ISSN 2277 – 5528
Impact Factor- 3.145

INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES & MANAGEMENT

MIVAN TECHNOLOGY USING ALUMINIUM FORMWORK

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ABSTRACT

Construction is one of the significant sectors of Indian economy. Also, it is an integral part of the development. Today India's urban population is the second largest in the world and its future development deficit to increased demand for housing to cope. And with this problem India should desperately need to plan for acquisition of land and also for rapid creation of dwelling units. Formwork is used to creating moulds from wood, steel, aluminum or prefabricated forms into which the concrete is poured. This is allowed to harden and set after which it is stripped, or in the case of stay-in-place formwork it is left as part of the structure. Formwork allows contractors to cast and construct the main parts of a building which are required to be strong and handle the structure such as floors and walls, as well as smaller parts of a building such as stairs relatively quickly. The project plan also include prentive measure for one of the lack in mivan technology i.e. segregation while placing the concrete resulting honey combing in shear walls by using "Master Glenium ACE 30JP" admixture the process of vulcanization which improves desirable properties of rubber.

Keywords: *Cost effectiveness, Time effectiveness, Quality control, Quantity parameter, MIVAN formwork*.

I.INTRODUCTION

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 aluminium 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 aluminium 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 progress made by the construction industry of any country could be considered as the index of development of that country. Further, the number of pucca houses built in any country could be another index. While there has been a progressive rise in stock of housing in India since independence, the speed thereof has not kept pace with the rapid growth of population and urbanization. As a result, the shortage of accommodation is increasing continuously and the situation has become acute in urban areas.

The most effective means available for the construction of high, medium and low rise mass housing R/C structures. It is a precision-engineered formwork fabricated in Aluminium Monolithic pouring. Walls, columns, slabs & beam are poured together.

Construction is most important part of development and it is significant sectors of Indian economy. India is having second largest population in world and in future demand of housing increases desperately with this problem India should desperately need to plan for acquisition of land and rapid creation of dwelling units. Today there is growth in population for that speed of construction needs to be given greater importance especially for large housing projects. Fortunately, some of the advanced technologies for faster speed of construction are already available in the country for e.g. Prefabrication, autoclaved blocks, tunnel formwork, aluminium formwork (MIVAN Technology) of construction etc.

The use of MIVAN formwork in construction industry is very low in India compared to other countries. The use of MIVAN formwork in construction having great potential, especially needs for current developing India and not using MIVAN formwork as an alternative construction material and not using it where it is economical is a heavy loss for the country. This new method of construction by MIVAN technology can increase productivity, quality and performance of work through the use of better construction equipment, materials, and time saving compared to conventional. MIVAN technology is new construction technology upcoming for successful completion of mass housing project in India. This study is essential because it can provide the necessary information on the building cost and duration comparison between the conventional system and MIVAN building system in India's construction industry

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II.METHODOLOGY

The methodology will be adopted such as collecting the data from site visits, interviews, questionnaires, literature reviews and case studies, internet, books. The methodology also includes following point.

- The data needed for a project, interaction with builders, engineers and interviews with some of the selected respondents regarding the main objective of the topic were conducted for the data analysis stage..
- For accomplishing this project, Collection of the information regarding conventional methods of building technologies and study various concepts of MIVAN formwork building and its various applications is to be done by visiting on going site. Cost-effectiveness of MIVAN formwork building over conventional formwork buildings will be formulated

III.OBJECTIVES

- To compare the cost of building by using conventional formwork technique & by using MIVAN formwork
- To compare the Duration of building by using conventional formwork technique & by using MIVAN formwork technique.
- To carry out which formwork is best for construction of building.
- understand the concept of MIVAN formwork.

All above mention points will have been studied on a live case study.

- ***Mivan System***

It is the most advanced formwork systems. It is fast, simple and adaptable. It produces total quality work which requires minimum maintenance and when durability is the prime consideration. It is a totally pre-engineered system where in the complete methodology is planned to the finest details. In this system the walls, columns and slab are casted in one continuous pour on concrete. Early removal of forms can be achieved by the air curing/ curing compounds. These forms are made strong and sturdy, fabricated with accuracy and easy to handle. The components are made out of aluminium and hence are very light weight. They afford large number of repetitions (around 250). The re-propping is simple hence short cycle time can be achieved.

Fig1.Mivan Formwork

- ***Components Of Mivan Formwork***

The basic element of the formwork is the panel, which is an extruded aluminium rail section, welded to an aluminium sheet. This produces a lightweight panel with an excellent stiffness to weight ratio, yielding minimal deflection under concrete loading. Panels are manufactured in the size and shape to suit the requirements of specific projects. The panels are made from high strength aluminium alloy with a 4 mm thick skin plate and 6mm thick ribbing behind to stiffen the panels. The panels are manufactured in MIVAN'S dedicated factories in Europe and South East Asia. Once they are assembled they are subjected to a trial erection in order to eliminate any dimensional or on site problems. All the formwork components are received at the site within three months after they are ordered. Following are the components that are regularly used in the construction.

ISSN 2277 – 5528
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Fig 2.Wall panel

IV. ADVANTAGES

A)Advantages of Mivan formwork over conventional construction

1. More seismic resistance: - The box type construction provides more seismic resistance to the structure.
2. Increased durability: - The durability of a complete concrete structure is more than conventional brick bat masonry.
3. Lesser number of joints thereby reducing the leakages and enhancing the durability.
4. Higher carpet area- Due to shear walls the walls are thin thus increasing area.
5. Integral and smooth finishing of wall and slab- Smooth finish of aluminium can be seen vividly on walls.
6. Uniform quality of construction – Uniform grade of concrete is used.
7. Negligible maintenance – Strong built up of concrete needs no maintenance.
8. Faster completion – Unsurpassed construction speed can be achieved due to light weight of forms.
9. Lesser manual labour- Less labour is required for carrying formworks.
10. Simplified foundation design due to consistent load distribution.
11. The natural density of concrete wall result in better sound transmission coefficient.

B)Advantages Of Mivan

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

V. DISADVANTAGES

1. Because of small sizes finishing lines are seen on the concrete surfaces.
2. Concealed services become difficult due to small thickness of components.
3. It requires uniform planning as well as uniform elevations to be cost effective.
4. Modifications are not possible as all members are caste in RCC.
5. Large volume of work is necessary to be cost effective i.e. at least 200 repetitions of the forms should be possible at work.
6. The formwork requires number of spacer, wall ties etc. which are placed @ 2 feet c/c; these create problems such as seepage, leakages during monsoon.
7. Due to box-type construction shrinkage cracks are likely to appear.
8. Heat of Hydration is high due to shear walls.

VI. CONCLUSION

The task of housing due to the rising population of the country is becoming increasingly monumental. In terms of technical capabilities to face this challenge, the potential is enormous; it only needs to be judiciously exploited. Traditionally, construction firms all over the world have been slow to adopt the innovation and changes. Contractors are a conservative lot. It is the need of time to analyze the depth of the problem and find effective solutions. Our aim is to serves as a cost effective and efficient tool to solve the problems of the mega housing project all over the world. Our aim is to maximize the use of modern construction techniques and equipment's on its entire project.

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We have tried to cover each and every aspect related to conventional and aluminium form construction. We thus infer that aluminium form construction 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.

Thus it can be concluded that quality and speed must be given due consideration with regards to economy. Good quality construction will never deter to projects speed nor will it be uneconomical. In fact time consuming repairs and modification due to poor quality work generally delay the job and cause additional financial impact on the project. Some experts feel that housing alternatives with low maintenance requirements may be preferred even if at the slightly may preferred even if at the higher initial cost.

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