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Construction Planning and Management of Affordable Mass Housing Project by Using Primavera

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Abstract: ***Affordable housing refers to housing that some people in the community can afford with a lower than averagee family income. Affordable Housing is an immediate way to achieve the goal of housing for all under the leadership of Pradhan Mantri Awas Yojana. Modern Mivan technology is used to construct buildings quickly, while project management software such as Pri mavera is used to create a plan of events during construction. Large estates have many buildings.Primavera is a tool for underst anding project planning and tracking construction progress. The study also pointed out that the cost of constructing a monolithi c building using the Mivan method is higher due to the higher cost of aluminum formwork; therefore using more than 150 form work systems will make construction faster and cheaper than traditional methods. Similarly, the traditional method requires 88% more workers than the Mivan method due to the long time taken.***
Keywords: Planning, Scheduling, Management, Mivan, Primavera.

I. INTRODUCTION

Today, the construction industry is built on providing housing, energy and public roads to the needs of the world's people. Although the work and environment of a designer or designer has become more, people's needs have not changed over time. According to a M cKinsey report (2010), by 2030 40% of India's population will live in cities, with 68 cities (currently 42) with populations of more th an 1 million. Demand for affordable housing is expected to rise to 38. The number of residences, which was 19 million in 2012, will increase to 2030. New products that can offer low-cost, high-quality and long-lasting products should be made.

II. LITERATURE REVIEW

1) Ministry of Housing and Urbanization (2022) - Revenue 2022-2023 outlines the government's plan focusing on affordable housi ng under Pradhan Mantri Awaas Yojana (PMAY) and other AHP, ISSR, BLC and ARHC and Vision (CSS).
2) Chanakya Sahasrabuddhe (2021) Study of the cost of school, Housing Affordability Guide, when housing costs do not exceed 3 0% of total family income. India uses the 40% rule. Population growth, urbanization and unmet needs are what make us think a bout affordable housing. Government funding in this area and limited access to heritage invite citizens to play a role in this situa tion through public and private partnerships.
3) Ministry of Housing and Urbanization (2019) Presentation of the book "Urban Transformation through Housing for All: Rs 1 c rore and above" for resolution over 10 crore at the 50th Central Sanctions and Monitoring Conference Milestone Meeting PMA Y (U) House (Shanghua) Meeting was held on December 27, 2019. This book contains all the details regarding the progression plan, growth drivers, job creation subsidies, technology development, responsibility and housing.
4) Ramkrishna Nallathiga (2018) Affordable housing is now in demand. Urban population growth has put great pressure on housi ng, especially low-income housing. The market has a large demand, but a small supply.This makes the search for affordable housing even more important because it has the ability to solve problems, take advantage of the great needs of the economy and reduce the need for equipment.
5) Ms. Harshleen Kaur Sethi (2017) The current government's affordable housing policy is a boon for homebuyers and developers . It offers a credit deduction, a tax deduction, a tax deduction, and possibly a tax deduction. It does not give developers enough breathing space to complete and deliver projects.If the state government has succeeded in implementing the central government' s affordable housing plans, such as providing single window permits, preliminary building permits, and building permits, plans to increase density and density will help them complete projects on time, avoiding delays necessary in many respects.

