

# Construction Management Techniques to Complete the Project within Time Period and Estimated Cost, Study on Residential and Commercial Building: A Review

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**Abstract** - Construction Management is the art of directing and coordinating human and material resources throughout the life of a construction project using modern construction management strategies to achieve predetermined goals of scope, cost, time, and quality and participation satisfaction. This study created the need for Construction Management Techniques in the Indian construction industry which takes Pune in Maharashtra province as a residential and commercial building research. In this project what building management methods are used or used for the project. What works or not works to achieve time, cost and quality. In this residential building construction review Construction Management Strategies discussed in this study include the Gantt Chart, Microsoft Project planning (MSP) software, Work breakdown structure, Cost Profit Analysis and much more and features such as project size, project location, Client Type of Client Source, Complexity project, Strength of building materials, improper planning, material storage, Travel costs and maintenance etc. include factors that affect construction management strategies in a residential building project.

**Key Words:** Construction Management Techniques, Management Strategies, Planning techniques, Work Breakdown Structure, Time Management, Gantt chart.

## 1. INTRODUCTION

The world of project management is vast. It covers many industries and requires a range of skills. But the common thread that ties these various behaviors together is the way project managers use to get the job done. Project management strategies make project planning and management easier and more effective. They can be used in any project, outside the field or industry. They are also used in conjunction with project management software, helping to save time and reduce costs. There are many project management strategies, some project management strategies are included in this report. Every project manager should know how to manage their projects and guide them to successful conclusions. Construction Project Management is the art of directing and coordinating human and material resources throughout the life of a construction project using

modern construction management strategies to achieve predetermined goals of scope, cost, time, quality and satisfaction of participation (Idoro and Patunola - Ajayi, (2009). In contrast, general business executives and industrial companies take a broader view of greater operational continuity. However, there are enough similarities and differences between the two so that modern management methods designed for standard management fit the project management. (Arnaboldi et.al, 2004)

There are many construction management techniques in the Indian construction industry, but which construction techniques is best for the construction project is important to complete project in time period, cost and quality. In these review study of the construction of residential plus commercial building, some strategies are used like Gantt Chart (MSP) Microsoft project planning software, Work Breakdown structure, Program Evaluation and review technique (PERT), Critical path method (CPM) using these strategies, from these strategies which is useful to achieve the construction cost and quality and the completion of the project within time period.

### 1.1 Construction Project Management

According to Opara, (1986) project management project is the overall planning, co-ordination and control management of a project from start to finish aimed at meeting customer needs in order to produce a viable and fully viable project. Construction Project Management is what applies to the construction industry (Lewis J.P (2007). The most common responsibilities of construction management Association of America (CMAA) fall under seven categories, Project management Planning, cost management, time management, Quality Management, Contract Administration, Safety Management and CM Professional Practice which integrates specific functions such as defining responsibilities and management structure of the project management team, planning and directing through project management, defining roles and functions and developing project design and project identification contracts. Arnaboldi et.al, (2004)

## 1.2 Functions of Construction Project Management

Construction project management tasks usually include the following

1. Clarification of project objectives and plans including scope, budgeting, planning, implementation requirements, and selection of project participants.
2. Increase efficient use of resources through staff procurement, equipment and equipment according to a set schedule and schedule.
3. Implement a variety of operations through effective coordination and control planning, design, measurement, contract and construction throughout the process.
4. The development of effective communication and conflict resolution mechanisms between various participants

## 2.0 REVIEW STUDY OF CONSTRUCTION PROJECT

The information is collected from the site which is “Le Skylark” A project by Sanjay Kakade group and the other residential building sit at Karvenagar Hingane Pune. The project is commercial and Residential. The net plot area of the project is 7354.6 (sqm). At the Le Skylark Project which construction management techniques are used and Is There is a material management, Cost control management, which type of software used for project planning and Scheduling, and time management and at these stage I collected construction management techniques which are used on the site of “Le Skylark” Project and other sites.

**Table -1:** Le Skylark Project Details

1.	Name of Project	Le Skylark
2.	Type of project	Residential Commercial
3.	Constructed total built up area (sq.m)	6000.00
4.	Total area in (acres)	2.7 acres of land
5.	Towers and floors	Two towers and 13 floors
6.	Estimated Cost of Project	60 Cores
7.	Contractor	Sanjay Kakade Developers



**Fig-1 :** Le Skylark Project



**Fig-2 :** Construction work of Le Skylark Project

## 2.1 Construction management techniques

In short, other innovative strategies share similar goals regarding Project delivery benefits such as fewer changes and delays during construction, reducing project costs and a growing number of final product.

