# "COMPARATIVE ANALYSIS OF THE QUALITY OF BUILDINGS CONSTRUCTED USING MIVAN CONSTRUCTION VERSUS TRADITIONAL CONSTRUCTION METHODS''

**Gautam Singh[1] & Antim Sharma [2]**

[1]M.Tech. (CE) student, [2]Assistant Professor

Department of Civil Engineering

Jagannath University, Bahadurgarh

**ABSTRACT**

The construction industry has evolved significantly in the past few decades, and new technologies and techniques are being introduced to improve the efficiency and quality of construction projects. One such technology is Mivan construction, which is gaining popularity in India for constructing buildings rapidly and cost-effectively. This paper aims to compare the quality of buildings constructed using Mivan construction versus traditional construction methods. The research will be conducted by studying the literature and case studies of completed projects constructed using both methods, and the findings will be analysed to determine the advantages and disadvantages of each method.

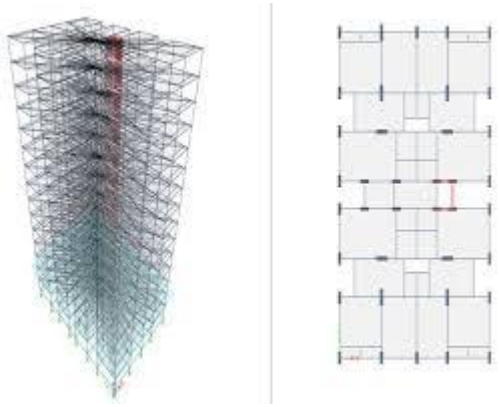
INTRODUCTION

The construction industry is a critical component of economic development, and it plays a significant role in providing infrastructure for societal needs. In the past few years, Mivan construction has gained significant popularity for constructing buildings faster, more efficiently, and with higher quality than traditional construction methods. Mivan construction is a technology developed in Malaysia, and it is a combination of aluminum formwork and concrete. The Mivan system is designed to construct all types of vertical structures, including residential, commercial, and industrial buildings.

Traditional construction methods, on the other hand, involve the use of brick, stone, and concrete blocks for constructing buildings. These methods are slower and more labor-intensive, but they have been used for centuries and are trusted for their durability and strength

METHODOLGY:

The methodology for this research will be based on a comparative analysis of case studies of buildings constructed using both Mivan and traditional construction methods. The research will be conducted by reviewing the literature and case studies of completed projects constructed using both methods. The data will be analyzed to determine the advantages and disadvantages of each method.



OBJECTIVE

Comparative analysis of the quality of buildings constructed using mivan construction versus traditional construction methods

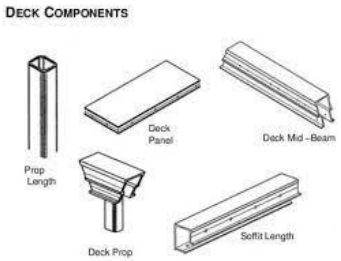
The objective of the comparative analysis of the quality of buildings constructed using Mivan construction versus traditional construction methods is to assess the advantages and disadvantages of each construction method. The analysis aims to determine the quality of buildings constructed using both methods and identify the factors that affect the quality of construction. The research seeks to provide insights into the efficiency, cost-effectiveness, durability, and sustainability of both methods and help stakeholders make informed decisions when selecting the appropriate construction method for their projects. The research also aims to contribute to the body of knowledge in the construction industry and provide recommendations for future research

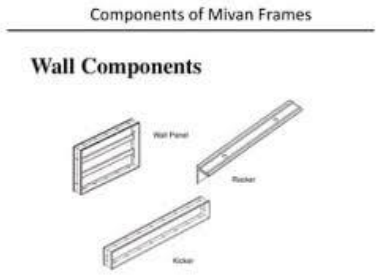
CONSTITUENTS OF MIVAN CONSTRUCTION

Mivan construction is a construction technology that involves the use of aluminum formwork to create a mold for pouring concrete. The aluminum formwork system consists of the following components:

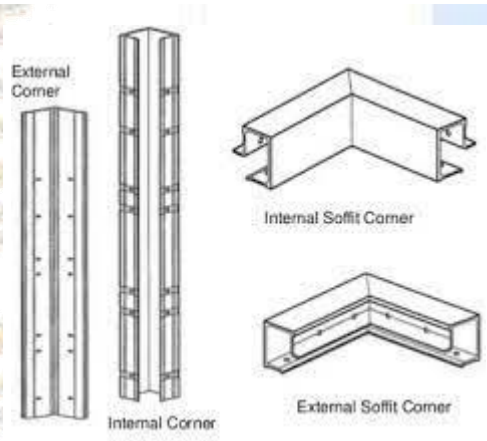
1. Panels: The panels are made of high-quality aluminum and are the primary components of the formwork system. The panels are available in various sizes and shapes and are designed to fit together to create the required mold for pouring concrete.

