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Construction Management Techniques to Complete the Project within Time Period and Estimated Cost: A Case Study of Residential Building

Ankit Dharmaprakash Sawai[1], Sham Shivaji Lohar[2]

[1]M.E Student, Department of Civil Engineering, Construction Management, Imperial College of Engineering & Research, Wagholi Pune, India.
[2]Assistant Professor, Department of Civil Engineering, Imperial College of Engineering & Research, Wagholi Pune, India.

Abstract - *This study required the Pune World City Lohegaon Project Building Project "Pride World City Lohegaon Project" This world-class project is located on a 400-hectare site in Dhanori, which will be the center of Pune with 1, 2. 3 BHK apartments / apartments. As an example of research. The Building Control Strategies discussed in this study include a comparative analysis between the Microsoft Project Design Plan (MSP) Techniques and the Aluminum formwork (MIVAN) Technique. Construction Review, Lean Construction Technique, Value Engineering Technique, Gantt Chart, System Evaluation System and Review System (PERT), Critical Method Method (CPM), Balance Line, Workflow Structure, Network Analysis, Graphic Test Method and Review (GERT), Project Sensitivity Analysis, Cost Profit Analysis and much more and features such as project size, project location, Type of Financial Client Source, Project Complex, Construction Capacity, Buildings, Buildings, Storage, and the latest and others include aspects that affect the Building. Management strategies in the Indian construction industry.*

Key Words: Construction Management Techniques, Management Strategies, MIVAN Techniques, Work Breakdown Structure, Microsoft Project Planning, Time Management, Gantt chart.

1. INTRODUCTION

Construction is an important part of development and is an important sector of the Indian economy. India has the second largest population in the world and in the future the demand for housing is rising sharply due to this problem India will need a lot to plan land grabbing and quickly create settlements. Today there is an increase in population so that that speed of construction is given greater importance especially to large housing projects. Fortunately, some of the advanced technology of rapid construction speed is already available in the country e.g. Pre-construction, autoclaved blocks, tunnel formwork, aluminum formwork (MIVAN Technology) building etc.

The objections of construction quality is serious issue in the Indian construction industry. For fruitful quality work, for example, unviability of skilled workers, poor working techniques, bad condition of equipment's, old working methods and so forth it will require more time, cost will increased, bad work quality. The infrastructure venture requires more numbers of skilled workers, updated equipment, soft wares, and proper project management, which will save time and increases productivity.

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 case study of the construction of residential building, some strategies are used like Gannt Chart *(MSP)* Microsoft project planning software, (MIVAN) Aluminum formwork Construction Technique, Work Breakdown structure, 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,[1] (1986) design operation design is the overall planning, collaboration and control operation of a design from launch to finish aimed at meeting client needs in order to produce a feasible and completely feasible design. Construction Project Management is what applies to the construction assiduity. The most common liabilities of construction operation Association of America (CMAA) fall under seven orders, Project operation Planning, cost operation, time operation, Quality Management, Contract Administration, Safety Management and CM Professional Practice which integrates specific functions similar as defining liabilities and operation structure of the design operation platoon, planning and directing through design operation, defining places and functions and developing design and design identification contracts. Arnaboldiet.al, (2004)

1.2 Functions of Construction Project Management

According to Adedeji (1989), building planning is an important and difficult task in implementing and developing construction plans. It includes special selection, job description, amount of money needed and duration of each job, as well as identification of any relationship between different jobs. Building a building plan is an important task in the operation of a building, especially if the plan is not

written or officially recorded. In addition to these special features of setting planning, it may also be necessary to formulate organizational ideas about the relationship between design actors and indeed which organizations should be included in the design. For example, the extent to which subcontractors will be used in construction is usually determined during construction planning

2.0 METHODOLOGY

The methodology will be used as data collection for site visits, interviews, questionnaires, book reviews and case studies, internet, books. The methodology includes the following point. Data collection was taken from various executives who worked in residential, commercial, and Pride world City Charoholi Budruk, Pune.Required project data, collaboration with developers, engineers and interviews with some of the selected respondents regarding the main purpose of the article are designed for the data analysis phase.To accomplish this project, a collection of information on common ways to make technologies to build and learn different concepts of MIVAN form structure and various applications will be done by visiting a continuous site. The cost-effectiveness of building MIVAN formwork over conventional structures will be made.

Questions are asked for the information from various executives who have worked in the residential, commercial, and form the Pride World City Pune, Project name "Manhattan" are as follows.

1. What are the construction management techniques are follows to complete the project within time period?

2. Which Construction management techniques is used to complete the project in give time duration and in quality if yes, then In how many days or duration of the project is completed as compared to Conventional construction management and techniques.

3. What are the impact of construction management techniques on construction cost, time and overall performance in Project?

