



IMPLEMENTAION OF VALUE ENGINEERING FOR RESIDENTIAL AND COMMERCIAL BUILDINGS

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Abstract : Value Engineering, is a subject about technology and economy helps to improve the function of product or system, sometimes to reduce the cost of both, by following different methods and techniques to meet customer's requirement about function. The application of value engineering focuses on the design phase of the research and development of the product, which is an important characteristic of value engineering. There are number of techniques to be induced to reduce the time and cost for the project. In this project we have considered a case study and on that the application of value engineering taken. Value Engineering focuses on accomplishing the required functions at the lowest overall cost. It helps in eliminating or minimizing wastage of material, time, and unnecessary cost, which improves value to the customer. The project involves detailed cost estimation and duration analysis of a building constructed by MIVAN formwork and Conventional formwork. Later comparative analysis is done on cost and duration of both the buildings.

IndexTerms – Mivan formwork, Value Engineering, Detailed Estimation, Duration, Comparison

I. INTRODUCTION

Due to Globalization of construction industry, construction projects increasingly needs new technique, advance execution methods, alternative materials and different soft wares to increase value of construction, all these methods are seeking attention in construction industry. However, construction did not take full advantage of available new techniques to improve the value of construction projects due to lack of sufficient experience and assistance in the successful implementation of the techniques. Today many construction companies face many challenges and problems, such as “delay in project completion”, “workmanship defects”, “cost overrun” in completing their projects. Value engineering is a systematic method of analyzed techniques which identify and establish the worth functions of the product or service, and provide the necessary functions to meet the customer's Requirement required at the lowest cost. It is an organized approach which allows the Value engineering team to analyze a project by quickly identifying high cost to worth areas and selecting alternatives which minimizes cost while maximizing quality. Value engineering team which does not follow a formal Value engineering job plan tends to perform a design or cost cutting review rather than true value engineering studies. It encourages Value engineering team to think in a more thoughtful and creative manner i.e. to look beyond the use of common or standard approaches. In large construction projects, material wastages, loss of labour work and loss of resources occurs constantly, which affect the overall project cost, time of completion and quality of construction. Use of New techniques or material without proper planning and monitoring leads to quality reduction.

II. OBJECTIVES

- To study value engineering and its implementation in construction industry.
- To compare projects cost and schedule using conventional techniques and new techniques for residential and commercial projects.
- To compare time and cost for conventional and Mivan Construction Techniques

III. METHODOLOGY

Methodology comprises of a single construction site which is residential plus commercial having G+ 7 storeys. The methodology includes the estimation and time analysis for the construction site. The site is constructed in the conventional brickwork structure. It includes detailed study of the project in time and cost. So detailed estimate for conventional brickwork is taken. If same building is constructed in Mivan framework the detailed estimate and time for construction is calculated. The comparison between two construction techniques is taken.

Mivan shuttering is a rising construction technology that leaving behind the conventional ways of construction. At this time only a few real estate developers in India are utilizing this technology and most developers still rely on traditional methods. But if you want to tackle the major concerns of the construction industry like construction quality, availability of expert workers, and timely possession then you have to adopt Mivan construction technology. Under this technology walls & slabs are mold all

together on the construction site by using easy to maintain & lightweight aluminum shuttering framework. This technology work very fast in comparison to the usual beam, brick & mortar assimilation. So, in the contest between Mivan and the usual construction, Mivan comes out as a winner The time and cost analysis for the same building is carried out and is as shown below:

Table 5.2 Cost analysis of material

Type	Amount (Conventional)	Amount (Mivan)
Brick	INR 4,626,337.32	0
Tile + Ceiling Finish	INR 6,350,121.60	INR 6,350,121.60
Door	INR 243,782.59	INR 243,782.59
Folding door	INR 718,588.95	INR 718,588.95
Window	INR 473,571.81	INR 473,571.81
RCC beam	INR 3,005,348.42	INR 9309614.24
RCC slab	INR 2,033,753.64	
RCC Column	INR 1,516,964.31	
RCC Footing	INR 616,370.56	INR 616,370.56
RCC retaining wall	INR 1,046,077.53	INR 1,046,077.53
Glass railing	INR 448,494.55	INR 448,494.55
With material Contract	INR 7,088,200.00	INR 7,088,200.00
Labour Contract	INR 10,166,450.00	INR 10,166,450.00
Total	INR 38,334,061.29	INR 36,461,271.84

As cost for the building is calculated similarly the duration for the project for the Mivan Technology and conventional technique is calculated. It is tabulated as given below.

