Innovative Journal for Opportunities and Development in Science & Technology,
Volume 6, Issue 7, June. 2026
Paper Id: – IJ2025V6I7 -4 A-G
ISSN 2582-6026

COMPARATIVE ANALYSIS OF CONVENTIONAL FORMWORK AND MIVAN FORMWORK TECHNOLOGY

[1]Chetan Dipak Tambe, [2]Shubham Khandu Bhandare, [3]Rushikesh Dadasaheb Walke, [4]Rutuja Rangnath Gitte, [5]Tejaswini Baban Gaikwad, [6]Vedika Manoj Ambhore, [7]Dr. Y. R. Suryawanshi

[1]UG Scholar, Dept. of Civil Engg., JSPM's Imperial College of Engineering & Research wagholi, Pune
[2]UG Scholar, Dept. of Civil Engg., JSPM's Imperial College of Engineering & Research wagholi, Pune
[3]UG Scholar, Dept. of Civil Engg., JSPM's Imperial College of Engineering & Research wagholi, Pune
[4]UG Scholar, Dept. of Civil Engg., JSPM's Imperial College of Engineering & Research wagholi, Pune
[5]UG Scholar, Dept. of Civil Engg., JSPM's Imperial College of Engineering & Research wagholi, Pune
[6]UG Scholar, Dept. of Civil Engg., JSPM's Imperial College of Engineering & Research wagholi, Pune
[7]Assistant Prof., Dept. of Civil Engg., JSPM's Imperial College of Engineering & Research wagholi, Pune
vedikaambhore3@gmail.com

ABSTRACT - In terms of construction efficiency, cost, quality, and overall project performance, this study compares Mivan technology with the traditional RCC formwork method. While Mivan technology is an innovative aluminum formwork system intended for quick and repeated construction, the standard RCC formwork system, which is commonly utilized in the building sector, uses conventional techniques including hardwood, plywood, and steel shuttering. The purpose of the study is to assess both systems' benefits, drawbacks, and applicability to contemporary building techniques. The study looks at important factors including construction speed, labor cost, material consumption, durability, surface quality, and viability from an economic standpoint. Case studies, site visits, and comparative study of actual building projects are used to gather data. The results show that traditional RCC formwork is labor-intensive and time-consuming, despite its flexibility and reduced starting cost. However, Mivan technology is very efficient for large-scale housing and repetitive structural paper because it offers quicker building cycles, improved quality control, and less waste. The research shows that choosing the right formwork method depends critically on factors including project magnitude, design complexity, and long-term economic concerns. According to the study's findings, large building projects benefit more from Mivan technology. Whereas conventional RCC formwork remains practical for smaller and customized structures. This research contributes to understanding the evolving role of innovative construction technologies in improving productivity and sustainability in the civil engineering sector.

Innovative Journal for Opportunities and Development in Science & Technology,
Volume 6, Issue 7, June. 2026
Paper Id: – IJ2025V6I7 -4 A-G
ISSN 2582-6026

Keywords—Construction, Conventional formwork, Mivanformwork, Cost, Time, Quality,

I. INTRODUCTION

1.1 GENRAL

The construction industry is continuously evolving to meet the growing demand for faster, cost-effective, and high-quality building methods. One of the most critical aspects of any reinforced cement concrete (RCC) structure is the formwork system, which significantly influences project time, labor requirements, construction quality, and overall cost. Traditionally, conventional RCC formwork systems—such as timber, plywood, and steel shuttering—have been widely used in building construction. These systems are flexible and suitable for varied designs, but they often require more labor, longer construction cycles, and repeated adjustments on site.

In recent years, Mivan formwork technology has emerged as an advanced alternative, especially in mass housing and high-rise construction projects. Developed as an aluminum formwork system, Mivan enables monolithic construction where walls and slabs are cast together in a single operation. This method reduces construction time, improves dimensional accuracy, and enhances structural strength. Its reusable nature also makes it suitable for large-scale projects with repetitive layouts. A comparative analysis of conventional RCC formwork and Mivan formwork is essential to understand their relative advantages, limitations, and suitability under different project conditions. While conventional formwork remains practical for small-scale and customized projects, Mivan technology offers efficiency and speed in projects requiring standardization and rapid execution. Evaluating these two systems with respect to cost, time, quality, labor dependency, and sustainability provides valuable insights for engineers, contractors, and project managers.

