

Role of Project Management Consultancy in Construction Project

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Abstract : The construction industry generally deals with the various types of construction sectors viz Real Estate & Infrastructure. Real Estate Sector is segmented in Residential, Industrial, Corporate, and Commercial. Whereas Infrastructure sector in Roads, Railways, Urban Infrastructures, Ports, Airports and Power. To manage such kind of unique projects requires an expertise with organizations and a thorough body of knowledge. The purpose of this paper is to provide the analysis or breakdown of Role of Project Management Consultancy and study the Problems faced by PMC for implementing the project. Project Management Consultancy plays multifaceted part in such projects and provides the services from inception to completion of projects. At every stage of project life cycle, the principles of pro-activeness and creating the win-win situation is necessary keeping in mind the customer / client's requirements. Use of Project Management Consultancy (PMC) offers one of the effective management solution to increase and improve the efficiency and outcome of a project in construction. A case study of construction of a Mega Industrial Project which is dealt by PMC and Project consist of various type of buildings for Manufacturing unit, Assembling unit, Logistic unit, Process unit with allied Infra of Electrical utilities, Services like Fire fighting, Sewage line, Storm water arrangement and Road etc have been considered for this research work.

Keywords: Body of Knowledge, Industrial Buildings, Project Management Consultancy (PMC), Role & Responsibility Matrix.

I. INTRODUCTION

The Project Management Consultancy has a wide variety of roles to play during the construction process. Construction project gives benefits to the Customer / Client in terms of satisfaction and it consists of business development, profit, resources utilization, etc. Because of this consultancy plays a multifaceted part in the construction project, and is usually involved in the project from the project's inception to its completion. It is important to fully understand Project Management Consultancy and authority. Doing so ensures that the Consultancy can be fully maximized on each construction project. Normally the job is managed by the Project Manager and supervised by the Construction Manager, and allied team of design engineer, construction engineer or project architect. Efficiency in Management is needed to gain a higher level in competitiveness. Every construction project is different i.e. unique, every construction project demands the full attention, professionalism and energy of its project team, every construction project depends upon an experienced leader to make it happen. The construction industry in India has grown very fast with the construction of new projects. Due to the rapid expansion in the construction industry, the services provided by the Consultancy need to be improved in terms of performance and quality of work to meet the construction project goals and objective and also the clients satisfaction.

Paper highlights the case study for research of dealing the Mega Industrial Projects by PMC through their role and responsibility during project life cycle from Project Initiation Phase and A/E Selection - Schematic Design Phase- Design Development Phase-Construction Documents Phase-Bidding and Award Phase-Construction Phase -Closeout. In all phases PMC manage the project by various services like Scheduling, Cost budgeting, Value engineering, Risk Identifying, Monitoring & controlling, Time line optimization, Resources Allocations, etc.

II. NEED FOR CONSULTANCY :

1. Shortage of specialized staff with the Industry since at present the supervisory staff conversant with latest construction technique is not available in bulk. 2. Also, in general, there is a shortage of supervisors who can be associated with a single project. 3. Faster execution of projects in short time.

III. PMC ROLES AND RESPONSIBILITY MATRIX:

There is no specific definition of project consultant. Most definitions describe management consultants by their roles and responsibility and services that they provide using tools and skills they have in delivering a task assigned by the client or the owner of the project (Dzulkarnaen, 2005).

Project is a Temporary endeavor with a specific beginning and end (i.e. has limited life) and creates a unique product, service or result (i.e. each project by definition is unique). Project management is the art of directing and coordinating human and material resources throughout the life of a project by using modern management techniques to achieve pre-determined objectives of scope, cost, time, quality and participation satisfaction.

Consultation is happening if the clients seek expert knowledge or some opinions on some engineering problems or anything that involves engineering matters. Consultation maybe brief or extended which involves only few hours of time, with the clients sitting across the desk of the consultant. Other consultation may require traveling, some period of substantial portion of a consultant's time over a period of several months, and repeated presentations and discussions with the client (Maxwell, 1982).

Table 1 shows the roles and responsibility matrix for the various stakeholders of the project at different stages of construction.

