is crucial to companies, as having ample cash on hand will ensure that creditors, employees, and others can be paid on time.

However in context of CPWD the concept of cash flow is different than, as we understand in the corporate parlance. In CPWD there is no concept of income/revenue because it only supervises the execution of construction activities for various Central Government departments/agencies. CPWD does not levy any departmental charges for the work it executes, be it construction or maintenance and all its expenditure is met by budgetary appropriation. (other than deposit works from quasi- govt institutions.) It only means that funds should be available at the appropriate time for timely payment to the contractor.

To clearly understand cash flow in CPWD it is essential to understand the following:

- Activities of CPWD
- Budgeting process

5.2 Activities of CPWD

The functions and activities of CPWD have been detailed out in previous chapters. For the purpose of providing a perspective to the cash flow management practices in CPWD, a brief summary of activities, relevant to cash management at CPWD, is presented below:

a. Construction of new assets for the Government – All the assets created by CPWD can be categorised into the following:
    - Works of other Ministries/Departments for which the amount appears in MoUD's budget
    - Works of other Ministries/Departments for which the amount appears in their respective budgets.
    - Deposit works – are generally executed for agencies like Municipalities and other Public bodies, wherein the cost is chargeable either to the cash deposits made for the purpose or to their credit balances at Treasuries.
    - Cash Settlement Suspense (CSS) works – are works executed by CPWD for the Cabinet Secretariat. In such cases, CPWD executes the work and charges the expenditure in a suspense account. The Cabinet then reimburses the expenditure and suspense account is cleared.

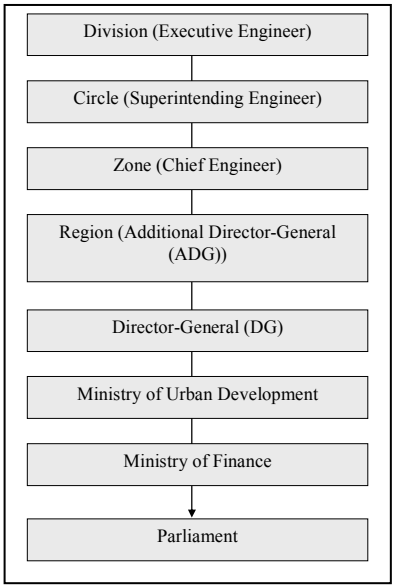
b. Maintenance of existing assets – all Central Government assets are to be maintained by CPWD, unless specified otherwise by the Ministry/Department owning the assets. The money for maintenance of assets appears in MoUD's budget, irrespective of the ownership of assets.. CPWD has to budget for the same.

5.3 Budgeting Process

A Division of CPWD, which is headed by an Executive Engineer (EE), is the primary unit, which prepares budget for the work it proposes to execute in the coming year. The budget prepared by the EE consists of two main categories of works:

- Construction work for the Ministries/Department for which the appropriation appears in MoUD's Demand for Grants
- Maintenance work for assets that fall under his jurisdiction.

Figure 5.1: Budgeting Process

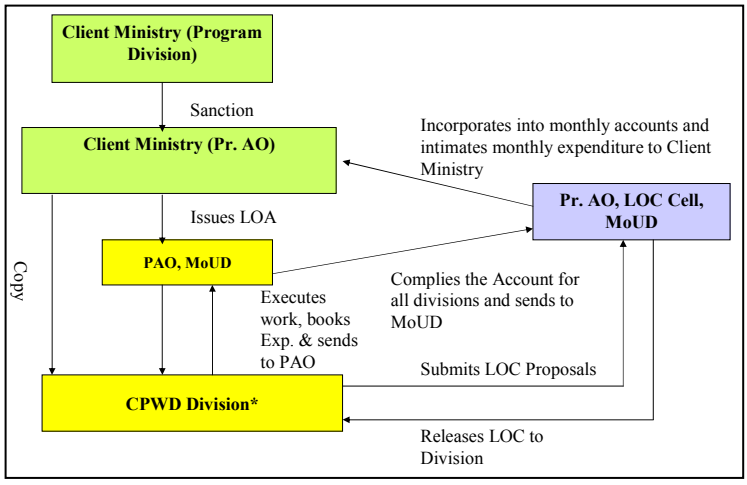


There is however one major difference in construction and maintenance budgets. The maintenance budget also includes the salaries for the CPWD staff (all work charged staff like masons, beldars etc.). However, for all other CPWD employees including the engineers and other administrative staff their salaries are appropriated under a head which is different than the construction works head.

