

COMPARISON BETWEEN CONVENTIONAL BRICKWORK CONSTRUCTION VS MIVAN CONSTRUCTION

Akshay Kapoor¹, Shubham Upadhyay²,
Devendra Pratap Chauhan³, Anshul Dohare⁴

(^{1,2,3,4}Civil Engineering, NIET, Greater Noida, Uttar Pradesh, India)

ABSTRACT

Conventional method of construction is brickwork method in which the cost of construction is increases due to the high labour cost and long time period of construction as it require plastering after brick masonry. It absorbs water which results dampness and cause damage over time. So mivan construction is introduced which isan advance construction technique. It will overcome all the demerits of conventional brickwork construction. In this paper we will discussed about cost comparison of conventional brick construction with mivan construction. The mivan technology is absolutely fine with cost, quality and also time saving as compare to conventional brickwork method. In this paper we will analyse both the construction method with the help of AutoCAD drafting and Staad.pro software and compare their cost, durability, workability and time taken in both the constructions.

I.INTRODUCTION

Mivan construction is firstly introduced in 1990 by a European construction company whose name is Mivan Company Ltd. This is mostly used for residential building and group housing construction in India. In this construction the load bearing walls are constructed with RCC. In this method the wall, lintel, slab is concreting at same time due to this the duration of completion of project is reduce. And the work finish is perfect. There is no need of plastering hence it is more suitable for Indian condition and mass construction. In this construction the load bearing walls are constructed with RCC. And aluminium formworks are used for high quality wall finish. It is most suitable for constructing large number of house in short time duration.

II.MIVAN FORMWORK

Formwork is a mould for structure which is either made up of wood, iron or aluminium. Into this mould, fresh concrete is poured only to harden subsequently. Timber is mostly used for formwork. But the disadvantage with the timber formwork is that it will swell and shrink due to the drying and wetting of wood. To overcome these problems mivan formwork is introduced in 1990 which is aluminium form work system which is introduced by Mivan company ltd. Aluminium form work is most cost effective and long durability as compared to wooden

formwork. In this construction there is no need of block work or masonry work and hence the speed of work increases.

The mivan aluminium formwork system allows easy fixing and removal of form work due to which construction speed increases, dimension tolerance less which results in cost reduction. All the formwork components are made up of high strength aluminium alloy. The aim of mivan construction is to use modern techniques and equipment in construction process. Before dispatching all the panels from factory it is clearly labelled to ensure that they are easily identified and fitted together on site. The panels are held on position by simply pin and wedge system that pass through holes in the outside rib of each panel. The panels are fitted smoothly, precisely and doesn't require bracing. The formwork components used in mivan construction is of light weight which reduces the cost of heavy lifting crane and these formworks are used upto 200 times. With the help of these formwork components the chances of dimensional error is also eliminated.

III.COST COMPARISON

The cost of mivan construction is low as compared to the conventional brickwork construction and the quality of the construction is better as compared to the normal construction. In this paper the cost is compare between mivan construction and conventional brickwork construction in this project we compare a building having stilt parking on ground level and four stories on top. It is compared on the basis of AutoCAD drafting and Staad.pro analysis and the cost of the project is calculated from SSR.

ADVANTAGES OF MIVAN FORMWORK OVER BRICKWORK

- Mivan construction offers Joint less construction which gives better resistance in earthquake.
- It provides good durability and stability.
- It is mostly used in mass construction and group housing.
- It gives smooth and precise finishing of wall and slabs.
- Less manual labour is required in mivan construction.
- Plastering is not required in it.
- The shuttering is used upto 200 times.
- In this construction less number of joints are formed hence the chances of leakage is decrease