Table: 1 Roles and Responsibility Matrix
(R- Responsibility, I- Participatory responsibility)

Code	Description of Project Management Consultancy's Roles and Responsibility Matrix @ Industrial Projects	Client	PMC	Architect
A. Pre-construction Stage:				
A.1	Analyze Client's project related requirements	I	R	R
A.2	Prepare the Design Brief in terms of function ability, cost, time, quality and safety	R	R	R
A.3	Develop project control systems	I	R	I
A.4	Finalization of project organization chart.	R	R	I
A.5	Establishment of project communication and reporting system	I	R	I
A.6	Preparation of works breakdown structure	I	R	I
A.7	Preparation of Project Master Schedule with base line	I	R	I
A.8	Preparation of Design / Drawings deliverables schedule	I	R	I
A.9	Feedback on the Master Budget of the project	I	R	I
A.10	Co-ordination and follow-up with Architect and other design consultants for their inputs	I	R	I
A.11	To identify and suggest consultants/designers for specialized requirements	I	R	I
A.12	Lead project meetings as necessary for review of progress	I	R	I
A.13	To set up, track, monitor a design deliverable schedule	I	R	I
A.14	Checking & verification of designer's submissions (design basis reports, value engineering, cost benefit analysis, drawings etc)	I	R	I
A.15	Cost control during all stages of design and design development	R	R	I
A.16	Preparation of procurement plan	R	R	I
A.17	Review of technical specifications and Bill of Quantities (BOQ)	I	R	R
A.18	Monitoring the statutory approvals process by follow-ups with liaison consultants and reporting the progress.	R	R	R
A.19	Conducting Pre-bid meetings and feedback for completeness of tender specifications and technical parameters.	R	R	I
A.20	comparative statements & techno-commercial evaluation reports	R	R	I
A.21	Submitting Weekly and Monthly progress reports	I	R	I
B. Construction Stage				
B. 1	Full time supervision of All construction works / activities for the project	I	R	I
B.2	On-site design co-ordination and issue of drawings / clarifications	I	R	R
B.3	Organize approval to contractors shop drawings, product data sheets, samples,	R	R	R
B.4	Refinement of works breakdown structure	I	R	I
B.5	Monitoring the progress of work with the Master construction schedule	I	R	I
B.6	Prior flagging of anticipated bottlenecks and analysis of its reasons	I	R	I
B.6	Day to day correspondences including contractual issues	I	R	I
B.7	Change order management for design changes and extra items	I	R	I
B.8	Prepare QA/QC plan and Method Statement	I	R	I
B.9	Quality assurance and control to ensure conformance to drawings and specifications.	I	R	I
B.10	Establish EHS plan (Environment, Health and Safety)	I	R	I
B.11	Issue GFC drawings to respective contractors and keep updated record issued.	I	R	I
B.12	Scrutinize and check working drawings received from Architects /designer	I	R	I
B.13	Organize Progress review meetings on weekly basis.	I	R	I
B.14	Collect, review and maintain all the records of contractors' daily progress reports.	I	R	I
C. Post-Construction Stage:				
C.1	Advice about probable date of Substantial Completion	I	R	I
C.2	Preparing & addressing the schedule of defects / punch lists	I	R	I
C.3	Provide assistance in Testing and commissioning of the facility	I	R	I
C.4	Collection and integration of various O and M manuals, commissioning & test certificates	I	R	I
C.5	Reconciliation and Certification of Final bills of contractors, suppliers, vendors and consultants	I	R	I
C.6	Preparation of project close-out report including learning	I	R	I
C.7	Collate and verify all As-built drawings	I	R	I
C.8	Addressing any queries during defects liability period	I	R	I
C.9	Co-ordination with the Contractors to rectify the defects during the defects liability period,	I	R	I

IV. CASE STUDY:

Project Management Consultancy manages the Mega Industrial Project in Maharashtra, India. Project land area of 90.00 Acre and proposed Industrial Buildings are 8 No (16.50 Lac sqft) space with supporting utilities building, other services like fire fighting, etc and whole project is bifurcated in to 3-Phases with allied infra works as follow :