### 1. Work Breakdown Structure (WBS)

Work Breakdown Structure (WBS) is concerned with the division of the project into individual manageable components and phase structure. Such a structure defines the functions that can be completed independently of other functions, to facilitate resource allocation, the allocation of responsibilities and to evaluate and manage the project. Wysocki (2009) also noted that it is a reliable tool for defining work packages and to develop and track cost and project plan. Work Breakdown Structure (WBS) provides a

comprehensive framework for the overall development of the overall planning and control of the project and is the basis for dividing the work into a descriptive increase in which the Work Statement can be developed as well as technology, schedule and work costs. hourly reporting can be established. (Abbasi & Al-Mharmah, 2000).

## 2. Gantt Chart

Gantt chart is a useful building method for planning and organizing projects. Demonstrates a graphical representation of the duration of activities against the continuity of time. It was founded by Henry Gantt in 1915 with the aim of monitoring the continuation of projects. Gantt charts are a common way to represent the stages and activities of a Work Breakdown Structure (WBS) project that can be understood by many audiences around the world (Wysocki, 2009). Gantt chart is a popular bar chart that displays a project schedule. Gantt charts show start and end dates and project summaries. Tasks and summaries cover the classification framework of a project. Some Gantt charts also show dependence (i.e. initial network)

**The Current Application of these Methods-** Today, the Gantt chart is accepted as a standard project management tool. This approach, through the use of many available desktop applications, is mainly used by construction project managers and project planners in project management. It is popular because it allows you to estimate how long a construction project should take, lay out a plan, help manage interdisciplinary tasks, determine necessary resources, monitor progress and help determine how the repair work can be done. it help to get the project back on track.

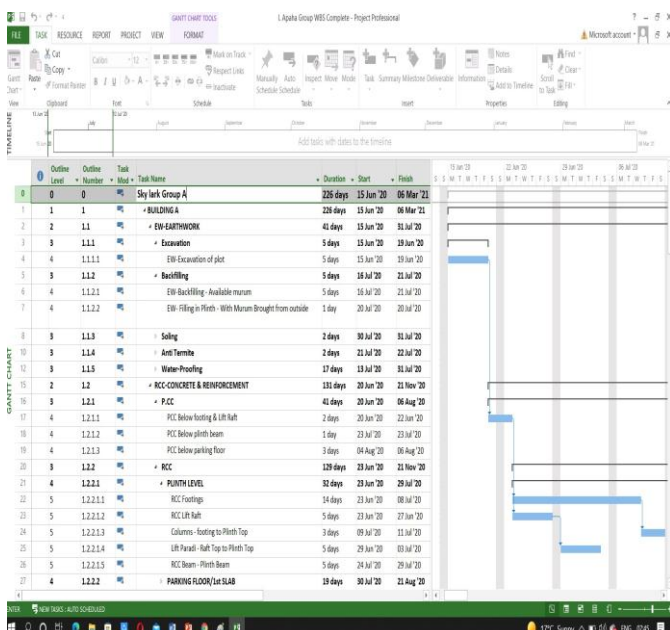


Chart-1: Gantt Chart

## 3. Lean construction Management Technique

Lean construction management is different from the current standard practice because it has a clear set of delivery process objectives, aimed at improving customer performance at the construction project level, product design and process simultaneously, and using lifelong production control. of the project. In contrast, the current type of production management in construction is based on the same work-focused approach found in mass production and project management. (Arnabodi, Azzone, & Savoldelhi, 2004) Aims to improve project performance through work; it is assumed that the customer value is identified in the construction. Production is controlled throughout the project by breaking the project into pieces, i.e. designing and building, and then placing those pieces in logical sequence, measuring the time and resources needed to complete each task as well as the project. Each piece or work is recovered until it is issued or handed over to the task leader, supervisor or team manager. Control is considered as monitoring each contract or activity against its own schedule and budget assumptions (Arnabodi, Azzone, & Savoldelhi, 2004). This guess is summarized in the project level report. If a reliable work flow was the result of a queue setting there is a stated purpose. Jobs or chains on a critical route are left behind, efforts are being made to reduce the cost and time of the offending work or to change the work sequence. If these measures do not solve the problem, it is often necessary to trade the cost of the schedule by working in the best sequence to make progress. Focusing on jobs hides the waste created between ongoing jobs with unexpected job release and the arrival of needed resources.