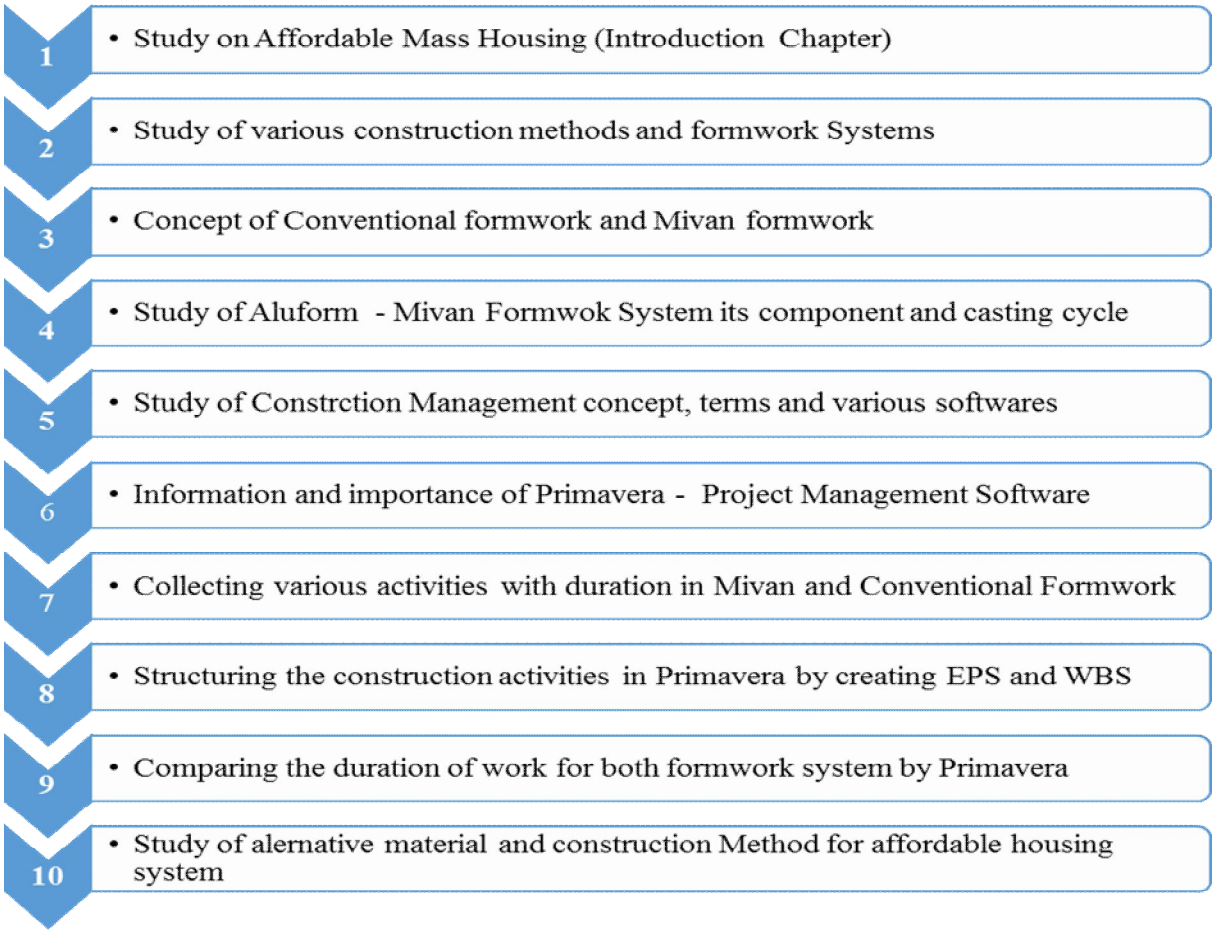
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6) Mr. Anuj Singh Bhadoria, Harish Kumar Dwivedi (2021) The main aim of this study is to understand the role of supervision an d control in the successful and timely completion of construction. This goal is achieved by updating data and a process of evalu ation and control. This study highlights the importance of resource management in large construction projects.
Primavera P6 keeps all construction costs under control and reduces delays thanks to the efficient use of resources (sometimes i ncreased by the use of waste materials).

7) Gaurav S. Narlawar, N.B. Chaphalkar et al.and others. (2019) found that a lack of knowledge about resources and the context of interaction between different resources leads to ineffective use of resources. Primavera software enhances the delivery system by providing detailed information on time management, cost management, updating and monitoring, and more. It has been sho wn that organizations can be more efficient and productive by optimizing resources. Oracle Primavera P6 is more efficient than Oracle Primavera P6 Web Logic in terms of task planning, scheduling, and monitoring.

III. METHODOLOGY

The above objectives will be studied and implemented through a research project titled "Study, Soil Investigation, Structural Design and Construction of 3559 EWS Affordable Housing Project at Pradhan Mantri Awas Yojana (U) in Macarewadi District". Solapur" project includes a total of 54 buildings. It is spread over four different parcels named A, B, C and D. There are 6 planned houses in Plot D. Construction management and planning will be studied as part of the Lot D project. The following methods will be used to c omplete this research.



A. Formwork System

This system allows faster building construction with better quality, durability and improved efficiency by Mivan Company Ltd in M alaysia in the early 1990s. Mivan Technology has rapid construction and commercialization capability while constructing large scale buildings in developing countries. Large residential projects can be completed using the new Aluform technology, which speeds up construction and provides high quality and durable structures at an affordable price.