This study aims to analyze and compare conventional RCC formwork and Mivan formwork systems to identify the most effective solution for modern construction demands. The findings can help in selecting an appropriate formwork method based on project scale, complexity, and economic consideratio

1.2 FORMWORK

Concrete may be shaped into the right shape and kept in the correct place until it hardens thanks to a quick procedure called formwork. Additionally, it supports the weight that has been applied to it. A framed structure made of infilled frames that holds the formwork in place is called false work. Formwork creates efficient healing techniques after it is left in situ. The removal of formwork is referred to as stripping. Reusing the stripped formwork is possible. Failure of the form work during construction resulted in time and money losses, as well as fatalities and injuries. Wood, plywood, aluminum, and precast concrete are just a few of the materials that

Innovative Journal for Opportunities and Development in Science & Technology,
Volume 6, Issue 7, June. 2026
Paper Id: – IJ2025V6I7 -4 A-G
ISSN 2582-6026

may be used to create formwork. Steel and aluminum have had a benefit over other materials in that they can be reused. Timber has the disadvantage of shrinking, swelling, and shrinking.

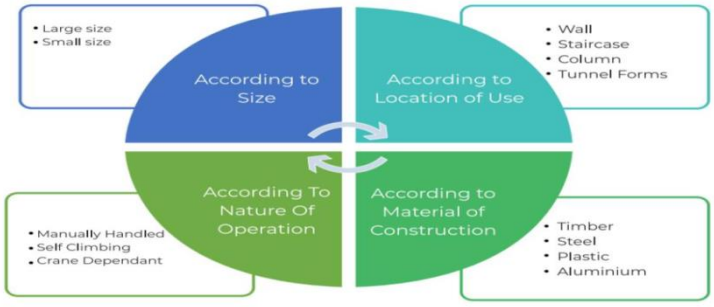


Fig.1 – Graphical representation of formwork

1.3 CONVENTIONAL FORMWORK

A classic yet crucial technique for building concrete structures is the use of conventional formwork. It is a sensible option for many kinds of projects due to its price, flexibility, and ease of use, especially in situations where sophisticated technologies are not practicable. When choosing the best formwork system, engineers and construction professionals must be aware of its features, advantages, and drawbacks.

The traditional framed panels that make up this formwork are joined with horizontal components called wailing. The howling opposes the longitudinal power of wet concrete. The opposite end formwork is built after the placement of the side formwork. This formwork system is used in the construction of every building component.

Objectives

1) To research building and planning techniques
2) To examine the construction cycle time for each floor.
4) To evaluate structural behavior
5) To assess viability from an economic standpoint
6) Learn about formwork systems, fundamental building methods, and how to use them.
7) Consider the constraints of customization and design flexibility.
8) Despite the greater initial MIVAN cost, compare the long-term cost benefits.

II. LITERATURE REVIEW

1. Vedika Prasad Mahele et al. (2021)

This paper highlights the increasing adoption of Mivan formwork in mass housing and high-rise buildings due to its speed, cost-effectiveness, and sustainability. They conclude that Mivan is

particularly beneficial for large-scale urban projects, offering significant long-term advantages that outweigh the initial investment.

2. Nitesh Baban Patekaretal.(2023)

This paper emphasizes the continued reliance on conventional formwork due to its lower upfront costs and flexible design compatibility. However, it also points out drawbacks, including extended assembly time, higher labor demands, and substandard finishquality. The study discusses the reduced environmental footprint ofMivandue tominimalwasteand longer material life span compared to timber or steel alternatives.

3. Yogesh Radheshyam Jangid et al. (2023)

This study provides a comprehensive overview of Mivan formwork technology as an innovative system employing aluminum components, particularly suited for high-rise construction. It traces the evolution from traditional timber and steel formwork to aluminum, citing improvements in construction speed and cost-efficiency.

4. Prof. Santosh Mahadev Kinayekar et al. (2023)

This study explores Mivan technology's contribution to improving the efficiency and quality of precast structural components. It explains how Mivan enables the rapid and standardized production of durable concrete structures,making it ideal for high-rise and mass housing developments. The research supports the widespread use ofthis technology due to its time-saving and cost-reducing features, along with its alignment with sustainable building.

5. Sumit Ghangus et al. (2018)

This research introduces the components of Mivan formwork—such as wall panels, rocker supports, and stub pins—and explains how its lightweight aluminum structure aids in efficient installation and removal. Moreover, its performance under seismic conditions makes it favorable in earthquake-prone regions. The study does, however, acknowledge the higher initial cost as a potential barrier.

