

# Cost Optimizing by Providing Affordable Housing for Lower Income Group (LIG)

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## Abstract

Adequate shelter for all people is one of the crucial challenges faced by the developing countries like India. In India by 2013, shortage of 30 million homes with almost 99% of the shortfall coming from families earning less than 2 lakhs rupees per year (EWS & LIG segment). According to census 2011 India has 65 million of slum population and by 2017 it will outreach 104 million. The country had a population of 1210.98 million, out of which 377.10(31.16%) lives in urban areas. This growing concentration of people in urban areas has led to problems of land shortage, housing shortfall and has also several basic amenities such as water, power and open spaces of towns and cities. Urbanization has resulted in people increasingly living in slums and squatter settlements and has deteriorated the housing conditions of the economically weaker section of society. This is primarily due to skyrocketing prices of land and real estate in urban areas that have forced the poor and economically weaker section of the society to occupy the marginal lands typified by poor housing stock, congestion and obsolescence. Considering these factors there currently exists a wide gap between the demand and supply of housing (both in terms of quantity and quality) in urban areas. Hence, it has become a necessity for developing country like India to adopt cost effective, innovative housing for the construction of houses for enabling the people to construct houses at affordable cost. Our project aims to reduce the cost of building by replacing ordinary material with latest one and suggest new methodology which will reduce cost as well as do not affect the strength of the structure.

**Keywords:** Affordable, Affordable housing, LIG, Cost optimization, low cost housing

## I. INTRODUCTION

### A. Concept of Low Cost Housing/Affordable Housing

Low cost housing generally known as affordable housing. As the word suggest it is the housing system that can be afforded by people having low income. But, there is no clear-cut definition of the term Affordable, as it is a relative concept and could have several implied meanings in different contexts.

According to the RICS Report on Making Urban Housing Work in India, affordability in the context of urban housing means provision of "Adequate shelter" on a sustained basis, ensuring security of tenure within the means of the common urban household. As per US Department of Housing and Urban Development, the generally accepted definition of housing affordability is, for a household to pay no more than 30% of its annual income on housing. Families who pay more than 30% of their income for housing are considered cost burdened and may have difficulty affording necessities such as food, clothing, transportation and medical. According to the Task Force on Affordable Housing set up by the MHUPA in 2008, affordable housing for various segments is defined by size of the dwelling and housing affordability derived by the household income of the population. The JNNURM Mission Directorate of MHUPA has also defined Affordable housing in its amended Guidelines for Affordable.

Affordability as a concept is very generic and could have different meanings for different people based on differences in income levels. Defining affordable housing in India is a difficult task given that at every square kilometer of the country, the dynamics of the market are different. We have therefore broadly defined affordable housing in India for Tier I, II and III cities based on three key parameters:

- Income level
- Size of dwelling unit
- Affordability

According to estimates of the Technical Group constituted by the MHUPA, the urban housing shortage in the country at the end of the 10th Five-Year Plan was estimated to be 24.71 million for 66.30 million households. The group further estimated that 88% of this shortage pertains to houses for EWS and another 11% for LIG. For MIG and HIG, the estimated shortage is only 0.04 million. During the 11th Five-Year Plan, the group estimated that the total housing requirement in Indian cities (including backlog) by end-2012 will be to the tune of 26.53 million dwelling units for 75.01 million households. If the current increase in backlog of housing is maintained, a minimum of 30 million additional houses will be required by 2020. Backlog is nothing but an accumulation of uncompleted work or matters needing to be dealt with.

According to the Times of India, "a majority of Indians have per capita space equivalent to or less than a 10 feet x 10 feet room for their living, sleeping, cooking, washing and toilet needs." The average is 103 sqft per person in rural areas and 117 sqft per person in urban areas.



Fig. 1: Urban Housing Shortage

### B. Affordable housing in Ahmedabad

In order to house its fast rising population, the biggest city of Gujarat Ahmedabad will be needing over 2.48 lakh houses in the next five years till 2018. However, the city is expected to build only 44,200 houses, falling short of over 2 lakh houses. This in turn could artificially jack up prices of homes, say realtors.

Between 2014-18, the demand for houses in Ahmedabad is estimated to be for over 2.49 lakh units, of which 46 percentage will be from the Low-Income Groups (LIG), 42 from the middle-income groups and the remaining 12 percentage from the high-income groups, states a recent study done by global consultants Cushman & Wakefield.

However, the estimated supply of houses during this five year period will be only 44,200 units. The hardest hit will be the Low-Income Groups, says the report. The LIG demand seems completely unattended with a massive cumulative gap of around 1.07 lakh units, it states explaining how Ahmedabad will be building only 6900 houses of LIG segment against an estimated demand for 114,300 houses during this five year period.

This short fall in supply of homes, especially for the LIG segment, is expected to happen despite AUDA or the Ahmedabad Urban Development Authority earmarking a 76 square kilometer area on the periphery of Ahmedabad city to provide 15 lakh affordable homes.

