Affordable Housing in Pradhan Mantra Awas Yojna for EWS and Low Income Groups

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Abstract -- In this paper we focused on low costing houses for EWS, Now-a-days due to excessive population growth, people require more number of houses to stay within but they generally built normal building in which energy consumption is more which inefficient. But the energy source is decreasing very fast now-a-days, so by implementing green buildings throughout the world, we can reduce the conventional energy consumption and so by reducing pollution. In this paper an analysis has given to compare between Normal buildings and Green buildings and its economical analysis. Housing is a basic need of human being. But this is out of the means of low income householder who constitute majority of the population in the country. Low cost housing become must in civil engineering. In this report some methods of low cost housing given. First of all in this report present situation present trends and future tends about low costing hosting in India is given. This report is mainly concentrated on chapter construction materials. A few low cost materials are developed and discussed in this report. The report are also includes an important chapter as specification. The material needs for real construction of house are specified. For example, use of solid blocks or low cost housing and bricks for common housing.

Indexed Terms: Pradhan Mantri awas yojana, MHADA, Low Cost housing, EWS.

I. INTRODUCTION

Low-cost housing projects are characterized by an increasing demand mainly due to urbanization. The selection of building materials should meet the needs of local conditions to improve quality of life for the most needed ones by building new structures and/or by improving existing structures. Sustainability regarding urban housing intends to develop new approaches to manage human settlements and integrate energy and environmental issues. To achieve a sustainable housing project is required a balance of environmental, economical and social issues with technical issues. Findings show that up to 60 % of the total cost of a low-income housing project is allocated to engineering design and construction materials. Moreover, walls constitute up to 50% of the total cost of materials and up to 45% of total construction time. Material origin, production techniques and labour requirements all have major impacts on the selection of wall building material. The analysis of particular local conditions will determine where materials are most suitable for their use. Furthermore, the time when materials and techniques were / are mostly used will determine whether they could be classified as traditional or contemporary. The regularity of use will determine whether materials and methods could be classified as conventional or alternative.

To stay healthy one need a proper place to reside for the entire life and that is home. This is one important component of one's life. But contrary to this, in India type and number of homes available is not adequate as per the estimation reported by the Ministry of Housing and Urban Poverty Alleviation, Government of India. With an annual population growth rate of 1.64 % as compared to world population growth rate of 1.23 % during the last decade there would be a great demand to fulfil housing needs in coming years. In this context, the Pradhan Mantri Awas Yojana (Prime Minister Housing for All Mission, 2015), envisages to provide housing to all by 15th August 2022.

II. LOGICAL APPROACH FOR OPTIMIZING HOUSING SOLUTIONS

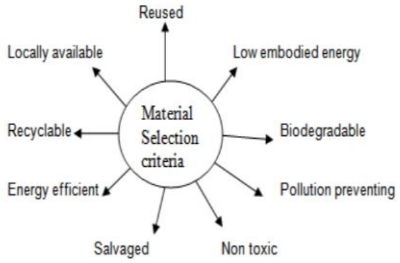
There should be a logical approach for providing appropriate technology based on the availability of

options, considering its technical and economic analysis.

1. There should be optimal space in the design considering efficiency of space, minimum circulation space.
2. Economy should be considered in design of individual buildings, layouts, clusters etc.
3. While preparing the specifications it should be kept in mind that, cost effective construction systems are adopted.
4. Energy efficiency has gained considerable importance due to energy crisis especially in developing countries. Orientation, built–form, openings & materials play a vital role besides landscaping / outdoor environment.
5. To develop an effective mechanism for providing appropriate technology based shelter particularly to the vulnerable group and economically weaker section. (R. K. Garg, 2008)

III. MATERIALS SELECTION FOR LOW COST HOUSING

The first step to low cost housing material selection is to select eco friendly building materials. This also enhances the sustainable design principle. The life cycle of building is Pre-building, building and post-building stages. Each stage of building should be such that they help conserve the energy. These three stages indicate flow of building materials through different stages of a building. Pre-building stage mainly consists of manufacture which is subdivided in processing, packing and transport. The building phase mainly consists of construction, operation and maintenance whilst as the last stage would be disposal where the material can be recycled or reused. In Manufacturing of low cost building materials.