2.1 Data Collection

The information is collected from the site of Pride World City, a 400 acres township In which taking a construction site is "Manhattan'' project by Pride Group's at Pride world City and the other residential building sit at Pride world City Charholi, Budruk Lohegaon, Pune. The project "Manhattan "is a Residential Building Which use the Aluminum (MIVAN) formwork construction technology and other building which used conventional construction management methods and techniques. The area of the project is 4.39 acres. At Pride world City, manhattan Building 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 the information is collected construction management technique which is Aluminum (MIVAN) Formwork construction technology at the site of Pride World City, Pune. It is a project of the buildings MIVAN formwork building 4A2 and 4B3 Conventional construction building.

Image no:-1 MIVAN formwork Construction

Image no:-2 Conventional Construction Work

2.2 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 design into manageable factors and phase structure. Such a structure defines tasks that can be completed in addition to other tasks, to grease resource allocation, the allocation of liabilities and to estimate and manage the design. Wysocki (2009) also noted that it's a dependable tool for defining work packages and to develop and track cost and design plan. Work Breakdown Structure (WBS) provides a comprehensive frame for the complete development of design planning and operation and is the base for dividing the work into a descriptive expansion in which the Work Statement can be developed as well as technology, program and operating costs. Hourly reporting can be established. (Abbasi & Al-Mharmah, 2000).

2. Microsoft Project Planning (MSP)

Microsoft Project is a project management software developed and marketed by Microsoft, designed to assist the project manager in planning, allocating resources to projects, tracking progress, managing budgets, and evaluating workloads. Microsoft Project is a project management software used to create project plans, schedules, resource management and time tracking. It has features such as Gantt charts, kanban boards and project calendars by project management professionals. Microsoft Project is also known by other names such as MS Project or Project Professional, which is the current official name of the software.

Design creates budgets predicated on assignment work and resource cost. As fund are assigned to the task and the program calculates the cost equal to the work times the rate, which rolls up to the task position and also to any summary tasks position and eventually to the design position. Resource delineations (Labour, stuff and materials) can be participated between systems using a participated resource pond. Each resource can have its individual timetable, which defines what days and time is resource present. Each resource can be assigned to multiple tasks in multiple systems and each task can be assigned many finances. The achievement of the recorded task work rested on the resource obtainability as defined in the resource timetables. All fund can be defined in Work, Material and Cost. Therefore it can not estimate how numerous finished products can be attained with a given quantum of raw accoutrements. This makes Microsoft Project improper for working problems of available stuff constrained product.

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.

3. MIVAN Aluminum Formwork Construction Technology

MIVAN is a new aluminum formwork system. The MIVAN framework is a development of formwork, a strong cast-in-situ divider and solid floor sections provide a framework that assists with a single consistent yield. Larger structures measured by dividers and basements are elevated locally. These structures are made of durable and durable, durable and easy to handle. They have a large number (about 250) for multiplication. Concrete is produced under strict quality control in the RMC processing industry and transferred to a mixing facility. The MIVAN formwork system has become a growing trend in recent years in many countries. The development of a country may depend on the progress made by that country's construction industry. In addition, the number of houses built in any country may be the development of that country. Although there has been a steady increase in housing prices in India since independence, the pace has not been matched by rapid population growth and urbanization in India. As a result, housing shortages are increasing and the situation is becoming more urban.

The use of the MIVAN form in the construction industry is very low in India compared to other countries. The use of the MIVAN form in high-strength construction, especially the needs of developing India and not using the MIVAN formwork as an alternative and do not use it when saving is a major national loss. This new way of building with MIVAN technology can increase productivity, quality and performance through better construction equipment, building materials, and time-saving compared to standard. MIVAN technology is a new construction technology coming to successfully complete a major housing project in India. This study is important because it can provide the necessary information about construction costs and time comparisons between the standard system and the MIVAN construction system in the Indian construction industry.

MIVAN Formwork Work Cycle: 1. Straight reinforcement bars are constructed with one side of a straight formula for the whole floor or part of one floor, as it may be. The second side of the straight formwork is built along with the floor formwork.

2. The reinforcing bars of the lower slabs are repaired and the walls and slabs are cast.

3. Straight form panels are removed (after 24 hours). However, the props were left in place for 7 days and the floor slab formwork was left in place for 2.5 days.

3.0 RESULT AND DISCUSSION

The information is collected from the site of Pride World City, a 400 acres township In which taking a construction site is "Manhattan" project by Pride Group's at Pride world City and the other residential building sit at Pride world City Charholi, Budruk Lohegaon, Pune. The project "Manhattan "is a Residential Building Which use the Aluminum (MIVAN) formwork construction technology and other building which used conventional construction management methods and techniques. The area of the project is 4.39 acres. At Pride world City, manhattan Building 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 technique which is Aluminum (MIVAN) Formwork construction technology at the site of Pride World City, Pune. It is a project of the buildings MIVAN formwork building 4A6 and Conventional Building
Both the buildings MIVAN Formwork Building 4A2 and Conventional Construction Building 4B3 Both are 12 floor and are is 960.77sqm Having 6 flats of 3BHK(2) and 2BHK(4).