Table: 2 Overview of Industrial Project

Phase 1: (Completed and Operational)	Phase 2: (Construction in Progress)	Phase 3: (Proposed construction)
<ul style="list-style-type: none"> • Building B1 • Building B3 • Building B4 (B4A+B4D) • Building B8 • Electrical Substation- 33 KVA • Roads, STP, General Infrastructure 	<ul style="list-style-type: none"> • Building B1A- 106,284 Sqft • Building B5-162,096 Sqft • Building B2 -58,056 Sqft • PMO, Gatehouse- 12,086+2,968 Sqft • Roads and Infrastructure 	<ul style="list-style-type: none"> • Building B • Building B6 • Building B7

4.1 Methodology:

The data of this research was collected from different sources. Literature and theoretical reviews have been taken from books, articles and papers to describe main concepts about consultant service management in construction project. The main methods are descriptive, explanatory and quantitative. In description, it starts by providing information about the current situation on the field of the construction industry. The quantitative works done by collecting data from field / Site. Also collecting data by some questionnaires from the case study. Experiences shared by supervisor engineers, managers, in tackling problems at various levels in these projects put forth during planning stage of a new project helps in over viewing the project and identifying the expected expert judgments.

4.2 Project Scheduling –Phase-1:

Generally Industrial buildings are constructed and earlier ready in the form of Cold Shell, but it is very difficult to completely make it 100 % ready for functional use. It is reflected from Table-2 data that the within 9-12 months Industrial building having built area 1.5 Lac (Appr.) Sqft can be completed with a slight delay with satisfactorily functioning and commission in the presence of PMC. Table 3 gives the schedule actually achieved for the completion for phase – I.

Table: 3 Project Schedule

Industrial Project- Phase- 1 Activity	Building B3	Building B4A	Building B4D	Building B8
Concept Initiation	03.05.2012	20.01.2012	01.06.2012	28.03.2012
Civil Works	11 Months	06 Months	08 Months	07 Months
Structural Work (Pre-Engineered building)	09 Months	06 Months	07 Months	07 Months
Services	05 Months	03 Months	03 Months	05 Months
Allied Infra	06 Months	04 Months	05 Months	07 Months
Office Bldg. with Interior Works	08 Months	04 Months	07 Months	07 Months
Completion & Handing Over	22.05.2013	20.08.2012	26.03.2013	19.03.2013
Total Duration	12 Months	08 Months	09 Months	12 Months

The proposed project cash flows for the phase- II are shown in fig 01, whereas the projected manpower requirements are indicated in fig 02. Fig 02 reflects the need for averaging out the resource allocation, particularly in the period from April-14 to August -14.