6. Pramod Shinde et al. (2020)

This review analyzes various formwork systems and their impact on construction efficiency. It focuses primarily on the comparison between traditional and Mivan systems, especially regarding cost implications. While Mivan requires a higher initial investment due to its specialized materials and design, it delivers long-term savings by reducing labor and expediting project timelines.

7. Naveen V. Chikkaveerayanavar, Naresh Patil(2022)

As the country's population grows, the task of construction has become monumentally more difficult. As we all know, high-rise building construction is becoming more popular, and the process of constructing big structures takes longer, thus new technology is used to shorten the project's duration and expense. New technological technologies are being developed for the construction of multi-storied complexes, resulting in cost-effective and quick residential construction.

8. Aqib Majid Khan and Chitranjan Kumar (2021)

Mivan formwork is required in the Indian construction industry. A comparison of conventional and aluminium formwork was conducted. This research covers all aspects of mivan technology. For the comparison of mivan formwork with conventional formwork, various parameters were considered. The concrete used in mivan formwork is stronger than standard formwork concrete.

9. Patil R.S., Pawale, D.B., Tambe H.D., Pawar P.D. and Wakchuare A.V. (2020)

Performed a study on Mivan technology using aluminium formwork. This study shows a comparison of cost and time in between the conventional formwork and Mivan Formwork technique. Mivan formwork technique gives more seismic resistance to structure than conventional formwork. Mivan technique has less number of joints which reduces the leakages and increase the durability.

10. Dr. M.N. Bajad, Rohan P. Shah and Harsh Kumar C. Ughareja (2016)

performed study on the aluminium formwork system. Necessity, advantages and disadvantages of aluminium formwork is also described in this study. This report is based on a comparison study of traditional and aluminium formwork. This study shows that selection of aluminium formwork depends on the project type and project requirements. Aluminium gives high quality of construction and it is cost effective for the mass constructing**.**

III. PROBLEM STATEMENT AND METHODOLOGY

3.1 PROBLEM STATEMENT

Urbanization, population increase, and the growing need for quicker housing and infrastructure development are all contributing to the construction industry's rapid transition. In the current situation, it is anticipated that construction projects will be finished on time, within budget, and with higher quality standards. Engineers and building experts have been forced to use cutting-edge technology and effective construction methods due to these increasing demands. In reinforced cement concrete (RCC) construction, the formwork system is one of the key elements affecting construction efficiency.Formwork is a crucial part of RCC constructions because it gives freshly poured concrete the support and form it needs until it becomes strong enough. The formwork system type

used in a project directly affects construction speed, labor productivity, cost, safety, and the overall quality of the structure. Therefore, selecting an appropriate formwork system is a critical decision in construction planning and execution.

Conventionally, RCC formwork systems have been widely used in the construction industry. These systems generally involve materials such as timber, plywood, and steel, which are assembled manually at the construction site. One of the major advantages of conventional formwork is its flexibility, as it can be easily adapted to different shapes, sizes, and complex

Innovative Journal for Opportunities and Development in Science & Technology,
Volume 6, Issue 7, June. 2026
Paper Id: – IJ2025V6I7 -4 A-G
ISSN 2582-6026

architectural designs. This makes it suitable for a variety of construction projects including residential, commercial, and infrastructure developments. Additionally, the initial cost of conventional formwork is relatively low, making it a preferred choice for small-scale projects. However, despite its widespread use, conventional formwork systems have several limitations. This increases dependency on manpower and may lead to delays if The availability of labor varies. Additionally, because tasks are performed floor by floor, the building cycle is quite sluggish, which lengthens the project's time.The potential of Mivan formwork to drastically cut construction time is one of its main benefits. Because the panels may be reused, the technique enables quicker installation and disassembly. multiple times, it enhances overall productivity. This makes it highly suitable for large-scale housing projects with repetitive layouts. Moreover, the precision of aluminum formwork ensures accurate dimensions and a smooth surface finish, often eliminating the need for plastering work.

