

Preparation of Papers for International Journal of Scientific & Engineering Research On Low Cost Housing

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Abstract- Low cost housing is a new concept which describes affordability of housing in terms of disposal income and gives the technique to reduce the cost of construction. Low cost housing is beneficial for EWS and LIG.

Keywords- Low Cost Housing, Affordability, Literature Review, Case Study, Estimation, Analysis, Construction Techniques.

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1:- Introduction

Affordability is measured in terms of disposable income, In the context of housing, affordability means the financial capacity of an individual to buy or rent a house. In 2008, the High Level Task Force on Affordable Housing for All, setup by the Government of India, defined affordability as a measure of household gross annual income and the size of a housing unit. It recommended that for economically weaker section and low income groups, the suggested affordability is cost not exceeding four times of the household gross annual income and EMI/ rent not exceeding 30% of the household's gross monthly income for a unit with carpet area not exceeding 300 and 600 sq.ft. For middle income category of houses, the cost was recommended as five times the household gross annual income and EMI/ rent not exceeding 40%, for a prescribed carpet area not exceeding 1200 sq.ft. India is currently facing a shortage of about 17.6 million houses. The dream of owning a house particularly for low-income and middle-income families is becoming a difficult reality. Hence, it has become a necessity to adopt cost effective, innovative and environment-friendly housing techniques. Low cost housing can be considered affordable for low and middle income earners if household can acquire a housing unit. The low-income groups in developing countries are generally unable to access the housing market. Cost effective housing is a relative concept and has more to do with budgeting and seeks to reduce construction cost through better management, appropriate use of local materials, skills and technology but without sacrificing the performance and structure life. It should be noted that low cost housing are not houses which constructed by cheap building materials of substandard quality. A low cost house is designed and constructed as any other house with regard of foundation, structure and strength. The reduction in cost is achieved through effective utilization of locally available building materials and techniques that are durable, economical, accepted by users and not requiring costly maintenance.

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2:- Literature Review

2.1 NANO HOUSE-After its revolution on wheels, the Tatas are aiming at a Nano house, which will cost between Rs 3.9 lakh and Rs 6.7 lakh. Tata Housing, a subsidiary of Tata Sons, has launched its low-cost housing initiative called the SHUBH GRIHA project. The first SHUBH GRIHA Township will be launched at Boisar in Mumbai. Tata Housing has tied up with SBI and HDFC to help potential buyers with finance options.

2.2 CIDCO- City and Industrial Development Corporation of Maharashtra Limited (CIDCO) is all set to launch a new housing scheme under its lottery 2014 in Kharaghar Sector 36 in navi Mumbai on July 22. After the successful selling of hi-end homes in Kharaghar, CIDCO will offer affordable houses for LIG and EWS category. CIDCO will offer 3292 affordable homes under the lottery July 2014 in Kharaghar in sector 36. The economically weaker section of the society with an annual income of below Rs. 16,000 per month will be the beneficiaries for 80% of under construction flats. The rest 20% of the flats will belong to the people who fall under the LIG category and the income group of 16,000 to 40,000 per month. The new homes will be ready for possession by March 2016. The carpet area of EWS flats is 307 square foot while LIG flats will have a carpet area of 370 square foot.

2.3 MEGHALAYA AFFORDABLE HOUSING

SCHEME- The state government of Meghalaya is planning for a new affordable housing scheme for the people of the state. The scheme is named as Meghalaya Affordable Housing Scheme for which the government has created all the guidelines and sent the scheme to the Planning Department for necessary approvals. Besides this, several other criteria for constructing a house under the scheme. According to the source, government is planning to construct 10,000 houses across the state. Under the scheme 25% of total cost of houses to the beneficiaries from EWS (economical weaker section) and for remaining 75%, loan will be provided to the beneficiary.

2.4 MIGSUN AMULYA AFFORDABLE HOUSING-

Migsun Amulya PMAY is located at the prime location of Raj Nagar Extension Ghaziabad and offering 1BHK and 2BHK flats for allotment. The size of affordable houses under PM Awaz Yojana is in the range of 55.80 Sq. Mt. to 75.92 Sq. Mt. And the cost of these residential flats is also affordable starts from Rs. Rs. 9.9 lakh.

2.5 GLS ARAWALI HOMES- An affordable housing project of GLS Infratech Private Limited located at the prime location of Sector-4 Gurgaon. The project is approved under affordable housing policy 2013 of Haryana government.