4.3 Project Cash Flow –Phase-2

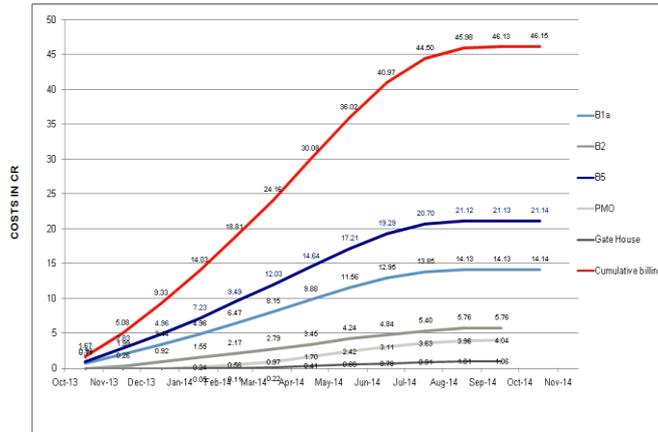


Fig-1 Cash-Flow

4.4 Resource Allocation -Project Total Manpower-Phase-II

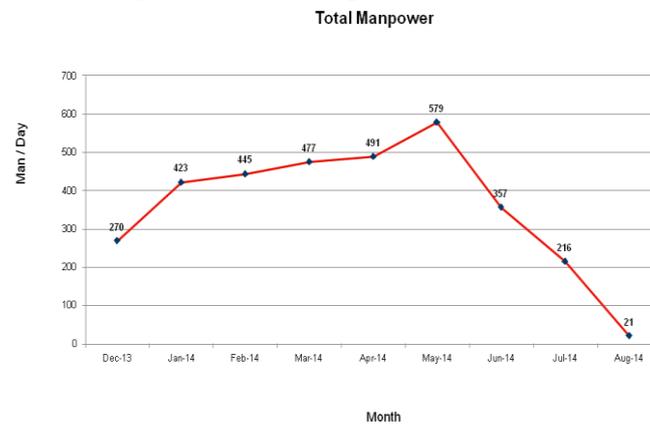


Fig-2 Allocation of Total Manpower

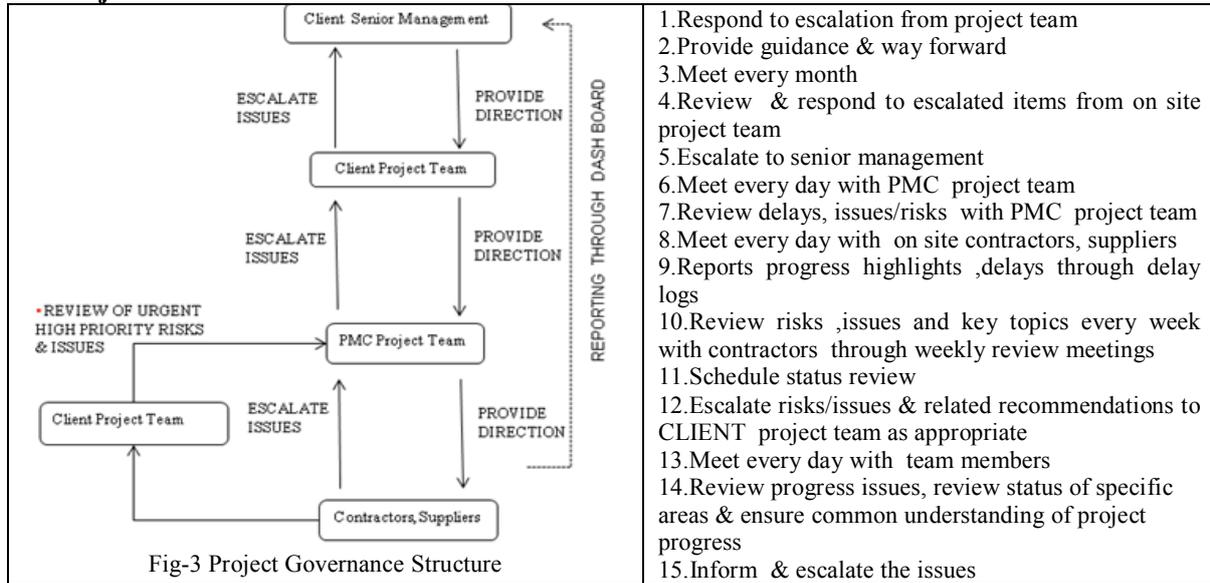
4.5 Project Time Line Optimization:

PMC tried to optimize the time factor through various phases, where delays have occurred. These efforts are mentioned in Table 4.

Table: 4 Time Line Optimization

Design Phase	<ol style="list-style-type: none"> Finalization of Building Elevation and sign off with concept Addendums of Tenant Improvement finalization in early design stage & sign off on concept & details Incorporation of statutory requirements in design phase Addition of Mezzanine structural works to PEB (pre-engineered building) scope Linking Building Schedule to Design delivery schedule Finalization of Power requirements of End user Introduction of Precast Waffle wall
Procurement Phase	<ol style="list-style-type: none"> Delinking of PEB (pre-engineered building) & civil package to concept finalization Linking Procurement schedule to building deliverables Untimely processing per lead delivery of long lead items viz. Dock leveler, Fire door, HT Cables, etc. Soft copy approvals – Reduction in Hard copies turnaround time
Construction Phase	<ol style="list-style-type: none"> Milestone linking to individual package delivery timelines, Set points briefing & acceptance Progress balancing per requirements through work scope shuffling Progress communication & running catch up plans for delays Lesser turnaround time through design communication in soft forms Identification & attention of snags through process

4.6 Project Governance Structure:



Project Governance structure is for easy communication through authorities to avoid the conflict and the further delay. In order to channelize this structure smoothly various lines of actions need to be implemented such as escalating any issue of contractor to PMC and further firm PMC to client and to the Project Team. PMC also reports through dash board to higher management of client and provide the direction to contractor as per feedback received. This is shown in Fig 3.