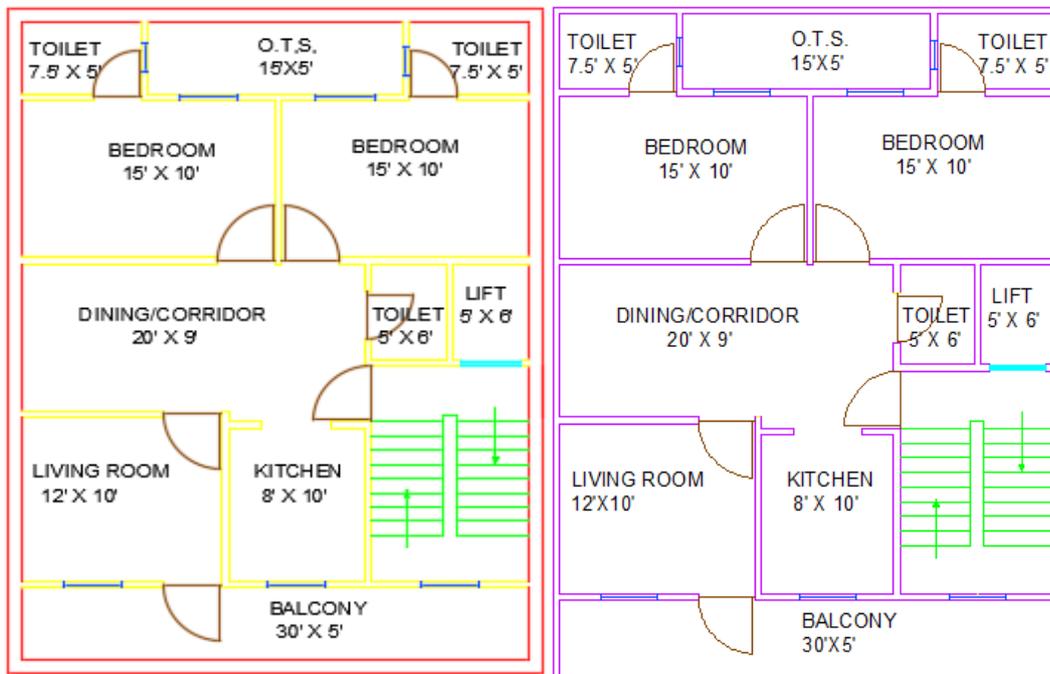
DISADVANTAGES OF MIVAN FORMWORK OVER BRICKWORK

- It reduces the flexibility of the structure.
- Its initial setup takes more time.
- Skilled labour is required for this work
- Initial cost is high.
- Aluminium form work is more costlier than conventional cost of construction
- Creep is formed in it due to the shrinkage of concrete.
- Small size component the finished structure could have several finishing line visual on concrete

DETAIL ABOUT STORY

1. Built up Area of single story = 108.69sq.meter
2. Story consist of :
 - 1 Living Room
 - 1 Dinning/corridor
 - 2 Bedroom
 - 3 Toilet
 - 1 kitchen
 - Lift, stairs and comman area

LAYOUT OF FLOOR PLAN:



Brickwork Construction Mivan Construction

DETAILED ABOUT STRUCTURE MATERIAL

	Traditional brick work	Mivan construction
1. Grade of concrete	M25	M25
2. Wall thickness	115mm partition wall 230mm main wall	120 mm all wall 150mm in parking wall
3. Slab thickness	Same in both cases	Same in both cases
4. Number of floor	Parking+4 floor	Parking+4 floor
5. Finishing	Same in both case	Same in both cases
6. Plaster	15mm	No need
7. Steel diameter Fe415	8, 10, 12, 16	8, 10, 12, 16

RATE LIST

Description	Unit	Rate
Brick work or F.P.S brick with 1:4 cement mortar ratio.	Cu.m	6362
15 mm thick plaster of mix 1:4 on rough side of single brick wall	Sq.m	189
Providing and laying cement concrete 1:1:2	Cu.m	9325.6
Steel binding rate	Kg	6.5
SAIL Steel bar (fe 500)	Kg	55.55
Shuttering cost (M.S. Material)	Sq.m	100
Mivan construction	Sq.m	104.63

ANALYSIS DATA FOR CONVENTIONAL BRICKWORK CONSTRUCTION:

Description	Quantity	Cost
Total concrete used	12cu.m	1,11,907.2
Total Steel used	17,266.8kg	9,59,170.74
Total brick work	202.579 cu.m	12,88,807.6
Total plaster	2064.6 sq.m	6,31,767.6
Shuttering cost (M.S. Material)	540	54,000
Steel binding rate	17,266.8 kg	1,12,234.2
Total cost	-----	31,57,887.34

ANALYSIS DATA FOR MIVAN CONSTRUCTION:

Description	Quantity	Cost
Total concrete used	171 cu.m	15,94,677.6
Total Steel used	11,720 kg	6,51,046
Total brick work	No need	0
Total plaster	No need	0
Shuttering cost (M.S. Material)	1,239.1194sq.m	1,29,649.06
Steel binding rate	11,720 kg	76,180
Total cost	-----	24,51,552.66

**NOTE: In both the cases foundation of the building is not consider. And it is assumed that the cost of the slab construction and finishing work such as paint, POP, electricity work, etc.is same in both type of construction.

IV.CONCLUSION

It is concluded from the above data analysis that mivan construction require less time and cost to complete construction. In this construction there is no requirement of plastering walls aluminium formwork will provide better surface finish. Hence it is much better than conventional brickwork construction.

REFERENCES

1. <https://www.quora.com/What-is-Mivan-shuttering>
2. <https://www.ukessays.com/essays/construction/comparison-of-mivan-formwork-system-with-conventional-system-construction-essay.php>
3. Indian standard code of practice of Plain and reinforced concrete (IS 456:2000) by Bureau of Indian Standard.
4. https://cpwd.gov.in/Documents/cpwd_publication.aspx
5. https://www.google.co.in/url?sa=t&source=web&rct=j&url=https://www.erpublishing.org/published_paper/IJETR032419.pdf&ved=2ahUKEwiV8uf2ztvdAhWBK48KHdhpB4oQFjAAegQIAhAB&usg=AOvVaw0XcrthHu3x3YK9cVDn2nnb