3.2 METHODOLOGY

Fig. 2- flow chart of Methodology

- **Cost considerations in formwork system:**

Cost is another important consideration when choosing a formwork system since it has a direct impact on the building project's total budget and financial viability. The purchase of materials, labor costs, installation, upkeep, and possibility for reuse are all included in the cost of formwork. Although conventional formwork is initially less expensive, its reduced reusability and higher labor demand result in higher long-term expenses. Because Mivan formwork can be reused up to 250–300 times, compared to 15–25 repetitions for standard timber formwork, it

becomes cost-effective in large-scale repeating projects while having a greater initial expenditure.

- **Labour productivity in constructions:**

The success of construction projects is largely dependent on labor productivity, especially in high-rise structures where effective workforce management has a direct impact on project budgets and schedules. In the construction industry, productivity is commonly measured in square meters of shuttering or concreting per man-day, or the quantity of labor performed per person each day.

The intricacy of the formwork system, the availability of skilled labor, site circumstances, and building methods are some of the elements that affect labor efficiency.

Due to frequent reassembly and material waste, conventional formwork, which mostly depends on expert carpenters and manual modifications, often has poorer productivity.

- **Data Collection and Analysis:**

Cost analysis is done for both conventional formwork and aluminum (Mivan) formwork, taking into account a number of factors such as cycle times, labor expenses, and material prices. Material prices, labor costs, shuttering cycle time, cost per square meter, and shuttering utilization ratio are the main cost components. The two formwork technologies have very different material costs. Although aluminum formwork has a high initial cost, it may be reused up to 200 times, which lowers long-term expenses. Additionally, it guarantees a superior concrete surface, which lowers plastering costs. Conventional formwork, on the other hand, is less expensive initially but has a shorter lifespan (10-20 repetitions), leading to higher cumulative costs over multiple floors. Additionally, it requires more timber or plywood, contributing to material waste.

Aluminium formwork has higher efficiency, and a lower lifecycle cost compared to conventional formwork. The shuttering usage ratio, which measures the efficiency of formwork material utilization, is calculated as:

$$\text{Shuttering Usage Ratio} = \frac{\text{Quantity of shuttering done in a month}}{\text{Total shuttering available for the month}}$$

Aluminium formwork typically has a lower usage ratio due to higher reusability and faster cycle times, whereas conventional formwork has a higher usage ratio due to frequent replacements and greater material wastage. Labour productivity is assessed based on IS 7272 (Part 1 & 2) standards, which provide guidelines on labour output in building works. It is calculated using the formula:

$$\text{Productivity} = \frac{\text{Quantity of work done}}{\text{Number of Manday's}}$$

Innovative Journal for Opportunities and Development in Science & Technology,
Volume 6, Issue 7, June. 2026
Paper Id: – IJ2025V6I7 -4 A-G
ISSN 2582-6026

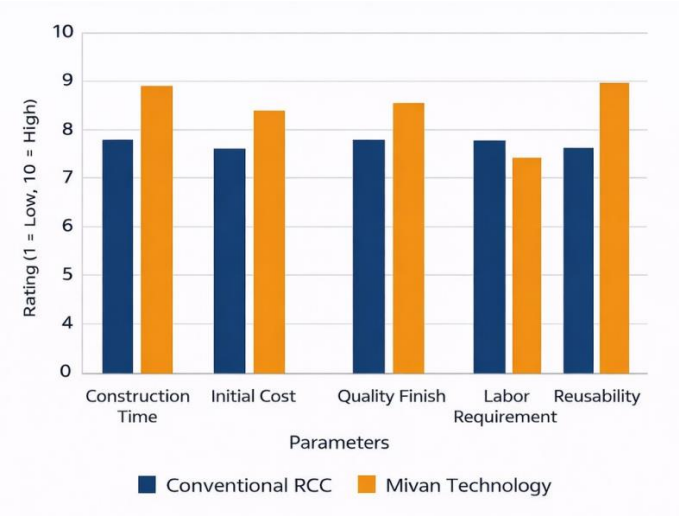


Fig.3- Comparative Analysis

IV. THEORETICAL CONTENT

4.1 Theoretical Content on Comparative Analysis of Conventional RCC Formwork and Mivan Formwork

1. Formwork Selection Strategy in Modern Construction

The choice of formwork system is a crucial strategic choice in contemporary construction that has a direct impact on project effectiveness, cost, quality, and overall success. Formwork was traditionally chosen by contractors mostly on the basis of local material availability and immediate cost. But as building technology has advanced and project complexity has increased, formwork selection has become a multi-criteria decision-making process.

