

Comparative Study of Various Construction Techniques

Prof. Manish Mata

Assistant Professor of Civil Engineering Department, SSGBCOET Bhusawal, Maharashtra, India

Gauravi Anil Chaudhari

SSGBCOET Bhusawal, Maharashtra, India

ABSTRACT

Construction is one of the longest-standing industries, yet it has struggled to get good, simple technology on site. Construction is an important sector that contributes greatly in the economic growth of the nation, the construction industry is an investment-led sector where government shows high interest. Government contracts with construction industry to develop infrastructure related to health, transport, as well as education sector. It is very important to choose suitable construction techniques for rapid construction. The main objectives of this project is to compare construction techniques which can help to improve the selection of construction methods for a projects. In this project there is a comparison between MIVAN Technology and Conventional Construction Technology.

Date of Submission: 12-05-2021

Date of Acceptance: 25-05-2021

I. INTRODUCTION

Construction is a general term meaning the art and science to form objects, systems or organization and comes from Latin construction (from com- "together" and struere "to pile up") and Old French Construction. To construct is the verb: the act of building, and the noun is construction: how a building is built the nature of its structure. In its most widely used context, construction is the process of delivering a building or other built asset. It typically starts with planning, design and financing and it continues until the project is built and ready for use. As an industry sector, construction accounts for more than 10% of global GDP (6-9% in developed countries) and employs around 7% of the global workplace. Construction technology refers to the collection of innovative tools, machinery, modifications, software's, etc. used during the construction phase of a project that enables advancement in field construction methods, including semi-automated and automated construction equipment. Construction technology is a collection of multiple CII research practices dealing with technology applications and opportunities to improve performance in the construction industry.

Construction technology deals with the different process and construction systems of preparing for and forming building and buildings systems. It starts with planning, designing, financing and continues until the structure is ready for

occupancy. The study boundaries of this subject ranges from foundations to interior and exterior finishing work. The construction industry has started adopting new technologies and approaches in order to increase the overall efficiency of the project. The construction industry is one of the biggest industries in the whole world. The contribution of this industry towards advancement in technologies there has been a tremendous development. Today there is a growing realization that the speed of construction needs to be given greater importance especially for large housing projects. For undertaking mass construction works, it is necessary to have innovative technologies which are capable of fast rate construction and are able to deliver good quality and durable. It also includes study of construction equipment's and temporary works required to facilitate the construction process. The main objective of construction technologies is towards constructing lighter and taller buildings and to provide less economical and more affordable idea, which is always a big challenge in an era of financial crunch. To achieve these challenges successfully there is a need of sophisticated equipment's employed in the construction process. Now-a-days, many construction technologies are available which are chosen according to duration of project, budget of project, nature of land, building design, requirements of contractor etc. These technologies include Pre-Cast Construction System, Pre-

Fabricated Construction System, RCC or Non-RCC structures etc.

Innovations In Construction Technology

Technological progress has introduced many innovations in field of construction industry. There is huge difference between new and old construction methods. Use of latest machinery has made its way through the civil engineering. Most of the building parts such as pillars, roofs, and concrete blocks are available in prepared forms that increase the speed of construction process greatly. Use of pre-stressed concrete tendons and beams strengthen the building along with speedy construction.