3.1 Result Calculation are as follows:-

A) COST of Aluminum Formwork MIVAN Technology Building

a) MIVAN formwork building

1. Cost of Foundation of Building = Rs.500000
2. Cost of G+12 Floor of area 871.92 sqm =Rs 42250000
3. Total cost of building = 42750000

b) Conventional Construction Building

1. Cost of Foundation of Building =Rs500000
2. Cost of G+12 Floor of area 871.92 sqm =48250000
3. Total cost of building = 48750000

B) Duration of Construction work MIVAN and Conventional Building

a) MIVAN Technique building

1. Excavation = 38 days
2. RCC work =400 days

Total = 438 days

b) Conventional Construction Building

1. Excavation = 37 days
2. Rcc work = 348 days
3. Brickwork = 150 days
4. Internal Plaster = 135 days
5. Ceiling POP = 120 days
6. External Plaster = 90

Total = 880 days

3.2 Comparison between MIVAN formwork Construction Technique building and Conventional Construction Formwork building.

Content	MIVAN building	Conventional building
Duration of Construction	438 days	880 days
Total Cost	Rs.42750000	Rs.48750000
Wastage of formwork	Very less	More
Resistance to earthquake	More	Less than MIVAN system

Table:-1 Comparison between MIVAN Formwork and Conventional Construction Building

The construction management technique are used, which is Aluminum (MIVAN) Formwork construction technology at the site of Pride World City, Pune. In Conventional Building Construction, to complete the project, within time period and cost the, some tools and software are used which is Microsoft Project Planning (MSP), Work Breakdown Structure (WBS).and following

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

3.3 Following are the Advantages of Aluminum (MAIVAN) Construction Technique over Conventional Construction Method

1. High quality formwork ensures consistence of dimensions. On removal of mould a high quality concrete finish is produced to accurate tolerances and Verticality.
2. Total system forms the complete concrete structures.
3. Custom designed to suit project requirements.
4. Unsurpassed construction speed.
5. Panels can be reused up to 250 time and can be erected using unskilled labor

3.4 Advantages of MIVAN Construction Technique formwork over conventional construction.

1. Additional seismic resistance is achieved.
2. The continuity of a complete concrete structure is more than conventional brick bat masonry.

3. Due to shear walls the walls are thin therefore adding carpet area.
4. Inimitable construction rapidness can be scored due to light weight of forms.

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] Opara et.al (2004) financially feasible design. Construction Project Management is what affects the construction assiduity. The most common liabilities of a Construction Director according to The Construction Management Association of America (CMAA) fall under the following seven (7) orders Project Management Planning, Cost Operation, Time Management, Quality Management, Contract Management, Security Operation and CM Professional. Practices that include specific tasks similar as defining liabilities and operation structure of the design operation platoon, planning and leading through design operation, defining places and liabilities and developing communication agreements and relating design design and construction features that may lead to conflicts and claims.

[2] Abhishek Sharma et.al (2015) Numerous design suffers time and cost overruns due to indecorous planning, scheduling and completing workshop that results in multitudinous issues like detention in furnishing installations, development, cutback in quality of construction and making the design more precious. A little consideration shows that the time needed to complete the design is equally relative to the force of force. As the force is increased, the completion time of the design is dropped and on the other hand if the force is dropped, the completion time of the design is increased. A comparison between the birth duration and cost to factual duration and cost of force of design is also determined using design operation software tool Microsoft Project. The schedule report is examined and causes for detention are analysed. This detention is due to shy force, contractor not starting the multitasking conditioning at point shuttering material and the work executed by the exertion in erratic manner at point.

[3] Patil Dhanashri etl.al (2015) In this literature factors affecting selection of formwork were linked through literature study & experts opinion. A questionnaire check is conducted on high rise structure construction systems (above G 5) to find out factors impacting formwork selection in construction projects. The study entered 30 repliers the collected data was anatomized through both Relative Important Indicator system and Microsoft excel. According to their rank indicators the top 5 factors has been ranked consequently for 30 completed checks. The top 5 factors are quality and face smooth, time factor, lifetime, cost and safety. Grounded on these factors relative table was prepared from that decision support model was made. And this was anatomized on ongoing and completed systems it gives further than 90 accurate results. From this model the design directors can elect the formwork fluently grounded on their conditions.