The benefits of a non-foundation construction approach depend on the tools and methods used during the Implementation of any construction project. Based on the latter, the following Benefits of using soft construction principles as read by O'Connor & Swain, 2013

1. Improved project delivery performance in terms of value, quality, programme and cost
2. Alignment of all parties to deliver against an agreed set of project objectives
3. Improved performance in safety, quality, delivery and cost
4. Provides a clear view of the best way to carry out a project and/or to operate business
5. Processes in a way that seeks to maximise customer value
6. Improves predictability and productivity through all processes
7. Identifies opportunities for pre-fabrication to aid on-site productivity

8. Provides detailed information to help develop the current best standard practice to support
9. Productivity and reduce variability in methods and performance
10. Creating standard operations (or job details) with those people who carry out the work
11. Helps to develop ownership of identifying the best current method and supports continuous improvement

### 3.0 Techniques used on site

Construction Management Techniques are used on Le Skylark Project are as Work Breakdown Structure (WBS), Microsoft Project (MSP), Gantt chart

1. Material Management
2. Human Resource Management
3. Cost Control and Management
4. Project planning and scheduling
5. Safety Management
6. Time Management
7. Equipment and Machine Management
8. Risk Management
9. Contract Administration
10. Resources Management

Following factors Affecting Construction Management Techniques at the sites are size of the project, location of project, type of client, source of finance, complexity of the project, Vitality of the material, poor planning, Material shortage and cost of materials and transportation.

### 4.0 LITERATURE SURVEY

**[1] Arnaboldi et.al (2004)** Construction Project Management is what applies to the construction industry (Lewis J.P (2007). Quality, Contract Management, Security Management and CM Professional Practice which integrates specific functions such as defining responsibilities and management structure of the project management team, planning and directing through project management, defining roles and functions and developing communication and project identification and design elements that may cause conflicts and claims.

**[2] Patel et.al (2008)** Time management means personal efforts to manage one's time. In Construction projects, it refers to building a schedule that can be met, and then managing the work to ensure that this happens. Project Time Management in Construction can be termed schedule management (Patel 2008) However this is a powerful approach, especially for white employees, supervisors and

managers. Significant time (hours during which all employees must be on duty). Adaptable time (hours during which employees may change arrival and departure time) Stressed working week:

1. Working the same number of hours but a few days / week

08 hours 05 days  
10 hours 05 days

This series of timetables is a time management concept that knows when to work, the time allotted for each task to be done and the time to cool off. (Stukenbruck & Zomorrodian, 1987)

**[3] Enshassi et.al (2009)** Overspending is defined as the actual cost overruns over budget. An overdose is also called an increase in costs, an increase in costs, or a budget deficit. Choudhry (2004) described cost overruns as the difference between the average cost of a project and the actual cost of construction when completing commercial construction projects. In a study of infrastructure projects in Nigeria by Omoregie and Radford (2006), it was found that the main contributing factors were cost fluctuations, funding and payments for completed works, ineffective contract management, schedule delays, changes in location. condition, incorrect rate, shortage of building materials, delays in immigration, additional operations, changes in construction, subcontractors and designated suppliers, adverse conditions such as weather, non-compliance with contractual conditions, errors and inconsistencies in contract status and fraud practices Similarly, Vietnam Long et al. (2008) found that the top 5 most important factors that contribute to cost overruns in large-scale project management are site management and monitoring, lack of project management support, owner financial difficulties, contractor financial difficulties and design changes. Enshassi et al. (2009) conducted a study in Gaza and identified 10 key factors that contribute to rising costs.

Factors include rising commodity prices due to ongoing closure, delays in construction, supply of raw materials and equipment by contractors, volatile building materials costs, local currency in relation to dollar value, project asset management by other suppliers. , barriers to unfinished business, pockets and related resources, lack of planning / cost savings during pre- and post-contract phases, development of general design during construction phases, design changes and inaccurate valuation. A study by the UK construction industry, Olawale and Sun (2010) identified 21 major factors that contribute to cost overruns by structural changes, risks and uncertainties associated with projects, improper evaluation of projects and time and costs, inefficiency of subcontractors, complex work, conflict of project organizations, disagreements in contract documents, non-compliance with contract definitions, inflation, funding and remuneration, lack of appropriate training and project manager information, low-skilled staff, unpredictable

weather, dependence on foreigners, lack of appropriate resources. Software, unstable interest rate, currency / exchange rate, weak systems and controls, project fraud and corruption and unstable government policies. Ameh et al. (2010) conducted a study of communication projects and showed that the seven main factors were lack of contractor experience, cost of materials, fluctuations in building materials, general construction changes, economic insecurity, interest rates charged by banks on loans were very high. High-level, funding mechanisms and fraudulent practices.