Before selecting a suitable system, a number of things need to be taken into account. The project's size is a significant factor. Customized buildings or small residential developments could profit from conventional formwork due to its flexibility and lower initial investment. On the other hand, large-scale housing developments and high-rise buildings often require faster and more standardized systems, making Mivan formwork a preferred option.

2. Life Cycle Cost Analysis (LCCA) of Formwork

In contemporary construction management, Life Cycle Cost Analysis (LCCA) is a crucial method for assessing a formwork system's overall cost throughout the course of its useful life. LCCA takes into account all expenses related to acquisition, upkeep, reuse, repairs, and disposal, in contrast to conventional approaches that simply take into account the original investment.

Because materials like wood, plywood, and steel frames are readily accessible and reasonably priced, the initial cost of traditional formwork is comparatively modest. However, because of

wear and breakage, these materials frequently need to be replaced and have little possibility for reuse.

3. Impact of Formwork on Structural Performance

Formwork is not merely a temporary mold for concrete; it also has an indirect influence on the structural performance of a building. The accuracy, alignment, and rigidity of the formwork system affect the quality and durability of the finished structure.

- Conventional Formwork:

Conventional formwork involves manual assembly and adjustment of timber, plywood, and steel supports. Since much of the process depends on worker skill, there is a possibility of dimensional variations, misalignment, and inconsistencies in the finished structure. Such deviations may require corrective measures and can affect the overall precision of the project.

Additionally, separate casting of structural components such as columns, beams, and slabs creates multiple joints. These joints may become weak points in the structure if not executed properly.

- Mivan Formwork:

Because Mivan formwork is composed of factory-produced aluminum panels, it offers superior dimensional precision. It guarantees consistency and even alignment among repeated units. The construction has fewer joints since walls and slabs are cast together monolithically, improving load distribution and structural stability.

Mivan is especially advantageous for high-rise and urban residential buildings because of its monolithic character, which boosts resistance to lateral stresses like wind and earthquakes.

4. Influence on Project Scheduling and Planning

Formwork systems play a vital role in project scheduling and overall construction planning. The choice of formwork determines the workflow, sequencing of activities, and resource allocation.

Conventional formwork generally requires sequential planning. Activities such as assembly, reinforcement placement, concreting, curing, dismantling, and reassembly must be completed step by step. This often leads to longer cycle times and delays in project progress.

In contrast, Mivan formwork supports repetitive and streamlined scheduling. Since the system is standardized, floor cycles can be planned efficiently, allowing for parallel execution of tasks. This improves coordination among teams and reduces downtime.

5. Waste Management and Sustainability Considerations

Sustainability has become a major concern in the construction industry, and formwork systems contribute significantly to environmental performance.

Conventional formwork relies heavily on timber and plywood, which are often discarded after limited use. This leads to high material wastage and contributes to deforestation and disposal challenges. Frequent replacement also increases transportation and procurement requirements.

Mivan formwork, on the other hand, uses reusable aluminum panels that can be utilized for hundreds of cycles. This reduces raw material consumption and minimizes construction waste at the site.

6. Risk and Safety Analysis of Formwork Systems

Safety is a critical aspect of construction, and the reliability of formwork systems directly affects worker protection and structural stability during execution.

- Conventional Formwork Risks:

Conventional systems involve manual cutting, fitting, and assembly, which increases the risk of errors. Weak joints, improper bracing, and inconsistent workmanship may compromise stability. These issues can lead to accidents, structural failures, or injuries on-site.

- Mivan Formwork Safety:

Mivan is an engineered system with standardized components designed for precise fitting and secure assembly. Its strong connections and better alignment reduce instability and human error.

Because the system is organized and repetitive, workers can perform tasks more efficiently with fewer uncertainties. This enhances overall site safety, especially in large-scale developments.

7. Suitability Based on Project Type

The suitability of a formwork system depends on the nature and requirements of the project.

For independent houses and small customized buildings, conventional formwork is often preferred because it is flexible and adaptable to design changes.

For high-rise buildings and mass housing projects, Mivan is more suitable due to its speed, reusability, and ability to handle repetitive layouts efficiently.

Complex architectural structures with unique shapes may still rely on conventional systems, as Mivan is less flexible for irregular geometries.

8. Technological Advancements in Formwork

The construction industry continues to innovate in formwork technology. Modern developments include modular systems, climbing formwork, and slip formwork, each designed for specific applications.