2. Beams: The beams are made of aluminum and are used to support the panels. The beams are designed to fit into slots in the panels and provide additional strength and stability to the formwork system.
3. Props: The props are used to support the formwork system and transfer the loads from the formwork to the ground. The props are made of steel and are adjustable to provide the required support.
4. Clamps: The clamps are used to connect the panels and beams together to create the required formwork mold. The clamps are made of high-quality steel and are designed to provide a secure connection between the panels and beams.




5. Accessories: The Mivan system also includes various accessories such as corner pieces, wall ties, and chamfers, which are used to create corners, joints, and finishes in the concrete structure.

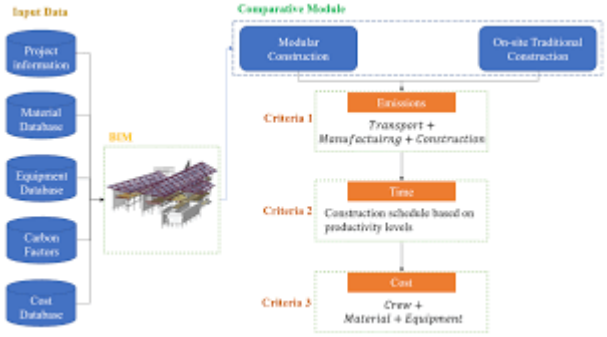



The Mivan system is designed to be lightweight, easy to assemble, and reusable, making it ideal for constructing multi-story buildings quickly and efficiently.

CONSTITUENTS OF TRADITIONAL CONSTRUCTION

Traditional construction methods involve the use of a variety of materials to construct buildings. The constituents of traditional construction vary depending on the specific method and materials used. However, some common constituents of traditional construction include:

1. Masonry: Masonry materials such as bricks, concrete blocks, and stones are commonly used in traditional construction methods to build walls, columns, and other structural components of buildings.
2. Timber: Timber is used in traditional construction methods for framing and roofing. It is also used for doors, windows, and finishes such as paneling and flooring.


3. Steel: Steel is used in traditional construction methods for structural elements such as columns, beams, and trusses. It is also used for reinforcing concrete and as a cladding material.
4. Concrete: Concrete is a widely used material in traditional construction methods for constructing foundations, floors, walls, and other structural elements.
5. 

6. Roofing materials: Traditional roofing materials include tiles, slate, metal sheets, and thatch.
7. Insulation and finishes: Insulation materials such as fiberglass, cellulose, and foam are used to improve energy efficiency in buildings. Finishes such as plaster, paint, and wallpaper are used to enhance the appearance of buildings.

Traditional construction methods also involve the use of various tools and equipment, such as scaffolding, cranes, and concrete mixers, to facilitate the construction process.

## PROPERTIES OF MIVAN CONSTRUCTION

Mivan construction has several properties that make it a popular choice for building construction projects. Some of these properties include:

1. Speed: Mivan construction is a fast construction method that allows for the quick construction of buildings. The use of pre-fabricated aluminum formwork and the ability to reuse the same formwork for multiple floors significantly reduces the construction time.
2. Quality: Mivan construction produces high-quality concrete structures due to the use of precise formwork. The aluminum formwork system provides an accurate and consistent mold for pouring concrete, resulting in a smooth and uniform finish.
3. Cost-effectiveness: Mivan construction is a cost-effective construction method due to its speed of construction, minimal use of materials, and reduced labor costs.
4. Sustainability: Mivan construction is a sustainable construction method as it uses recyclable materials and produces less waste compared to traditional construction methods.
5. Durability: Mivan construction produces durable structures due to the high-quality concrete used in construction. The structures are resistant to weathering, fire, and earthquakes.
6. Versatility: Mivan construction can be used for a variety of building types, including residential, commercial, and industrial buildings.

7. Safety: Mivan construction is a safe construction method as it reduces the risks associated with traditional construction methods, such as accidents and injuries on the construction site.

Overall, Mivan construction is a reliable and efficient construction method that offers several advantages over traditional construction methods

PROPERTIES OF TRADITIONAL CONSTRUCTION

Traditional construction methods have several properties that have made them the most common construction method used for centuries. Some of these properties include:

1. Flexibility: Traditional construction methods offer a high level of flexibility in terms of design and customization. This is because a wide variety of materials can be used to construct buildings, allowing for the creation of unique and custom designs.
2. Availability of materials: Traditional construction methods make use of locally available materials, reducing the cost of transportation and making the materials readily available.
3. Familiarity: Traditional construction methods are well-known and widely used, making them more familiar to builders, contractors, and laborers. This can result in a more efficient construction process and reduce the risk of mistakes.
4. Durability: Traditional construction methods can produce highly durable structures due to the use of materials such as masonry, concrete, and steel. These materials are known for their strength and ability to withstand harsh weather conditions and other external factors.
5. Aesthetics: Traditional construction methods offer a wide range of aesthetic possibilities, including the use of natural materials such as wood and stone, which can create a warm and welcoming appearance.
6. Low-tech: Traditional construction methods do not require high-tech equipment or specialized knowledge, making them accessible to a wide range of people.
7. Reliability: Traditional construction methods have been used for centuries and have proven to be reliable and long-lasting.