Table 5.3 Duration using Mivan technology

Sr. no	Activity	No. of days
1	All Shuttering	20
2	Conceal electrification & plumbing	20
3	Steel Reinforcement	6
4	Alignment checking	3
5	Buffer time	2
6	Concrete placing	3
7	Removal of Vertical formwork	2
8	Removal of Other formwork	15
9	Lifting of wall panels	2
10	Gypsum plastering & painting etc	30
	Total	103

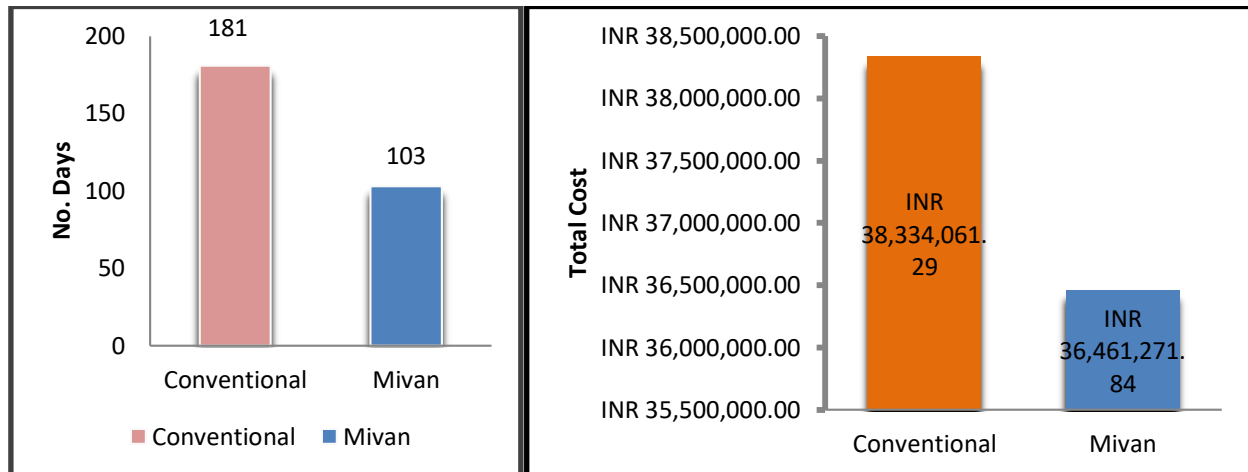
Table 5.4 Duration using conventional techniques

Sr. No	Activity	No. of Days
1	Column shuttering	15
2	Column steel reinforcement	15
3	Buffer	2
4	Beam & slab shuttering	18
5	Beam & slab steel placing	15
6	Leveling	3
7	Concrete placing	6
8	Removal of formwork	17
9	Brickwork	30
10	Plastering	30
11	Finishing	30
	Total	181

IV. RESULT AND DISCUSSION

- Using the Mivan technology the total cost of G+7 storey building is Rs. 38,334,061.29 and by using conventional techniques the total cost of G+7 storey building is Rs. 36,461,271.84. So the total cost saving is Rs.6000000.

- Using the Mivan technology the total duration required of finishing G+7 storey building is 103 days and using conventional techniques the total duration required for completion of G+7 storey building is 181 days. So the total time saving is 78 days



Graph 1.1 Comparison between Conventional and Mivan Construction Technique with respect to cost and Time

V. CONCLUSION

The strong concrete surface finish produced with the aluminium forms allows achievement of a excellent quality wall finish without the need for external as well as internal plastering. This particular system is identified to be very much suitable for Indian conditions for mass structural construction, where quality and speed can be achieved at excellent level that too at economical cost. The speed of construction by this particular system will surpass the speed of most of the other recent construction methods and technologies used.

Cost of construction with MIVAN formwork increases by almost 25-30 % as compared to the conventional method. Thus from the above points it is quite clear that construction by MIVAN formwork is quite expensive than the Conventional Method. However it can save considerable amount of time in construction of high rise building. Also, many of the finishing works is saved in Mivan which includes plastering (both internal and external), brickwork etc

VI. REFERENCES

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