V. CASE STUDY

A Case Study On Mivan Formwork Technology

5.1 Introduction

Innovation is the key to advancement in the building industry. This principle is demonstrated by Mivan formwork technology, which is transforming conventional building techniques with its efficacy, speed, and affordability. Through practical examples, this case study explores the revolutionary effects of Mivan formwork technology on the construction sector, highlighting its use, benefits, and ramifications. The Mivan Company in Malaysia invented the Mivan formwork technology, which uses aluminum formwork in place of conventional building techniques.

Innovative Journal for Opportunities and Development in Science & Technology,
Volume 6, Issue 7, June. 2026
Paper Id: – IJ2025V6I7 -4 A-G
ISSN 2582-6026

Prefabricated modular panels that are installed on-site to form the necessary structure make up this system. In contrast to traditional formwork, which uses steel or wood, Mivan formwork provides unmatched construction speed and precision while reducing material wastage. One notable case study highlighting the efficacy of Mivan formwork technology is the construction of high-rise residential buildings in urban areas.

5.2 Details of case study

- PMC: Feedback Infrastructure Services Private Limited.
- Contractor: Simplex Infrastructure Services Private Limited.
- Total Area: 22.123 Acres
- Built up area: 25.55 Lac. Sq. ft.

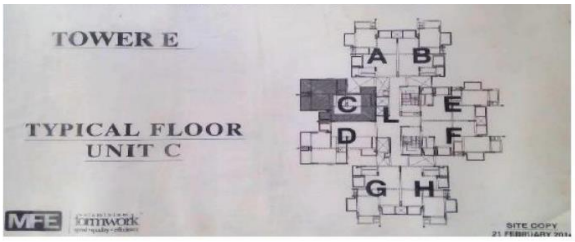


Fig.4 - Showing the plan of tower building

VI. Cost and Construction Time Analysis for Mivan Formwork & Conventional Formwork

A) Cost Analysis of Mivan Formwork

Here we considering Tower-E building and mivan cost as 9,000 per Sqm. without any taxes.

Sr.no.	Shuttering items.	Unit	quantity	Rate in Rs.	Total Rate
1	Column quantity	Sqm	489.75	9,000.00	44,07,750.00
2	Slab quantity	Sqm	487.08	9,000.00	43,83,720.00
3	Chajjas quantity	Sqm	125.01	9,000.00	11,25,090.00
4	Chajjas wall quantity	Sqm	338.49	9,000.00	30,46,410.00
5	Beam bottom quantity	Sqm	108.54	9,000.00	9,76,860.00
6	Beam sides quantity	Sqm	402.57	9,000.00	36,23,130.00
	Total quantity	Sqm	1951.44	9,000.00	1,75,62,960.00

Table.1- Table of Shuttering Rate Calculation for Mivan Formwork.

Innovative Journal for Opportunities and Development in Science & Technology,
Volume 6, Issue 7, June. 2026
Paper Id: – IJ2025V6I7 -4 A-G
ISSN 2582-6026

So, 1,75,62,960.00 Rs. that is the one time cost of mivan shuttering. We can use approximately 200 repetitions. So cost would be 87,814.8 Rs.

B) Cost Analysis of Conventional Formwork

Here we considering Tower-E building and approximate cost of conventional formwork (wooden/timber formwork) as 350 Rs. per Sqm.

Sr.no.	Shuttering items.	Unit	Quanity	Rate in Rs	Total Rate
1	Column quantity	Sqm	489.75	350.00	1,71,412.50
2	Slab quantity	Sqm	487.08	350.00	1,70478.00
3	Chajjas quantity	Sqm	125.01	350.00	43,753.50
4	Chajjas wall quantity	Sqm	338.49	350.00	1,18,471.50
5	Beam bottom quantity	Sqm	108.54	350.00	37,989.00
6	Beam sides quantity	Sqm	402.57	350.00	1,40,899.00
	Total quantiy	Sqm	1951.44	350.00	6,83,004.00

Table 2.- Table of Shuttering Rate Calculation for Conventional Formwork.

Here 6,83,004.00 Rs. is one time cost of conventional formwork (wooden/timber formwork) and for conventional formwork the no. of repetitions is 5. So the cost would be 1,36,600.00 Rs.