[4] Gernerd K.A et.al (1993) Value Engineering (VE) is a systematic and analytical process that seeks to achieve value for money by providing all the necessary services at low cost in line with the required standards of quality and performance. It is sometimes taught within project management or industrial engineering knowledge as a way in which the number of system outcomes is enhanced by combining performance (function) and cost. In many cases this process identifies and eliminates unnecessary costs, thereby increasing the value of the manufacturer and / or their customers.Referring to Wikipedia notes, Value engineering started at General Electric Co. in the middle of the Earth World War II. As a result of the war, there was a shortage of skilled workers, equipment, and components. he looked at other acceptable substitutes. They realize that these changes often reduce costs, improve productivity, or both. What started out as a risk need was transformed into a systematic process They call their process a "value analysis".

[4] Choudhry et.al (2004) Overtime is defined as the extension of the period beyond the listed contracted termination of a contractor (Kaming etal. 1997). Choudhry (2004) and Chan (2001), have explained that time passes as the difference between the factual completion time and the estimated completion time. Project detainments are those that beget a design completion date to be delayed (Al-Gahtani and Mohan 2007). Numerous time- related factors vary with the type of design, position, size and compass of the design. Time and cost increases are common in systems around the world. Still, these are especially delicate in developing lands. Kaming etal., (1997) linked 11 overdue variables and 7 overspending variables through a questionnaire check on the most rising construction systems in Indonesia. Changes in design, staff inefficiency, lack of acceptable planning, lack of structure accoutrements and inaccuracies of material norms are the five causes of overtime. Chan and Kumaraswamy (1997) reported five causes of observed detainments in contractors, guests and advisers in construction systems in Hong Kong. The data was collected through a questionnaire comprising 83 detention factors in eight phases and distributed to 400 original companies involved in construction conditioning. Grounded on the 37 response, the five most important aspects of detainments linked were poor point operation and monitoring, unanticipated soil conditions, decision- making detainments, client- initiated variations and design changes. Frimpong etal. (2003) conducted a series of questionnaires on Ghana's groundwater construction systems and linked 26 factors responsible for design detainments and cost

overruns. The Kendall concordance measure was used to assess the position of agreement between the possessors, contractors and advisers and concluded that there was a minimal position of disagreement. Aibinu and jagboro (2002) examined the goods of detainments in the delivery of construction systems in Nigeria. The acceleration of point operations coupled with bettered personal design operation procedures and the addition of an applicable exigency entitlement inpre-contract scale was recommended as a way to reduce the negative goods of construction detainments in Nigeria. Odeh and Battaineh (2002) have studied the causes of detainments in the construction of traditional contracts in Jordan. Exploration shows that labor productivity was the most important factor in contractor detainments, inadequate contractor experience, yet it was the most important detention factor for advisers. Koushki etal., (2005) have anatomized time and cost estimates and their causes. The three main causes of detainments are changing orders, the proprietor's fiscal constraints and the proprietor's ignorance. Alghbari etal., (2007) examined the causes of detainments in construction systems 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 Arnabodi M.et.al (2004) 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 White, D & Fortune, J et.al (2002) 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 A. Suchith et.al (2007) 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] Time overruns and Causes Peter F. kaminget.al (1997) Time overruns is defined as the extension of time beyond planned completion dates traceable to the contractors defined time overruns as the difference between the factual completion time and the estimated completion time. Detainments in design are those that beget the design completion date to be delayed Numerous factors related to time overruns vary along with types of design, position, size and compass of design. Time and bring increase is common miracle in systems worldwide. Still, these are especially severe in developing countries. Kaming etal., (1997) linked 11 variables of time overruns and 7 variables of cost overruns through questionnaire check in Indonesian high rise construction systems. Design changes, poor labor productivity, lack of acceptable planning, deficit of accoutrements and trip of material estimates are the five causes of time overruns.

5. CONCLUSION

1. Based on the results of the information provided, the construction management method should no doubt be applicable to all professionals in the construction industry. Construction management techniques used as evidence by responding professionals in the field of construction include the Gantt chart, Critical Path Method (CPM), Work Breakdown Structure, (MSP) Microsoft project Planning and Aluminum (MIVAN) Formwork Construction Technique is used in combination with other materials and features such as project size, project location, Type of Financial Customer Source, Project Complexity, Material Stability, Wrong Planning, Equipment Storage, Travel and Maintenance Costs and more include features. Affecting site construction management strategies.

However it is concluded that the construction project management activities of the Quality, Cost and Duration of the Construction Project usually include the following:

2. Cost Aluminum MIVAN formwork Construction is 14.04 percent cheaper than Conventional Construction Formwork.

3. Construction of the MIVAN building can be done during the construction of a typical 12-story building. From the results of the study it can be concluded that quality and speed must be accurately assessed in terms of the economy.

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