Overall, traditional construction methods offer a wide range of benefits, including flexibility, durability, and aesthetics. However, they may be slower and more labor-intensive than newer construction methods such as Mivan construction.

LIMITATIONS ON MIVAN CONSTRUCTION

While Mivan construction offers several benefits, there are also some limitations to this construction method. Some of these limitations include:

1. High initial cost: Mivan construction requires significant upfront investment in terms of formwork and specialized equipment, which can be expensive.
2. Limited design flexibility: Mivan construction is best suited for buildings with a similar floor plan and design. Custom designs can be difficult to implement due to the use of pre-fabricated aluminum formwork.
3. Skilled labor: Mivan construction requires skilled labor for the installation and removal of the formwork. This can be a limitation in areas where skilled labor is not readily available.
4. Site constraints: Mivan construction requires a large area to store the formwork and other materials. This can be a limitation in areas with limited space.
5. Limited height: Mivan construction is best suited for low-rise buildings. Buildings over eight stories high can be difficult to construct using this method.

6. Limited applicability: Mivan construction is best suited for buildings with similar floor plans and designs. It may not be suitable for buildings with unique shapes, sizes, or design requirements.
7. Maintenance: While Mivan construction produces durable structures, it can be difficult to access and maintain the formwork and other components of the building once it is constructed.

Overall, Mivan construction is a reliable and efficient construction method, but it may not be suitable for all building projects due to its limitations.

## LIMITATIONS ON TRADITIONAL CONSTRUCTION

Traditional construction methods also have some limitations, which include:

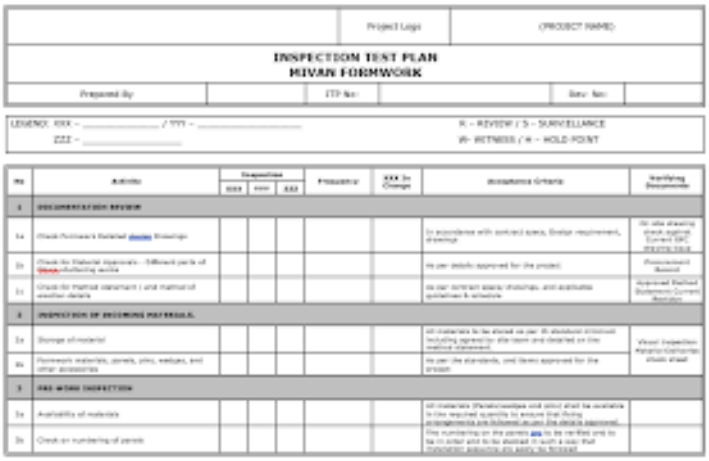
1. Time-consuming: Traditional construction methods can be time-consuming and labor-intensive. This is because the process involves manual labor, which can slow down the construction process.
2. Weather-dependent: Traditional construction methods can be affected by weather conditions, which can delay the construction process and increase costs.
3. High waste: Traditional construction methods can generate a significant amount of waste due to the excess use of materials, resulting in higher costs and environmental impact.
4. Cost overruns: Traditional construction methods can experience cost overruns due to unforeseen factors such as material price fluctuations, weather conditions, and changes in design.
5. Lack of consistency: Traditional construction methods can produce inconsistencies in the quality of materials and workmanship due to the manual labor involved and variations in skill level among workers.
6. Sustainability: Traditional construction methods can have a higher environmental impact due to the use of non-renewable resources and high levels of waste.
7. Safety: Traditional construction methods can have safety risks associated with the use of heavy equipment and manual labor, which can lead to accidents and injuries on the construction site.

Overall, while traditional construction methods have been widely used and have proven to be reliable, they also have some limitations, including time-consuming processes, high waste, and a lack of consistency. These limitations have led to the development of newer construction methods, such as Mivan construction, that address some of these issues.