The lop-sided supply will see residential projects cropping in certain parts of the city. According to C&W, locations like Bopal, Satellite, Prahaladnagar, Vasna, Thalej, Vejalpur, etc in the west, and Chandkheda, Motera, Ranip, Gota in the North will see new residential projects, but areas like Vatva, Ghodasar, Nikol, Odhav that house LIG population in the East and southern parts of the city are likely to witness poor supply of houses.

## II. METHODOLOGY

This thesis project is done for Lower Income Group therefore I have considered a 1 LIG Unit. Generally in a Building Construction Masonry work and Plaster work are one of the major items so we focus on that to reduce the cost. A cost of the same unit by using AAC Blocks, Fly ash bricks, Hollow Plinth Block, CSEB Blocks instead of normal bricks in masonry will be optimize. We also provide a suitable technique for construction which will reduce the time of construction. In this procedure for low cost housing cost optimization will be done in two ways by using latest and conventional material. we ensure that also that it will not affect the strength and quality of the construction.

## III. GENERAL COST OF A BUILDING

Cost of building is the cost included construction cost as well as land prices. Land prices are totally beyond our control what we can do to reduce the cost of the building is by reducing construction cost.

Construction cost of the building generally classified in following

- Construction material cost
- Labour cost

### **A. Construction Material Cost**

Construction material cost can be reduced by construction material. It can be directly by using cheaper construction material like fly ash bricks instead of conventional brick.

### **B. Labour Cost**

Labour cost includes all the types of labour work that include in construction work. Labour cost is rising rapidly in recent time. Labour cost generally is fixed but indirectly we can reduce it. Generally labours gets paid on daily basis we can reduce labour cost by doing fasters construction or by quicker construction techniques Cost of the construction is increasing day by day below are some cost analysis:

## **IV. MATERIAL & TECHNIQUES FOR COST REDUCTION**

Our approach in reducing the cost of building is by following,

- By Using Cost Effective Material.
- By Using Quicker Construction Techniques.

### **A. Areas where cost can be reduced**

- Walls
- Plasters

We can reduce the cost of the building by replacing the ordinary or conventional material with cost effective material. Cost can also be reduced by quicker construction techniques like pre fabrication. Quicker construction techniques which helps us to construct faster and that is the way we can reduce labour cost, some renting cost etc. We can also reduce the cost of the building by using light weighted material by using this foundation cost as well as reinforcement cost can be reduced

Material that can be used for reducing the cost:

#### *1) For walling:*

- Autoclaved aerated concrete blocks
- Flyash bricks
- Lime sand bricks
- Hollow concrete blocks
- Compressed stabilised earth blocks

#### *2) For Plaster: Brick Solution/Gypsum Plaster*

### **B. Construction Techniques**

Mascon Technology: The Mascon Construction System is a system for forming the cast-in-place concrete structure of a building. It is also a system for scheduling and controlling the work of other construction trades such as steel reinforcement, concrete placement, and mechanical and electrical trades. Developed in the late 1970's by W.J. Malone B.A.Sc., P.Eng., a Canadian engineer, the Mascon System of aluminium forms has been used in the construction of thousands of residential units in both low rise and high rise buildings. It has been proven to be very successful in the construction of mass housing projects in various parts of the world. It is fast, simple, adaptable and very cost effective. The Mascon System is unique because it forms all of the concrete in a building including; walls, floor slabs, columns, beams, stairs, lift shafts, window hoods, balconies and various decorative features in exact accordance with the architect's design. No other system can match Mascon's flexibility to handle all design conditions. Unlike other construction systems, the Mascon System of aluminium forms can be erected by unskilled labour and without the need for hoisting cranes. The largest panel weighs no more than 30 kilograms which means it can be handled by a single worker. The panels and other sections are secured and fixed by steel pins and wedges with spacer ties. The only tool required is a hammer.

Like most engineering systems, the Mascon System is comprised of two distinct parts, the hardware and the software. The hardware consists of hundreds of standard pieces of formwork equipment, manufactured to fine tolerances. The majority of the equipment comprises panel sections while the rest includes vertical and horizontal corner sections, bulkheads and special floor slab beams that can be dismantled without disturbing the props supporting the floor slab concrete. Ninety-nine percent of the Mascon equipment is made of aluminium, the other one percent is steel. The use of aluminium allows the larger components to be big enough to be effective, yet light enough to be handled by a single worker. Consequently, the need for cranes or other heavy handling equipment is eliminated. All of the individual pieces of equipment are joined by steel pins and wedges and the only tool required in assembly is a simple hammer. This eliminates the need for skilled workers.

## V. CONCLUSION

As discussed above in this paper cost optimization in affordable housing is must. In a country like India where housing need is much higher than supply for the lower income group. In a developing country where construction is so much cost based and need of this projects are very high so cost optimization is very important.

By using Cost effective material and Technique we can reduce the cost of construction. This Paper also suggests different ways to reduce the cost of construction for future study apart from Lower income Group same can be optimized for other categories like EWS (Economically weaker Section) and MIG (Medium income Group). Also, individual sites should be considered for cost optimization.

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