1. Detail Quantity Estimation of Sustainable Building (Material Summary Concrete for Proposed Residential Building, at Cool Homes):

Sr. No.	Description	Qty. (in Cum)	Fly Ash Cement (in Bags)	Sand (Brass)	Aggregate (Brass)
I.	**PCC (M10) [1:03:06]**	20	89	3	7
II.	**Footing(M20) [1:01:05]**	122	996	18	37
III.	**Plinth Beam**	18	150	3	6
IV.	**Columns**				
1	Footing To Plinth Column	10	83	2	3
2	Plinth To First Column	17	192	2	5
3	First To Second Column	11	91	3	3
4	Second To Third Column	13	109	4	4
5	Third To Fourth Column	13	104	4	4
6	Fourth To Terrace Column	12	98	4	4
7	Terrace To O.H.W.T	10	83	2	3
V.	**Beam**				

1	First Floor	18	150	3	6
2	Second Floor	16	131	2	5
3	Third Floor	14	114	2	4
4	Fourth Floor	12	98	2	4
5	Terrace Floor	10	82	2	3
6	O.H.W.T	9	75	2	3
VI.	**Slab**				
1	First Floor	51	420	8	16
2	Second Floor	48.45	396	7	15
3	Third Floor	46.02	376	7	14
4	Fourth Floor	43.72	357	7	13
5	Terrace Floor	41.53	339	6	13

2. Quantity of PCC:

Sr. No.	Description	Nos.	Size			Quantity (Mt^3)
			B (Mt.)	W (Mt.)	D (Mt.)	
1	F1	2	2.25	2.4	0.1	1.08
2	F2	2	2.2	2.35	0.1	1.034
3	F3	2	2.03	3.6	0.1	1.4616
4	F3	2	2.03	3.6	0.1	1.4616
5	F4	4	2.55	3.6	0.1	3.672
6	F5	2	1.35	1.7	0.1	0.459
7	F6	4	2.25	3	0.1	2.7
8	F7	2	2.15	2.6	0.1	1.118
9	F8	1	2.1	2.55	0.1	0.5355
10	F9	2	1.85	2.25	0.1	0.8325
11	F10	2	2.45	3.2	0.1	1.568
12	F11	2	2.15	2.6	0.1	1.118
13	F12	2	2.15	2.6	0.1	1.118
14	F12	2	2	3.9	0.1	1.56
Total		**31**	-	-	-	-
Total Quantity						**19.7182 Mt^3**

3. Quantity of Concrete in Footing:

Sr. No.	Description	Nos.	L (Mt.)	B (Mt.)	H (Mt.)	Quantity (Mt^3)
1	F1	2	2.05	2.2	0.65	6.95.863
2	F2	2	2	2.15	0.65	5.59
3	F3	2	1.83	3.4	0.65	8.0886
4	F3	2	1.83	3.4	0.65	8.0886

5	F4	4	2.35	3.4	0.83	26.5268
6	F5	2	1.15	1.5	0.43	1.4835
7	F6	4	2.05	2.8	0.75	17.22
8	F7	2	1.95	2.4	0.68	6.3648
9	F8	1	1.9	2.35	0.68	3.0362
10	F9	2	1.65	2.05	0.7	4.7355
11	F10	2	2.25	3	0.83	11.205
12	F11	2	1.95	2.4	0.68	6.3648
13	F12	2	1.8	3.7	0.65	8.658
14	F12	2	1.8	3.7	0.65	8.658
Total		31	-	-	-	-
Total						121.8828

4. Following are the Infrastructure Cost for Given Area:

Sr. No.	Sector	Sector Unit	Proposed Cost for 2018 (in Lakhs)
Physical Infrastructure			
1	**Water Supply**	Running length of sub line (Km)	2593.02
		Raising Main (Km)	564.11
		Individual taps (No)	0.00
		Overhead water tanks (No)	1802.63
		Sub Total	**4959.76**
2	**Sanitation**	Length of Underground Sewer Line (Km)	8633.71
		Length of storm water Drainage Lines (Km)	8633.71
		Individual toilets (No)	9015.52
		Sub Total	**26282.93**
3	**Solid waste management**	Garbage dumping Bins (No)	470.83
		Sub Total	**470.83**
4	**Roads**	Length of Approach roads (Km)	345.61
		Length of Internal roads (Km)	11384.51
		Sub Total	**11730.12**
		Street lights (No)	1529.05
		Sub Total	**1529.05**
		Total Physical Infrastructure Cost	**44972.69**

IV. ANALYSIS AND DISCUSSION

After analyzing the use of various sustainable materials which are environment friendly, cheaper and easily available following conclusions are made:

- Filler slab is much more economical than traditional slab as it saves 16%, 44%, 17% of cement, steel and cost in two way slabs and 33%, 46%, 25% in one way slab respectively.
- Brick panel saves 19% per m^3 and Rs 418 in cement, 19% per m3 and Rs 21 in sand, 19% per m^3 and Rs 127 in aggregate, and 38% per m3 and Rs 536 in steel.
- Soil stabilized bricks are 27.7% cheaper as compared to country fired bricks walls, where

country fired bricks use Rs 934 per m^2 on contrary soil stabilized bricks use Rs 736 per m^2 also they cause less air pollution, energy consumption and carbon emissions.