B. Construction Method

In general, the construction method is divided into four groups:

1) Traditional method
2) Pour-in-place method
3) Composite method
4) Precast method



Figure 1.1Conventional Formwork System

C. Process of Formwork Construction

The process of conventional formwork erection, fixing and removal are as below –



D. Mivan or Aluminum Formwork

Mivan formwork technology is a revolutionary aluminum formwork system that has been successfully used and developed for over 20 years to create cast-insitu reinforced concrete buildings. Using this unique technique, all walls, floors, columns, beams, stirs,bal conies, door and window openings are put in place in a single operation. The structure of the building is very solid, straight and long itudinally, at the same time as the quality of the finished concrete, Mivan formwork technology is fast, flexible and perfect.



Figure 1.2 Mivan Formwork External and Internal View

E. Mivan Casting Cycle

This is the timeline and management control from other construction, such as placing the walls after tying the ties in the shear walls This job takes 7 to 10 hours. Skirting boards and mantles are fixed in 7 hours. Blinds are installed in 6 hours. The main intense activ ation takes 10 to 12 hours.

Install the electrical equipment and the end of the concrete. The system usually follows a 7-day cycle as described below and shown in Figure 2.3.

Day 1: Shear walls support 100 mm wall and external formwork

Day 2: Additional support and 50% internal work.

Day 3: 100% interior formwork and 50% slab formwork

Day 4: 50% slab formwork and 50% reinforcement work for beam deck

Day 5: 100% slab formwork and 50% reinforcement work for beam deck

Day 6 buttress : 1 for reinforcement plates and beams.

Alignment and PMC Inspection

Day 7: Pour the work with flowing stone.

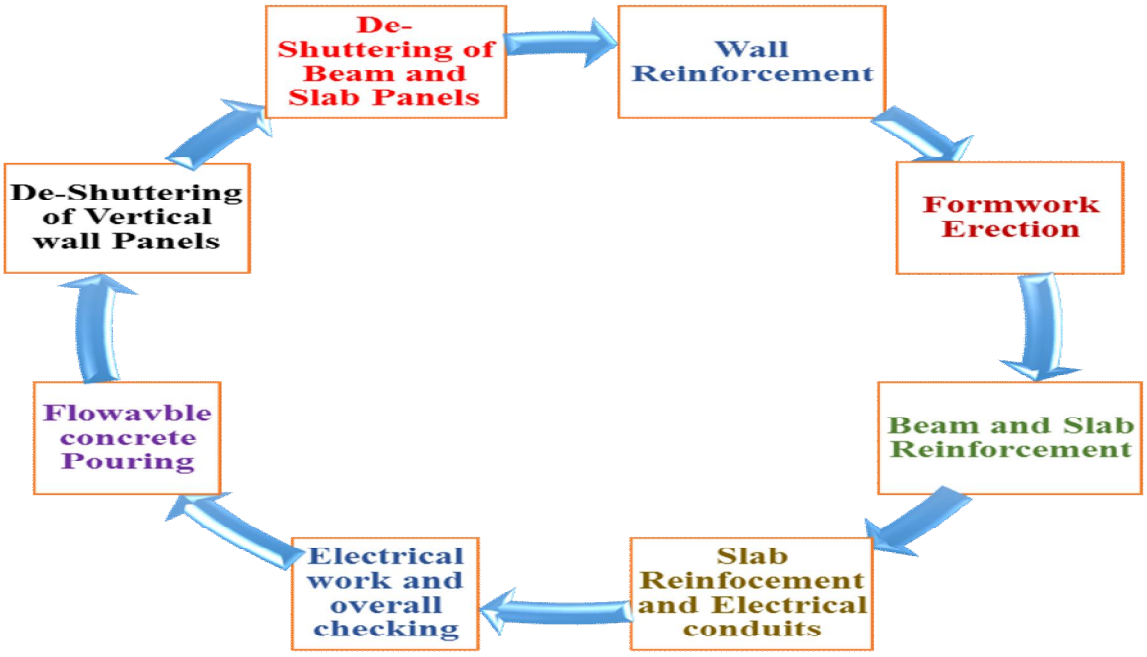


Figure 1.3 Casting Cycle of Mivan at Site

F. Comparison of Conventional and Mivan Formwork:

Following Table 4.3 shows the detailed comparison of Mivan and Conventional formwork system.