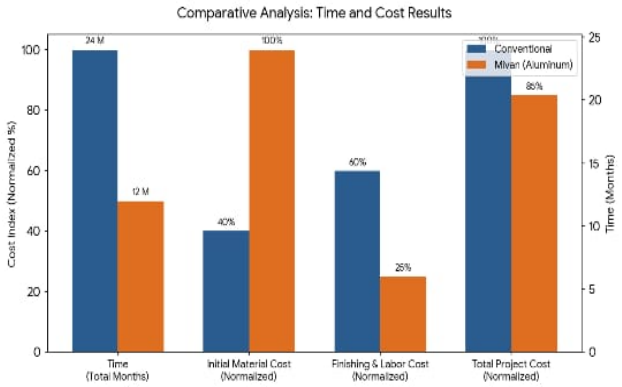
C) Construction Time Analysis of Mivan Formwork

For slab cycling that totally depend upon availability of workmanship for the shuttering work and we considering 18^{th} floor only. Here we are considering only one tower i.e. Tower-E.

1st slab – 21 days
2nd slab – 18 days
3rd slab – 15 days
4th slab – 12 days
5th slab – 9 days
6th to 18 th slab – 91days (@ 7 days per floor)
Total – 166 days = 6.38 months considering 26 working days per month.

Innovative Journal for Opportunities and Development in Science & Technology,
Volume 6, Issue 7, June. 2026
Paper Id: – IJ2025V6I7 -4 A-G
ISSN 2582-6026

VII. RESULT AND DISCUSSION



Compared to the traditional formwork cost of ₹31,57,883.34, the total cost of Mivan formwork is ₹24,51,552.66. This amounts to a 22.37% immediate savings. Conventional formwork costs ₹29,054 per square meter, whereas Mivan costs ₹22,555 per square meter. Unless the project employs rented or reconditioned Mivan components or has a very repetitive vertical architecture (such as a high-rise skyscraper with tiny floor plates), this cost inversion is unlikely for a modest built-up area of 108.69 square meters. The removal of masonry brickwork, plastering, and reduced labor hours are the main factors contributing to the savings. By enabling the casting of walls and slabs, Mivan formwork shortens the building schedule. Monolithically over a period of four to five days. The ₹7.06 lakh in direct construction cost savings in our project will be doubled by additional indirect savings. Faster completion results in cheaper overhead, supervision, and construction loan interest costs. For conventional formwork, the walls must be finished with thick plastering layers and additional brickwork. Right out of the form, Mivan creates a flawless concrete finish. Our concept totally avoids the expense of bricks, sand, and cement plaster while avoiding long-term plaster cracks by casting the concrete smoothly using aluminum panels.. Because Mivan replaces traditional columns and brick walls with comprehensive RCC shear walls, our project will benefit from increased carpet area (thinner walls) and superior earthquake resistance, making the lower Mivan price point exceptionally high-value.

- **Comparison of scrap value percentage for mivan and conventional formwork**

Sr.No.	Formwork	Scrap Value%
1.	Conventional	10%
2.	Steel	30%
3.	Aluminum	50%

1. **Speed and Construction Time**

Mivan: Designed for large-scale building, Mivan formwork enables a quick cycle of four to seven days per level. The walls, slabs, stairs, and beams are all cast monolithically.

Conventional: More labor-intensive and slower. Because of the progressive curing and conventional brickwork partitions, it usually takes up to twice as long as Mivan systems.

2. **Cost Effectiveness**

Mivan: While the initial investment for aluminium forms is high, it yields massive savings of up to 10-15% on the total project cost for high-rise, repetitive projects. Panels can be reused up to 250–300 times.

Conventional: Has a lower initial setup cost, but recurring material waste, frequent formwork replacements (plywood wears out after 8–10 uses), and extended project management overheads drive up total lifecycle costs.

3. **Surface Finish and Quality**

Mivan: Produces highly accurate tolerances and a smooth, uniform concrete surface that eliminates the need for plastering.

Conventional: Requires extensive manual finishing, including chipping, leveling, and plasterwork to achieve a usable surface.

4. **Structural Strength:**

Mivan: High-strength reinforced concrete shear walls are used in place of load-bearing masonry. This results in smaller walls and better seismic protection, increasing the flats' total carpet surface.

Conventional: Depends on a typical RCC structure made up of bricks and beams and columns. In comparison to monolithic Mivan shear-wall systems, the structural integrity and stiffness are usually lower.

5. **Labor and Flexibility Mivan:**

Mivan: Requires a semi-skilled labor force, but strictly follows a fixed design. Modifying the layout later is difficult, making it best suited for large, repetitive, or mass-housing projects.