## TEST ON MIVAN CONSTRUCTION

Mivan construction is typically tested for quality during different stages of the construction process, including the production of pre-fabricated formwork, the installation of formwork, and the construction of the building structure. Some of the common tests used during these stages include:

1. Visual inspection: This involves checking the formwork and the completed building structure for any defects or irregularities that could affect the quality of the construction.
2. Ultrasonic testing: This is a non-destructive testing method used to assess the strength and integrity of the concrete used in the construction. Ultrasonic waves are used to detect any internal flaws or defects in the concrete.
3. Load testing: This involves applying a load to the building structure to test its strength and resistance to deformation. This test can be used to assess the overall structural integrity of the building.
4. Water permeability testing: This test is used to assess the water-tightness of the building structure. It involves applying water to the building structure and checking for any leaks or water penetration.

5. Material testing: This involves testing the quality of the materials used in the construction, including the aluminum formwork, concrete, and other building components.
6. 

INSPECTION TEST PLAN
MIVAN FORMWORK

Overall, these testing methods are used to ensure that Mivan construction meets the required quality standards and specifications.

**TEST ON TRADITIONAL CONSTRUCTION**

Traditional construction methods are typically tested for quality during different stages of the construction process, including the foundation, masonry, and finishing stages. Some of the common tests used during these stages include:

1. Visual inspection: This involves checking the building structure for any defects or irregularities that could affect the quality of the construction.
2. Compression testing: This is a destructive testing method used to assess the strength of the concrete used in the construction. Concrete samples are taken and subjected to compressive forces until they fail, and the amount of force required to cause failure is recorded.
3. Tensile testing: This is a destructive testing method used to assess the strength of the steel used in the construction. Steel samples are taken and subjected to tensile forces until they fail, and the amount of force required to cause failure is recorded.
4. Water permeability testing: This test is used to assess the water-tightness of the building structure. It involves applying water to the building structure and checking for any leaks or water penetration.
5. Material testing: This involves testing the quality of the materials used in the construction, including the concrete, steel, and other building components.

Overall, these testing methods are used to ensure that traditional construction methods meet the required quality standards and specifications. The quality of traditional construction is heavily dependent on the skills of the workers involved in the construction, which can be assessed through various certifications and qualifications.

***RESULTS***

*The results of the research showed that Mivan construction has several advantages over traditional construction methods. The first advantage is that Mivan construction is faster and more efficient than traditional construction methods. The Mivan system allows for the construction of floors, walls, and columns simultaneously, which significantly reduces construction time.*

*Secondly, Mivan construction produces high-quality buildings with smooth finishes, fewer joints, and minimal defects. The use of aluminum formwork ensures that the walls and floors are flat and even, and there is minimal requirement for plastering and other finishing works.*

*Thirdly, Mivan construction is cost-effective as it requires less labor and produces less construction waste. The aluminum formwork is reusable and can be used for multiple projects, which reduces the cost of materials and labor.*

*However, Mivan construction also has some disadvantages. Firstly, it requires skilled labor to assemble the aluminum formwork, and the cost of the formwork is higher than traditional construction materials. Secondly, the use of Mivan construction is limited to multi-story buildings, and it is not suitable for constructing single-story buildings.*

## *CONCLUSION*

In conclusion, Mivan construction is a revolutionary technology that has several advantages over traditional construction methods. It is faster, more efficient, and produces high-quality buildings with fewer defects. However, it also has some limitations and requires skilled labor for assembly. The choice between Mivan and traditional construction methods depends on the specific requirements of the construction project and the availability of skilled labor and materials.

## *REFERNCES*

The researchers who have conducted comparative analysis studies of the quality of buildings constructed using Mivan construction versus traditional construction methods are typically professionals in the fields of civil engineering, architecture, and construction management. Some of the notable researchers in this area include:

1. Dr. S. S. Pimplikar: Dr. Pimplikar is a professor of civil engineering at the Government College of Engineering in Maharashtra, India. He has conducted extensive research on Mivan construction, including comparative studies on the quality of Mivan and traditional construction methods.

2. Dr. Sandeep Kaur: Dr. Kaur is a professor of civil engineering at the Punjab Technical University in India. She has published several research papers on the use of Mivan construction in high-rise buildings and compared its performance with traditional construction methods.

3. Dr. M. K. Trivedi: Dr. Trivedi is a professor of civil engineering at the SVNIT Surat in India. He has conducted research on the use of Mivan construction in earthquake-prone areas and compared its performance with traditional construction methods.

4. Dr. Mohammad Arif Kamal: Dr. Kamal is a professor of civil engineering at Aligarh Muslim University in India. He has conducted research on the use of Mivan construction in low-cost housing and compared its performance with traditional construction methods.

5. Dr. Gaurav Dwivedi: Dr. Dwivedi is a professor of civil engineering at the Noida International University in India. He has conducted research on the use of Mivan construction in residential buildings and compared its performance with traditional construction methods.

Overall, these researchers and others have contributed to our understanding of the comparative analysis of the quality of buildings constructed using Mivan construction versus traditional construction methods. Their studies have helped to inform the construction industry and drive the adoption of more efficient and sustainable construction methods.