Table 1.1 Comparison of Mivan and Conventional Formwork

Sr. No.	Parameters	Mivan Formwork	Conventional Formwork
1.	Initial Investment	High due to aluminum panels and fabrication at factory.	Low due to locally available as per need.
2.	No. of Repetitions	100-150 times	10 times
3.	Durability of material	High due to Aluminium alloy panels	Low due to more water absorption in timber and rusting in Steel
4.	Quality of surface finish	Excellent- Plastering not required	Not good – Plastering is required.
5.	Labour	Skilled	Semi-skilled
6.	Speed of Construction	7 Days	28 Days
7.	Construction Management	Assembly line productivity is possible because of fixed panel and mould system.	Assembly line productivity not Possible. Delay in work progress.
8.	Pouring Process	One time concrete pouring (Monolithic casting)	Casting in parts as per no. of columns, Shear wall, beam and slab (part-by-part Casting)
9.	Accuracy in construction	Accurate construction because of monolithic panel system	Accuracy is less due to no. of pieces more.
10.	Economy in Construction	Economical for Mass Housing and High Rise	Economical for Small Scale construction.
11.	Wastage of Formwork Material	Very Less due to fixed panel system and ductile material.	More in timber due to cutting and nailing in steel rusting and denting.
12.	Scrap value	30% -40% of initial cost	For timber – zero For steel – 2 to 3%
13.	Labour cost	Low due to fast process and monolithic Casting	High due to part-by-part casting.
14.	Pouring Method	Boom pump or stationary concrete pump is used therefore labour required is less	Manual casting and labour intensive for concrete pouring
15.	Type of concrete	Flow-able or self-compacting concrete	Low slump concrete can be used.
16.	Concrete Admixture	High PCE based admixture is needed to improve flow-ability and pumping	Naphtha Base admixture is sufficient for retention of slump.
17.	Curing Requirement	External curing is required Internal curing not required due to enclosed rooms Water requirement is less	Curing on both side required. Water required is more.

G. Preparation

An important part ofpreparation is discipline. However, during the construction process, Law No.was always ignored by the stakeho lders. Proper planningcannot be done without discipline. Therefore, commitment ofparties involved in the project is required for the plan to be successful.

I. The scheduling process for the construction of the project:

The most effective schedule as it describes and tracks all business activities. If you have a difficult, big or long project, it's important to have a detailed schedule to help keep everything going. Commonly used planning methods for infrastructure construction are:

a) Gantt chart (bar chart)

b) Critical Path Method (CPM)

H. Construction Repair Software Requirements

Researches more than specialist engineers with additional training. Those with experience will work on fewer projects, be more invo lved in research, and use Microsoft Project in addition to Primavera.

In addition, construction professionals use critical processes in determining management benefits, executing resource planning proc esses, and engaging in strategic planning and management.

IV. OBSERVATION

Use of Primavera P6 in Planning and Scheduling of T3 building:

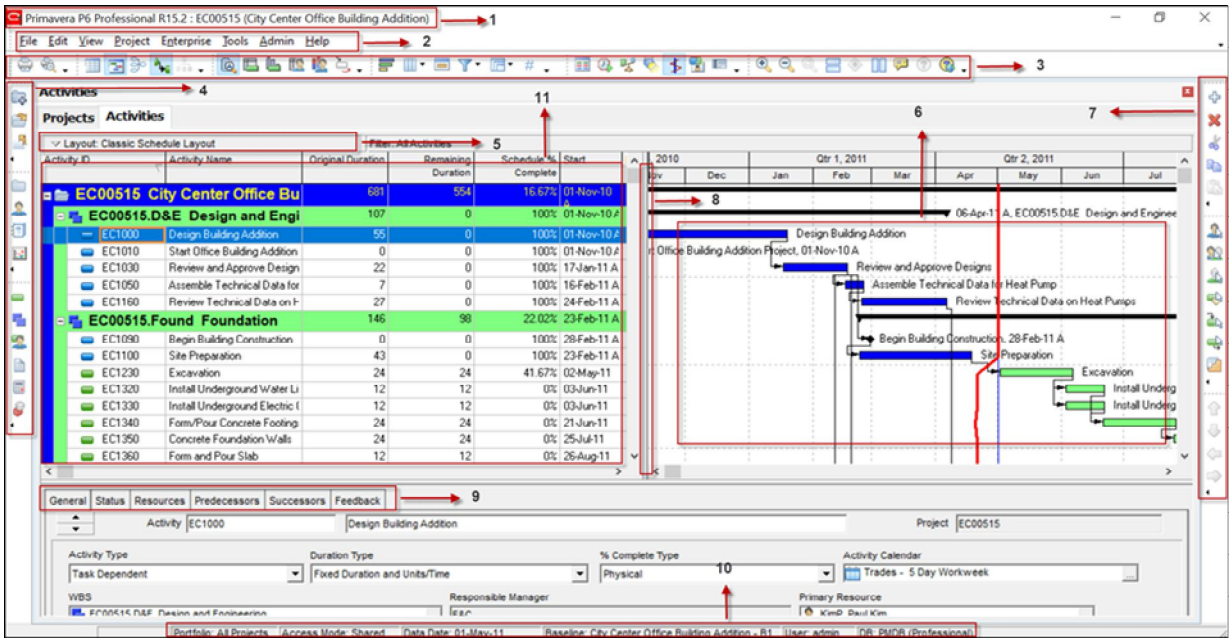


Figure 1.4 User Interface of Primavera

V. CONCLUSION

The project under study is currently in execution at Solapur city. The cost building in one usage of Mivan Method is Rs. 3,58,97,119/- and conventional method is Rs.3,83,79,503/-. The cost of construction for Mivan is 6.47% less than conventional method for one building. The cost of building per Built-up for single use of shuttering in case of conventional method is Rs.14,890/- and in Mivan method is Rs. 13,926/-. In case of multiple use shuttering cost of Mivan is Rs.9,138/- while Conventional Method is same. Total number of labour for conventional method is 2680 whereas for Mivan method is 1422 i.e. 88% more labours for conventional than Mivan method. The Mivan shuttering can be used 120-150 times but in conventional method 7-10 time is possible.

Conventional Shuttering gets unworkable for repetitions. Considering only RCC work excluding plinth and finishing activities, cost per cycle of conventional method is Rs. 17,33,108/- while Mivan method is Rs. 20,26,707/ Even though cost per cycle looks slight difference speedy construction in less duration makes Mivan Technology boon for Mass Housing.

Table 1.2 Summary of comparative parameters between Mivan and Conventional Method

Sr. No.	Parameter	Conventional Method	Mivan Method
1	Area of Shuttering	816.94 Sqm	1732.32 Sqm
2	Cost of Shuttering	Rs. 3000 per Sqm	Rs.7500 per Sqm
3	Duration Required for a Building	345 Days	253 Days
4	Total No. of Labours	2680 Nos.	1422 Nos.
5	Cost of construction for a Building	Rs. 3,83,79,503/-	Rs. 3,58,97,119/-
6	Cost per Built-up area for Single use of Shuttering	Rs. 14,890/-	Rs. 13,926/-
7	Cost per Built-up area for Multiple use of Shuttering	Rs. 14,890/-	Rs. 9,138/-
8	Cost per cycle	Rs. 17,33,108/-	Rs. 20,26,707/-