II. CONCEPT OF MIVAN TECHNOLOGY AND CONVENTIONAL CONSTRUCTION TECHNOLOGY.

A. Mivan Technology

The Mivan Technology System was developed by Mivan Company Ltd from Malaysia late 1990s as a system for constructing mass housing project in developing countries. The units were to be of cast-in-place concrete, with load bearing walls using a formwork of aluminum panels. To be erected by the hundreds, of a repetitive design, the system ensured a fast and economical method of construction. The concrete surface finish produced with the aluminum forms allows achievement of a high quality wall finish without the need for extensive plastering. This is one of the systems identified to be very much suitable for Indian conditions for mass construction, where quality and speed can be achieved at high level. The speed of construction by this system will surpass speed of most of the other construction methods/technologies. The Mivan formwork is made up of an aluminium alloy. While Construction is in process, the formwork is supposed to bear, besides its own weight, the weight of wet concrete, the live load due to labor, and the impact due to pouring concrete and workmen on it. The vibration caused due to vibrators used to compact the concrete should also be taken care off. Thus, the design of the formwork considering its requirements is an essential part during the construction of the building. The Mivan Formwork should be able to take a live load including the impact about 370kg/m². It is however, usual to work with a small factor of safety in the design of formwork. The surface of formwork should be dressed in such a manner that after deflection due to weight of concrete and reinforcement, the surface remains horizontal, or as desired by the designer. The sheathing with full live load of 370 kg/m² should not deflect more than 0.25 cm and the joists with

200kg/m² of live load should not deflect more than 0.25cm. Maintaining the Integrity of the specifications. The modular nature of the Mivan formwork should allow easy fixing and removal of formwork and the construction can proceed speedily with very little deviation in dimensional tolerances. Further, it should be quite flexible and can be easily adapted for any variations in the layout. Affordable housing projects are a good use of Mivan technology. Mivan technology is suitable for constructing a large number of houses in a short span of time using room size forms to construct walls and slabs in one continuous pour of concrete. It is very cost effective for similar building layouts and for the plinth work. This system is very unique as all components in the building including slabs, beams, walls, columns, staircases and balconies are of concrete and there is no need for cost-intensive and labour-intensive block works or brickworks.

APARNA CONSTRUCTION IN HYDERABAD BY MIVAN TECHNOLOGY

Aparna Constructions has adopted Mivan Technology for two of its projects in Hyderabad: Aparna Serene Park at Kondapur and Aparna Sarovar Zenith at Nallagandla. In the heart of HTEC City, Aparna Serene Park at Kondapur is an epitome of high-quality construction, top of the line fittings and unparalleled amenities.

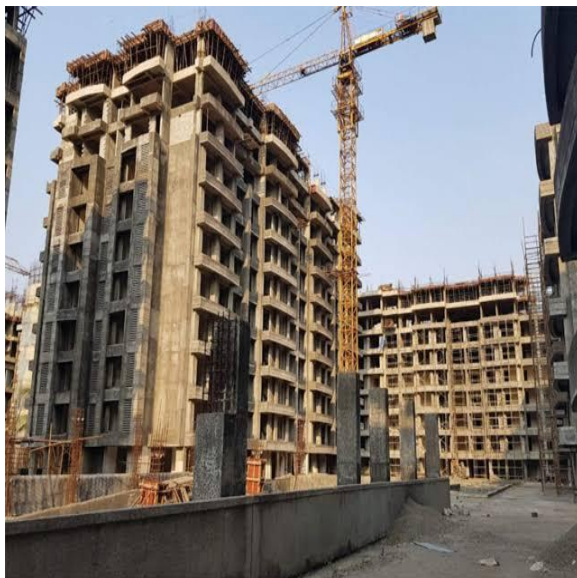
The project comprises of 1096 3 BHK / 4 BHK apartments spread across 14 blocks. There are 10 size ranges of apartments in the project. All apartments are designed as per Vaastu. Mivan technology ensures that the variation of apartment sizes across all blocks is uniform in nature.

Built on 2,622,925 sq. ft. of prime land set amidst the Botanical Gardens, Aparna Serene Park at Kondapur is a fine example of contemporary design and ultra-modern facilities while maintaining the tranquility of its natural surroundings. The elevation has been designed keeping the contemporary styling in mind, with aesthetic color and material combinations and elements to give the project a premium feel. The speed and efficiency of Mivan technology ensured that the surrounding area was not disturbed during construction.

B. CONVENTIONAL CONSTRUCTION TECHNOLOGY

Conventional construction method is a method of ordinary or standard construction. It commonly involves the utility of traditional materials and remains within particular set of parameters. Most conventional structure buildings are based upon plans of moderate and simple measurements, as well as regular floor plans.