Conventional: Highly flexible and allows for on-site design changes. It is ideal for small-scale projects or complex architectural designs that do not feature identical floor layouts.

VIII. CONCLUSION

For large-scale and repeated building projects, the comparative analysis demonstrates that Mivan formwork is more cost-effective and efficient than traditional formwork. Mivan formwork outperformed conventional formwork in the current trial, saving around 22.37% on costs. By permitting monolithic casting of walls and slabs with a 4-5 day cycle, Mivan formwork dramatically cuts down on construction time. Faster completion leads to earlier project delivery, fewer overhead costs, and lower supervision costs. While Mivan formwork offers a smooth concrete surface, eliminating finishing work and labor, conventional formwork necessitates extra

tasks like brick masonry and plastering. specifications. Mivan formwork has a somewhat high initial cost, but its frequent usage and quicker construction make it ideal for projects with repeating floor plans, high-rise structures, and mass housing. Because of its flexibility and cheaper initial cost, conventional formwork is still preferred for small, irregular, and non-repetitive projects. However, Mivan formwork is a preferable option for jobs that require economy, quality, and speed.

REFFERENCE

[1] Rahul b. Mojidra1, Pinal h. Patel2 Vinu r. Patel, "Analysis and design of tall structure using monolithic construction" (SJIF) April -2022: 4.72 Volume 4, Issue 4.
[2] Naveen V.Chikkaveerayanavar, Naresh Patil‟ planning and scheduling of shuttering system for multi- storied building", (IRJET) July -2023 Volume: 04 e-ISSN: 2395-0056, Issue: 07.
[3] Prof. Ashish P. Waghmare, Renuka S. Hangarge, Cost and Time estimation for Conventional, Aluminium &Tunnel Formwork. (IRJET) July -2024 Volume: 04 e-ISSN: 2395-0056, Issue: 07.
[4] Miss. Jyoti Suresh Magdum, Prof. Madhav Bhalchandra Kumthekar, Prof. Gayatri Dhananjay J adhav,‟ Comparative Study of Various Types of Aluminum Formworks" International Journal of Engineering Research and Technology, Number 1 (2022) ISSN 0974-3154 Volume 10
[5] Vasav R. Rakholia1, Srinil H. Soni, "Comparative Studies of Construction Techniques (Conventional vs. Mivan (IRJET) Nov - 2020 ,e-ISSN: 2395-0056 , Volume: 04 Issue: 11
[6] Bharagvi S. Pujari, D. B. Bhosale, R. D Shinde. „An emphatic time and cost saver technique Kumkang aluminum formwork system‟ (IRJET) , May-2024, e-ISSN: 2395-0056, Volume: 05
[7] V. Aaditya, Dr. S. Anandakumar‟ scope of aluminum formwork technology in affordable housing scheme based on cost and duration „2020 Volume: 3, Issue: 1, ISSN: 2455-9288.
[8] Majead H Pathan, Akash Padole, Amir Ali Plasterwala, „Design and Cost Analysis of Advanced Shuttering‟ (IJEDR) 2023 Volume 7, Issue 3, ISSN: 2321-9939.
[9] Bhagirathi Singh, Dr. Pankaj Singh „Comparative Analysis of Tunnel Formwork System & Conventional Formwork‟, IJSRD - 2022 Vol. 6, Issue 12, and ISSN (online): 2321-0613.
[10] Vijay anil Sonawane, Harshita amber, „Comparative Analysis of Aluminum Formwork Building and Conventional Formwork Building based on Duration by using Line of Balance (LOB) Technique‟ (IRJET) May 2019 e-ISSN: 2395-0056, Volume: 06 Issue: 05.
[11] ArbazKazi, "Comparative study and decision making for a formwork technique to be adopted on a construction site in mumbai", International Journal of Research in Engineering and Technology, eISSN: 2319-1163 | pISSN: 2321-7308.
[12] Dhanasekhar.A., "Detailed Analysis and Design of Slab-Wall System and Column-Beam System in Concrete Building" January 2025 ,International Journal of Applied Sciences Engineering and Management, ISSN 2320 – 3439, Vol. 04, No. 01, pp. 01 – 05
[13] Dr. Kari Jabbour, Journal of International academic research for multidisciplinary December 2023International Journal, ISSN 2320-5083, Volume01.