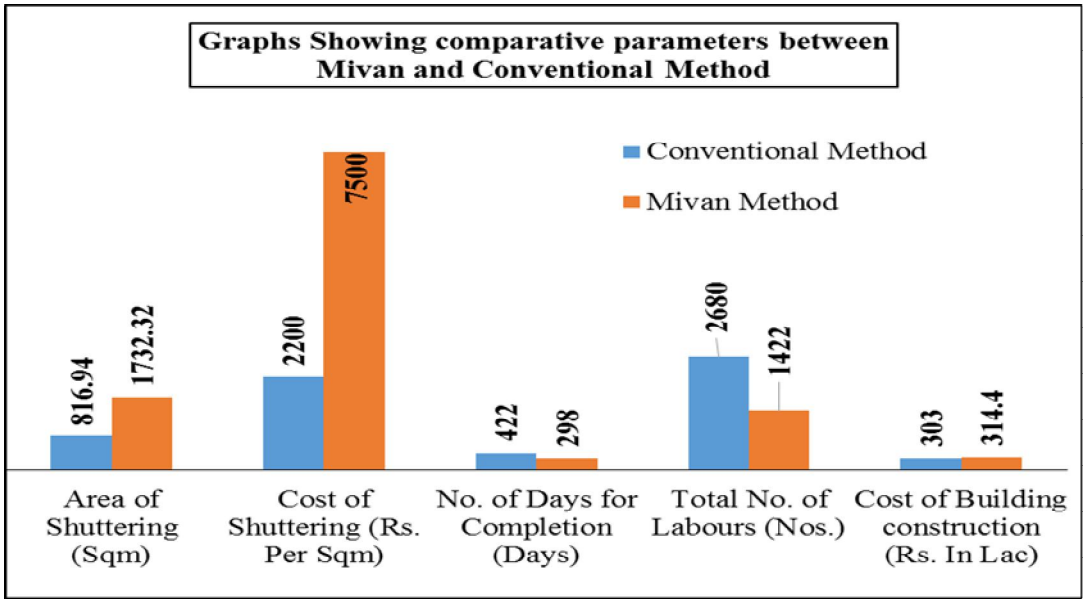


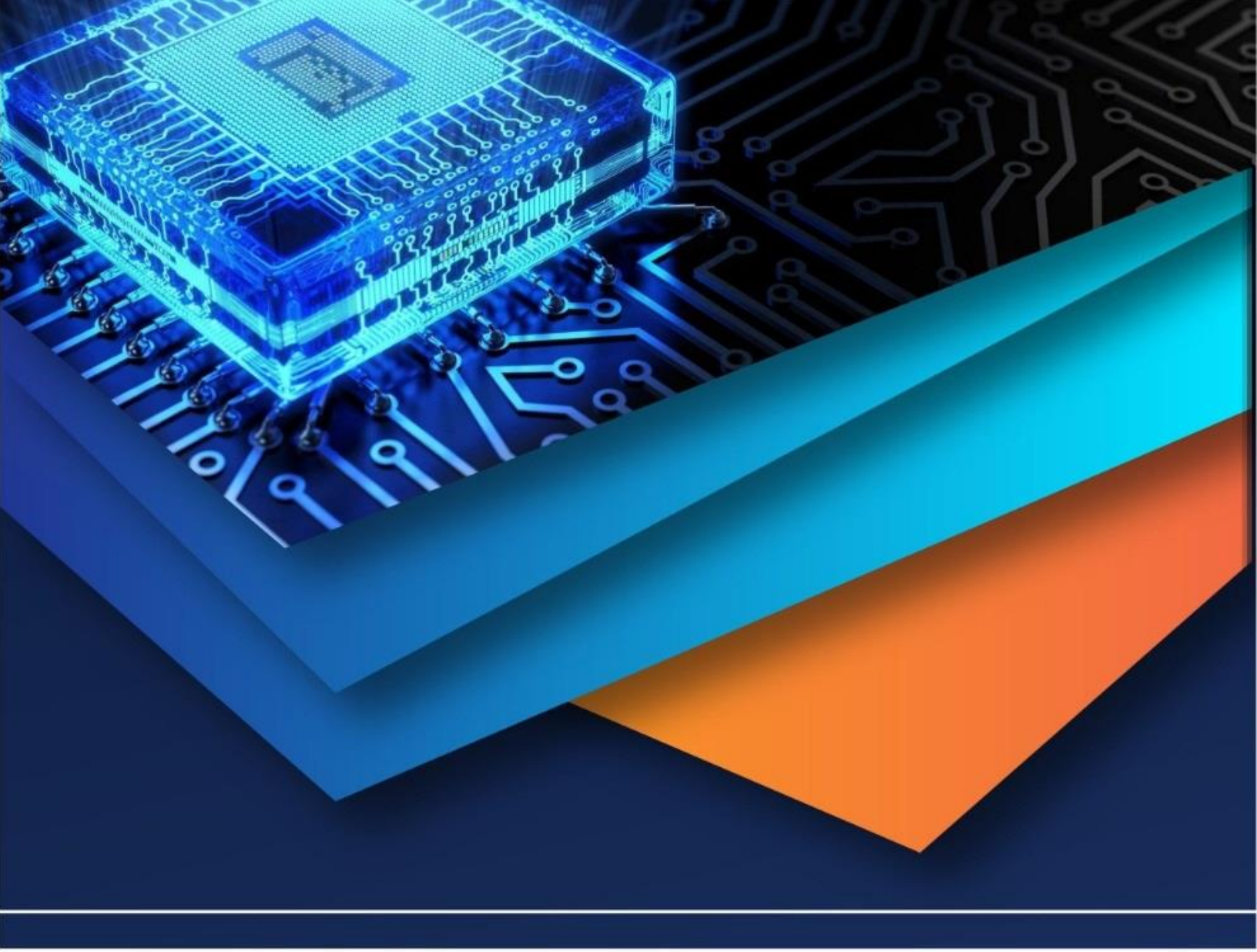
Figure 1.5 Graphs Showing comparative parameters between Mivan and Conventional Method

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