Once the division prepares budget at its level, the Superintending Engineer (SE) in-charge of the circle consolidates the budget figures for all the divisions under his jurisdiction. The SE then sends the same to Chief engineer (CE). The CE then consolidates the budget figures for all the circles under his jurisdiction and sends it to the concerned Additional Director General (ADG) who compiles and sends it to the Director General (DG). The DG sends the budget estimates to the Ministry of Urban Development, which is then consolidated at the GOI level by the Finance Ministry and gets voted in the Parliament.

No money can be withdrawn from the Consolidated Fund of India except under appropriations made by law. The appropriation bill, when passed by the Parliament, serves as an authority for spending the public funds for the objects/destination of the voted/charged grants/appropriations. Grants for all the Ministries (except Home) are given to MoUD. This however can be utilised

Figure 5.2: Cash flow Process



only when approved by the concerned Ministry. The program division of the client ministry sanctions the work to be executed and passes the detail to their department Pr. AO (Principal Accounts Officer). The Pr. AO for the client ministry intimates the PAO (Pay & Accounts Officer) of CPWD about spending money up to the authorised amount, with a copy to the executing division of CPWD. Before any execution of work and payment of bills thereof, the executing division of CPWD has to get the LOC (Letter of Credit) approved from the Pr. AO, LOC cell. The division of CPWD executes work, books all expenses and sends detail to the PAO, who in turn sends this detail to the Pr. PAO, LOC cell who incorporates them into the monthly accounts and sends it to the PAO of client ministry.

5.4 Some important aspects of CPWD working

There are certain procedural requirements that define the way money is made available to CPWD, which are as follows:

- No outlay for civil works (residential and non-residential buildings) should be proposed before land is actually made available and requirements of the building have been finalised by the Administrative Ministry concerned.
- Demand for establishment – estimates of funds required under the head "salaries" in the budget are framed on the basis of trends over the preceding three years taking into account other relevant factors like changes in pay, allowances, number of posts and their filling etc.
- Revised estimates give the requirements for the current financial year vis-à-vis the demands made for the items of work in the previous Schedule of Demands/Budget Estimates submitted last year. While making such provision, proper assessment of progress of the works for which the funds are required is to be made. This is generally done because of cost overruns in a project because of various reasons including approval from local bodies.
- Supplementary demands – expenditure for which no provision has been made in the original budget estimates for the current year cannot normally be incurred, except for either an unforeseen emergency or underestimating or insufficient allowance for factors leading to increase in expenditure.

- Re-appropriation – of funds shall be made only when it is known or anticipated that the appropriation for the unit from which funds are to be transferred will not be utilised in full or that savings can be effected in the appropriation for the said unit. All re-appropriation orders are issued with reference to unit of appropriation in the detailed demands or grants. Re-appropriation of funds of charged expenditure of one grant or appropriation to another grant or appropriation is not possible.
- Powers of Re-appropriation
  - DG (W) for funds exceeding 10% of the original budget provision for either of the primary units of appropriation or sub-heads i.e. the primary unit or sub-head from which the funds are being re-appropriated or the primary unit or sub-head to which the funds are to be re-appropriated, whichever is less.
  - CE can re-appropriate the funds available as savings from one major work to another work for which provision has been made in the budget allotment of the respective CE, subject to the ceiling within the expenditure sanction for the latter work. CE however cannot exercise these powers in cases, where re-appropriation of funds is involved from one zone to another.

5.5 Issues

5.5.1 *Shifting of funds between projects*

CPWD executes projects throughout the country wherein differences exist not only from the geographical perspective but also because of various other factors like the work culture, accessibility of the site and number of clearances required from the local bodies. Due to these factors some projects progress faster and are executed at the desired pace while the others are relatively delayed.

All the above reasons affect the fund requirement for various projects and it is expected that a sufficiently large number of projects through out the country will not be able to achieve the desired level of completion and hence the funds appropriated for them under a given major head might lapse. To avoid such situations, the DG (W) and the CE of a given Zone have the powers to re-appropriate funds from one project to another provided both the projects come under the same major head. This results in surrendering of LOC by one EE (whose project is delayed) and issuance of LOC to another EE (whose project is moving at a faster pace). Such transfer of funds via LOC results in the following:

- A lot of time is wasted because of the administrative delays, which may be attributed to the involvement of a large number of offices in the process.
- Shortage of funds for the EE whose projects are moving at a faster pace.

5.5.2 *Insufficient funds for maintenance*

The amount appropriated under the maintenance head also includes the salaries of the work charged staff, which is as high as two-third of the total maintenance budget. This results in insufficient maintenance budget for carrying out the actual maintenance of assets. This issue and the recommendations thereof have been dealt with in greater detail in the previous chapter on maintenance management.

5.6 Recommendations

The options to address the issues related to cash flow have been clubbed into two broad categories:

- Long term options
  - Creation of a revolving fund
  - Creation of Escrow accounts
- Short term options
  - Synchronising the budgetary process with the cash flow.