Table 5 reflects the key challenges faced by the project management consultant whereas, Table 6 indicates the various efforts undertaken by the PMC to overcome these challenges.

Table 5: Key Challenges faced by project management consultant

1. Constructability issues	2. Supply chain risk – material delays
3. Poor quality engineering process runs	4. Inter-Contractor Coordination Issues
5. Activity dependency structure	6. Lack of Safety Awareness & Unsafe work methods
7. Meteorological limitations	

Table 6 efforts done by PMC to overcome the Challenges

Coordination meetings, Services Coordinator right from design phase	Activity sequencing to reduce idle man hours in Monsoon
Higher management reporting dashboard – issues & achievements communication	Round table progress reviews, design – construction interface
Planning sign off & adherence system	Daily quality audits, quality diligence & delivery sessions in team, calibrations & standardizations enforcement
Conversion of RCC to Composite structure – Mezzanine, Package additions to pre engineered buildings	Safe working methodologies, Safety awareness programs, Penalty enforcement on defaulters
Project Delivery – Material delivery interface & forecast communications	

V. KNOWLEDGE:

There is no unique solution to what knowledge areas are necessary for managing a project. Knowledge needs to vary from project to project. Some of the knowledge needed to manage projects is unique or nearly unique. Project management knowledge areas do overlap with disciplines in General Management and Technology Management. The Project Management Institute in USA advocates 10 knowledge areas for managing projects in their ‘A guide to the project management body of knowledge – Fifth Edition-2013. These are also supported by ISO 10006 and renowned project management institutions in the world. These knowledge areas in construction project management can be broadly grouped as under:

1. Project Integration management

2. Project Scope Management
3. Project Time Management
4. Project Cost Management
5. Project Quality Management
6. Project Human Resource Management
7. Project Communications Management
8. Project Risk Management
9. Project Procurement / Contract Management
10. Project Stake holder Management

5.1 Dealing with the Risks:

Risk identification, proper analysis and scientific mitigation are essential for a successful project. The PMC's role as implemented on the project is as shown in Table 7.

Table 7: Role or PMC in dealing with project risk

Risks Identified	M I T I G A T I O N	a. b. c. d. e. f. g.
1. Concept Plan finalization	M	Sign off on the tenants on all concept layouts & scope sheets
2. Turnaround time of Design approvals	I	Follow up meetings with A/E every week
3. Alignment of scope sheet of tenants with BOQ's	T	Identify long lead items & trace those well in time
4. Procurement system ambiguity	I	Participate & educate team in training to all new techniques
5. Vendors not on board	O	Quality Assurance Plan implementation
6. Modifications to Building Elevation	N	Adoptions of recommendations by Liaisoning agencies for future development & compliances
7. Market risks & supply chain factors	P	To review the Risks & Issues on Weekly basis, discuss more often with client
8. Adoption of new execution methodology (Waffle wall, FM II floor etc)	L	
9. Cash flow factors	A	
10. Design errors & omissions	N	

VI. CONCLUSION:

Project Management Consultants manage the Project by application of their Knowledge, Skills, and Experience at various stages. However PMC has to face various challenges like Design Issues, Constructability Issues, Long lead material Issues, Inter Contractor Coordination Issues, Engineering Issues, Safety Issues, etc. These issues could be tackled by a well organized approach of the PMC. This also includes adopting the various types of tools of higher management like Reporting dashboard, Round table progress Review and conduction of brainstorming sessions, training on various field, design – construction interface, Daily quality audits, quality diligence & delivery sessions in team.

In addition to above Project Management Consultancy is effective and efficient only when it is involved in Total Project Life Cycle from Conception to Closeout. Awareness of various Processes involved in Project Management and detail study of multiple constraints of project like Time-Cost-Risk-Scope-Quality-Resource are an integral part of any project management consultancy.

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