- Aluminum form work is a comparatively high cost construction but gives high quality and speedy construction which can be used in places where construction is required at a fast pace. For flat slab the total quantity of steel and concrete used are 8.644m^3 and 1294m^3 as compared to conventional building which uses 10593m^3 of steel and 1505.25m^3 of concrete and the cost saving percentage in flat slab is 15% in B+G+3 building respectively.
- Hollow concrete blocks can be used in those places where the load is not coming directly on wall; the cost is saved by17.78%.

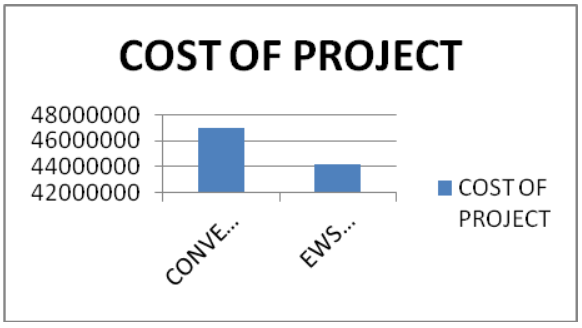
1. Comparison between conventional and filler slab:

Slab	Item	Cement (kg)	Steel (kg/m^3)	Cost (Rs/m^2)
Two Way Slab	Convectional slab of 120 mm thick	38.4	71	415
	Filler slab 150 mm thick	32	4	346
	Saving (%)	16	44	17
One Way Slab	Convectional slab of 120 mm thick	48	6.5	450
	Filler slab 150 mm thick	32	3.5	338
	Saving (%)	33	46	25

2. Result and Discussion:

As per the case study taken on Devraai Residential, Construction of a basement + parking + 2 floors residential building of 3103.48 sq. m. The residential building has parking in the basement and at the ground floor. At the first and second floor 4 flats; each of 94 sq. m. area is designed. The budget of the building is around 95lakhs. The duration for completion of the work is 10 months. The work commenced on March 15, 2017.

Type of Methods	Cost Of Project (Rs.)
Conventional Method	Rs. 47037468
EWS Applying	Rs. 44239228



V. CONCLUSION

At present both the conventional and cost effective technologies are available in the field of housing construction. Among these, the cost-effective technology has the advantage of economy in construction, saving of time and energy and of the optimum use of materials. Since the building materials are locally available the huge transportation costs incurred for transporting the materials and the delay in construction can be avoided. Thus, cost-effective technology, no doubt, can be opted as a permanent remedy to overcome the severe housing inadequacy in the country. It is better to avoid wasteful expenditure by giving garish colors and paints on housing - "let the bricks look bricks".

REFERENCES

[1] Nushrat Shabrin, 2 Saad Bin Abul Kashem 'A Comprehensive Cost Benefit Analysis Of Sustainable Building' IIER International Conference, ISBN: 978-93-86083-34-0, volume-4, Issue-2, Aprl.-2017

[2] Executive Summary 'Cost-Benefit Analysis and the Environment' ISBN 92-64-01004-1,OECD 2006

[3] Väinö Nurmi1, Athanasios Votsis, Adriaan Perrels, Susanna Lehvävirta 'Cost-benefit analysis of sustainable roofs in urban areas: case study in Helsinki' ISSN 0782-6079 2013

[4] Anna Furberg, Sverker Molander, Holger Wallbaum 'Sustainability Assessment of Transport Infrastructures' 2014

[5] Bakhoum E. S., Garas G. L. and Allam M. E. 'Sustainability Analysis of Conventional And Eco-Friendly Materials: A Step Towards Sustainable Building' Asian Research Publishing Network (ARPN), ISSN 1819-6608 , Vol. 10, No. 2, February 2015

[6] Greg Kats, Capital E 'The Costs and Financial Benefits of Sustainable Buildings' California Department of Resources Recycling and Recovery, October 3, 2003

[7] Davide Astiaso Garcia, Fabrizio Cumo, Mariagrazia Tiberi, Valentina Sforzini and Giuseppe Piras 'Cost-Benefit Analysis for Energy Management in Public Buildings: Four Italian Case Studies' CITERA, Doi: 10.3390, 8 July 2016

[8] Hannah E. Main 'Cost-Benefit Analysis Of Building Bicycle Lanes In Truro, Nova Scotia' Acadia University, March, 2013

[9] Rodrigo S Cassola 'Ecosystem Services and Cost-Benefit Analysis: the case of BR-319 Road in Brazilian Amazon' the economics of ecosystems & biodiversity, Version 1.1, June/2011