5.6.1 Long term options

- *Creation of a revolving fund* – A non-lapsable fund may be created to address the issue of end of year spending. This fund will involve transfer of money from the various client ministries, to the extent the work needs to be performed by CPWD. The fund could be equated to similar funds created for various infrastructure developments like the highway fund created for NHAI. Various checks and balances could be provided to ensure that the amount utilised for various works, for a given Ministry, does not exceed the total amount sanctioned under the administrative approvals granted earlier by the Ministry. However this solution has following shortcomings:
  - The creation of such fund is beyond the powers of CPWD and even MoUD and a special sanction would be required from the Parliament.
  - The creation of such a fund is akin to a planned development and the involvement of Planning Commission would be required.

- *ESCROW account* – In the current practice the amount to be spent on execution of various works, for client Ministries, appear under the Demand for Grants of MoUD. As CPWD is only an executing agency, the ownership of assets so created rests with the respective Ministries, and hence the amounts should be appropriated in their Demands for Grants. The process to affect this change has already been initiated and from April 01, 2006 the amounts shall appear in the respective Ministries Demands for Grants. This would result in dispensing of with the LOA thereby reducing procedural delays and would result in more effective monitoring. The client Ministry shall place the funds (in phases) in an Escrow account. Each of the escrow accounts should be linked to a particular Ministry to improve monitoring and accountability. Pr.AO/PAO of the client Ministry should draw a cheque and deposit the amount in the escrow account. The Division will book the expenditure and send a reconciliation report, along with vouchers, to the client Ministry. This system will help the client (Ministry) to monitor the pace of work on a continuous basis and ensure valid utilisation of funds. This will also reduce the efforts in issuing, re-appropriating and re-issuing funds for various projects being executed for a given Ministry. However the amounts that could be drawn from the Escrow account shall have caps at two levels:

  - An overall cap of the total amount that can be utilised in a given year for one or more projects of the respective Ministry
  - Within that overall cap the maximum amount that can be utilised for a given project will be limited to the total amount sanctioned earlier under the administrative approval granted to CPWD.

5.6.2 Short term options

Synchronising the budgetary process with the flow of cash – the present problems of cash flow faced by CPWD could be attributable to the fact that the budgetary allocations reach the EE through the normal hierarchical channels while the flow of cash through LOC is directly by the CCA, MoUD. During the year it is possible that some of the projects are progressing at a pace faster than planned while some others are progressing at a slower pace. This leads to a situation wherein at any given point some EE's have surplus funds at their disposal while the other EE's have shortage of funds. This leads to the shifting of funds between the divisions by means of surrender of LOC by one division and the issuance of LOC to the other. Such situations are compounded due to the presence of large number of divisions spread throughout the country. The re-appropriations not only complicates the whole working of the department but also leads to situation wherein monitoring of the spending limits becomes difficult. To avoid such situations, it is advisable that the LOC is issued at a circle level, with one DDO attached to the circle office who shall be responsible for issuing cheques for all the divisions attached to that circle. This will not only reduce the quantum of work associated with issuing, surrendering and reissue of LOC's but also ease the monitoring of funds. The EE who has been able to execute work at faster pace can advice the DDO at his circle office to issue cheque against the work carried out and this can be easily accommodated against the amount allocated to the division which is progressing slowly. However the amounts that could be issued against a given work shall have caps at two levels:

- An overall cap of the total amount that can be utilised in a given year for one or more projects of the respective Ministry
- Within that overall cap the maximum amount that can be utilised for a given project will be limited to the total amount sanctioned earlier under the administrative approval granted to CPWD.

Chapter 6 Road Map for Implementation

A detailed road map for implementation of recommendations as discussed in the previous chapters is given below:

Project Management

Sl. No.	Recommendations	1-3 months	4 - 12 months	13-24 months
1.	**Sign MoU with client – for both pre and post AA&ES stage**			
Activity 1.1	Drafting of separate MoUs for pre and post AA&ES approval			
Activity 1.2	Approval of MoU			
Activity 1.3	Pilot testing for 3-4 projects			
Activity 1.4	Review the MoU, if required based on pilot test results			
2.	**Introduce Knowledge Management System (KMS) for archiving organisation knowledge and experience**			
Activity 2.1	Identify the data to be archived – designs, drawings, estimates, contracts, team details, project progress details, etc.			
Activity 2.2	Issue advertisement inviting proposals for conceptualisation and development of KMS			
Activity 2.3	Commission a consultant and brief him on CPWD's requirement of KM in terms of quantum of data to be archived			
Activity 2.4	Monitor the work of consultant at all stages of systems and software development (likely to take about 3 months)			
Activity 2.5	Design / development and pilot testing of KMS system in one zone			
Activity 2.6	Work with the consultant in refining the KMS system			
Activity 2.7	Implementation of KMS in other offices of CPWD – to start with zonal offices followed by circle and division offices			
3.	**Introduce Project Management System (PMS) - a query based, fully networked computerised system to help in effective monitoring of progress of work**			
Activity 3.1	Issue advertisement inviting proposals for conceptualisation and development of PMS			