Conventional construction method is defined as components of the building that pre-fabricated on site through the processes or timber or plywood formwork installation, steel reinforcement and cast-in-situ. Conventional building are, mostly built of reinforced concrete frames. The traditional construction method uses wooden formwork. It is much more costly for construction, which includes labor, raw material, transportation and low speed of construction time.



Aparna Construction By MIVAN Technology
Duration using Mivan technology

SR. NO.	ACTIVITY	NO. OF DAYS
1.	All shuttering	18
2.	Conceal electrification & plumbing	18
3.	Steel reinforcement	6
4.	Alignment checking	3
5.	Buffer time	2
6.	Concrete placing	3
7.	Removal of vertical formwork	2
8.	Removal of other formwork	14
9.	Lifting of wall panels	2
10.	Gypsum plastering & painting etc	30
	TOTAL	98

Duration using conventional techniques

SR. NO	ACTIVITY	NO. OF DAYS
1.	Column shuttering	12
2.	Column steel reinforcement	12
3.	Buffer	2
4.	Beam and slab shuttering	15
5.	Beam and slab steel placing	12
6.	Leveling	3
7.	Concrete placing	6
8.	Removal of formwork	15
9.	Brickwork	30
10.	Plastering	30
11.	Finishing	30
	TOTAL	167

III. TIME AND COST

The structure is completed much faster than the traditional formwork as a large amount of work can be completed in each daily work routine. There is no need for brick laying and plastering as all walls can be formed at the same time. The project can be completed in shorter time due to fast production methods which save onsite running , operating and financing cost. For the speedy construction Mivan technology is better than conventional technology. Initial cost of Mivan shuttering is high because aluminium formwork is more expensive than conventional formwork. But maintenance cost is negligible as the walls and ceiling are made up of high quality concrete which do not require frequent repair work.

IV. CONCLUSION

Structures like high rise bulidings need more time for completion if it we use conventional method. Speed of construction can be faster by using MIVAN technology. MIVAN serves as a cost effective and efficient tool to solve the problems of the mega housing project all over the world. MIVAN aims to maximize the use of modern construction techniques and equipments on

its entire project. MIVAN technology is able to provide high quality construction at unbelievable speed and at reasonable cost. This technology has great potential for application in

India to provide affordable housing to its rising population.

REFERENCES

- [1]. Ninjal M Parekh , Bhupendra M Marvadi, Umang Patel (2015) “ **Comparative Studies of construction Techniques**” Journal of Information Knowledge and Research In Civil Engineering , ISSN:0975-6744, NOV 14 to OCT 15 , Volume 3, Issue 2, pp 226-230.
- [2]. P.Karthigai Priya,M.Neamitha “**A Comparative Study On Precast Construction And Conventional Construction**”, International Research Journal of Engineering and Technology (IRJET) , e-ISSN: 2395-0056 p-ISSN: 2395-0072, Volume: 05 ,Issue: 08 Aug 2018 , pp 839-842.
- [3]. Pradip Ajugiya, Prof. Jaydev J.Bhavsar, Dr. Jayeshkumar Pitroda “**Comparison of Modern and Conventional Construction Techniques for Next Generation: A Review**”, E-Proceedings of National Conference on Emerging Trends in Engineering , December’2016, pp 127-130.
- [4]. V.Prasanna,K.Chandra Sekar, “**A Comparative Study On Various Techniques In Construction Industry** ”, International Journal of Scientific & Engineering Research, ISSN 2229-5518 Volume 7, Issue 4, April-2016, pp 85-90.
- [5]. Kushal Patil, Ajitkumar Jadhav, Nikhil Shingate (2015) , “**Mivan Technology**”, International Journal of Engineering and Technical Research (IJETR) ISSN: 2321-0869, Volume-3, Issue-6, June 2015, pp 30-32.

Prof. Manish Mata, et. al. “Comparative Study of Various Construction Techniques.” *International Journal of Engineering Research and Applications (IJERA)*, vol.11 (5), 2021, pp 01-04.