**[4] Choudhry et.al (2004)** Overtime is defined as the extension of the period beyond the scheduled contracted termination of a contractor (Kaming et al. 1997). Choudhry (2004) and Chan (2001), have explained that time passes as the difference between the actual completion time and the estimated completion time. Project delays are those that cause a project completion date to be delayed (Al-Gahtani and Mohan 2007). Many time-related factors vary with the type of project, location, size and scope of the project. Time and cost increases are common in projects around the world. However, these are especially difficult in developing lands. Kaming et al., (1997) identified 11 overdue variables and 7 overspending variables through a questionnaire survey on the most rising construction projects in Indonesia. Changes in design, staff inefficiency, lack of adequate planning, lack of building materials and inaccuracies of material standards are the five causes of overtime. Chan and Kumaraswamy (1997) reported five causes of observed delays in contractors, clients and consultants in construction projects in Hong Kong. The data was collected through a questionnaire comprising 83 delay factors in eight phases and distributed to 400 local companies involved in construction activities. Based on the 37% response, the five most important aspects of delays identified were poor site management and monitoring, unexpected soil conditions, decision-making delays, customer-initiated variations and design changes. Frimpong et al. (2003) conducted a series of questionnaires on Ghana's groundwater construction projects and identified 26 factors responsible for project delays and cost overruns. The Kendall concordance coefficient was used to assess the level of agreement between the owners, contractors and consultants and concluded that there was a minimum level of disagreement. Aibinu and Jagboro (2002) examined the effects of delays in the delivery of construction projects in Nigeria. The acceleration of site operations coupled with improved proprietary project management procedures and the inclusion of an appropriate emergency grant in pre-contract scale was recommended as a way to reduce the negative effects of construction delays in Nigeria. Odeh and Battaineh (2002) have studied the causes of delays in the construction of traditional contracts in Jordan. Research shows that labor productivity was the most important factor in contractor delays, insufficient contractor experience, yet it was the most important delay factor for consultants. Koushki et al., (2005)

have analyzed time and cost estimates and their causes. The three main causes of delays are changing orders, the owner's financial constraints and the owner's ignorance. Alghbari et al., (2007) examined the causes of delays in construction projects in Malaysia.

#### **[5] Construction Project Quality Management**

As noted by Pinto et.al (2005), one cause of project failure is that quality is neglected or compromised in order to meet firm deadlines. It does not help much to complete the project on time, but you find that the delivered item will not work properly. Quality Management included both quality assurance (planning to meet quality requirements) and quality control (steps taken to monitor results to ensure compliance with requirements).

#### **[6] Construction Project Scope Management**

Changes in project scope are often the things that "kill" the project. Scope management includes project authorization, development of broad management that will define project boundaries, narrowly divide the work into manageable manageable components, ensure that the amount of planned work is achieved and define broader transformation management processes. (Muller and Turner, 2007).

#### **[7] Construction Project Human Resource Management**

Managing Mortal coffers is frequently overlooked in construction systems. It involves relating the people demanded to do the job, defining their places, liabilities and reporting connections, gaining those people and treating them as they do the job. (White & Fortune, 2002)

#### **[8] Construction Project Risk Management**

Communication management involves planning, executing and managing the acquisition and dissemination of all information relevant to the needs of all project stakeholders. This information will include project status, completed events that may affect other participants or projects and more. (White & Fortune, 2002)

#### **[9] Construction Project Risk Management**

Risk Management is a systematic process of identifying, evaluating, analyzing and responding to project risks. It includes maximizing profits and positive event outcomes as well as minimizing profits and negative event outcomes on project objectives. This is a very important aspect of project management that is sometimes overlooked by new project managers. (White & Fortune, 2002)

### **5. CONCLUSION**

Base on the results of the information carried out, Construction management technique is in no doubt a must use for every professionals in the construction industry. The construction management techniques however used as evident from the respondent professionals in the construction field include Gantt chart, Work breakdown

structure (WBS), Critical Path Method (CPM), Line of Balance, Lean construction Management Technique, (MSP) Microsoft project and lot of others and factors such as Size of the project, Location of the project, Type of Client Source of finance, Complexity of the project, Vitality of the materials, Poor planning, Materials storage, Cost of transportation and storage and so on constitute the factors affecting construction Management Techniques at the site.

However it is concluded that construction project management activities usually include the following:

1. Clarification of project objectives and plans including scope, budgeting, planning, implementation requirements, and selection of project participants.
2. Implement the various functions through proper coordination and control planning, design, measurement, contract and construction throughout the process.

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