Sl. No.	Recommendations	1-3 months	4 - 12 months	13-24 months
Activity 3.2	Commission a consultant and brief him on CPWD's requirement of PMS			
Activity 3.3	Design MIS reports that could be fed directly to the PMS			
Activity 3.4	Monitor the work of consultant at all stages of systems and software development (likely to take about 3 months)			
Activity 3.5	Design / development and pilot testing of PMS at HQ			
Activity 3.6	Work with the consultant in refining the PMS system and launch in all circles and divisions			
4.	**Adopt 'outsourcing' as a solution for short-term 'crisis' situations and also for improving overall productivity of CPWD and empower Chief Engineers and Chief Architects to outsource designing and costing works**			
Activity 4.1	Preparation of guidelines for outsourcing			
Activity 4.2	Issue Office Orders			
5.	**a. Zonal head shall have full functional and administrative control on engineers in the zone** **b. Functional distinction between different specialisation's must effectively end beyond a level (Ideally Superintending Engineer level)** **c. Empowered Project Manager with full authority and responsibility to undertake the project** **d. Empower CPWD for human resource management, specifically career progressions, personnel allocation and constitution of project teams**			
Activity 5.1	Preparation of guidelines for empowerment of zonal heads and project managers			
Activity 5.2	Issue Office Orders			
Activity 5.3	Review the new project structure and take necessary corrective action			
6.	**Explore possibility of a softer mechanism prior to launching vigilance enquiry**			
Activity 6.1	Explore the legal implication of such a mechanism			
Activity 6.2	If legally tenable, prepare guidelines for the charter of the committee			
Activity 6.3	Issue office orders			
Activity 6.4	Review the efficacy of this mechanism and take corrective action			

Sl. No.	Recommendations	1-3 months	4 - 12 months	13-24 months
7.	**Introduce Exchange Programmes and Training for capacity building**			
Activity 7.1	Identify organisations for exchange programme			
Activity 7.2	Identify CPWD engineers for exchange programme			
Activity 7.3	Capture the learning in KMS and review the effectiveness			

Maintenance Management

Sl. No.	Recommendations	1-3 months	4 - 12 months	13-24 months
1.	**Improve Co-ordination between various disciplines : Work gang for attending complaints**			
Activity 1.1	Test pilot the recommended organisation structure at service Kendra level			
Activity 1.2	Review the effectiveness of this mechanism and take corrective action			
2.	**Regular interaction between Local JE and citizens for regular feedback**			
Activity 2.1	Prepare a calendar for such interactions			
Activity 2.2	Report the minutes of the meetings every fortnight			
3.	**Introduction of awards for Service Kendras demonstrating better performance**			
Activity 3.1	Define service delivery parameters			
Activity 3.2	Prepare and announce the scheme			
4.	**Revisit and upgrade the specifications in the CPWD manual**			
	MOUD/ CPWD have already initiated in this direction			
5.	**Strengthen Monitoring of Complaint Redressal Mechanism**			
Activity 5.1	Preparation of format for fortnightly report to be prepared by every service centre			
Activity 5.2	Implement the new mechanism in a pilot zone			
Activity 5.3	Review the effectiveness of this mechanism and take corrective action			
Activity 5.4	Launch the mechanism in all zones			

Sl. No.	Recommendations	1-3 months	4 - 12 months	13-24 months
6.	**Outsourcing of Maintenance Activity** **CPWD's AE/ JE to only monitor activities of the service provider and ensure service provider's compliance to the contract conditions**			
Activity 6.1	CPWD and MOUD should make representations to the labour Ministry for necessary amendments to facilitate outsourcing			
Activity 6.2	Prepare service and contract conditions for Outsourcing of day to day maintenance			
Activity 6.3	Identify 2-3 pilot areas (Non-VIP areas), call for tenders and appointment of private agency			
Activity 6.4	Monitor the performance of the agency			
Activity 6.5	Citizen's survey / feedback to assess the agency's performance for replication in other areas			
7.	**In the case of office buildings, specialised facility management companies could be engaged**			
Activity 7.1	Empanel facilities management companies			
Activity 7.2	Select two office buildings for pilot testing			
Activity 7.3	Review the efficacy of this mechanism and take corrective action			