GLS Arawali Homes Affordable Housing Project is spread over the area of 10 acres offering 2BHK flats in high-rise apartments. The area of flat is around 750 square feet. Total two type of 2BHK flats having a carpet area of 567 square feet and 576 square feet available for allotment.

Low cost housing technique: It is found that cost-effective and alternative construction technologies, which apart from reducing construction cost by the reduction of quantity of building materials through improved and innovative techniques, can play a great role in providing better housing methods and protecting the environment. The detail procedures of each step used for the project are as follow:

3:- .Low Cost Technique

3.1 Rat trap bond- Rat trap bond is a brick masonry method of wall construction, in which bricks are placed in vertical position instead of conventional horizontal position and thus creating a cavity (hollow space) within the wall. Architect Laurie Baker introduced it in Kerala in the 1970s and used it extensively for its lower construction cost, reduced material requirement and better thermal efficiency than conventional masonry wall, without compromising strength of the wall.



Advantages of using rat trap bond

- Requires approximately 25% less bricks and 40% less mortar than traditional masonry
- Reduced material requirement results in considerable cost saving
- Strength of wall is not compromised, it remains same as traditional masonry wall.
- Cavity induced in wall provides better thermal insulation, resulting in cooler interiors during summer and warmer interiors during winter.

All vertical and horizontal reinforced bands, lintels (for standard size openings), electrical conduits are hidden inside wall, resulting in better aesthetic appearance without plastering (exposed brickwork).

3.2 Filler slab- Filler slab technology is a simple and a very innovative technology for a slab construction. The reason why, concrete and steel are used together to construct RCC slab, is in their individual properties as separate building materials and their individual limitation. Concrete is good in taking compression and steel is good in tension. Thus RCC slab is a product which resists both compression as well as tensile. which indicates the neutral axis and also tension concrete in the bottom fibers of the slab which is in tension but the top fibers will be in compression. Knowing this much is the key to understand the filler slab technology. Tension in a slab is on the bottom fiber and compression on the top fiber. That means if we want to optimise the structure we can remove concrete from the tension zone where it is not much needed. That's the key behind filler slab construction.

Advantages of filler slab technology-

- By adopting RCC filler slab construction compared to a RCC solid (conventional) slab in case where manglore tiles are used as a filler material, you can save on approximately 19% of the total concrete and including the cost of filler material, you can save around 5-10% of your concrete cost.
- Another advantage is, if the filler material is just a waste i.e. for ex temporary manglore tiles that are removed from the roof to construct a pukka roof, you can save upon nearly 15% on your roof concrete construction cost.
- Filler slab technology can also be applied to mass housing projects and township projects to gain high

cost saving and also saving in high energy consuming materials.

- Another advantage can be of a better thermal comfort if a cavity is kept between the filler material or the filler material itself has a cavity. For example tow manglore tiles/Clay tiles can be kept one over the other to form an air cavity thus keeping the interiors of your house remain cooler in summer and warmer in winters.
- Filler slabs can be kept exposed (with proper workmanship) to create aesthetically pleasing ceiling with a view of filler material from below and thus the cost of plastering and/or painting also can be avoided.
- RCC being made of cement, steel, sand and aggregates, is a very high energy intensive material. So reduction in concrete quantity compared to conventional slab construction, adds this technology to the list of sustainable and environment friendly technologies and incorporating green building features.

3.3 Plastering- Plastering can be avoided on the walls, frequent expenditure on finishes and its maintenance is avoided. Properly protected brick wall will never lose its colour or finish.

4:- Analysis- Comparision of traditional and low cost house:

SR. NO.	ITEM	Traditional HOUSE	LOW COST HOUSING	COMPARE IN PERCENTAGE
1	EXCAVATION	4623.19	1957.08	57.67
2	P.C.C. (1:5:10)	10535.25	6852.33	34.96
3	EARTH FILLING (RIVER BED MATERIAL)	42660.69	20660.85	51.57
4	D.P.C.	3044.33		100.00
5	BRICKWORK	342794.41	123587.55	63.95
6	CHAUKHAT	31130.14	16774.01	46.12
7	DOOR	27405.84	11130.67	59.39
8	WINDOW	34450.844	21059.25	38.87
9	R.C.C.	117846.68	133459.25	-13.25
10	STEEL	81459.29	85888.07	-5.44
11	PLASTER (1:6)	63716.21	15687.92	75.38
12	FLOOR CEMENT CONCRETE	21780.29	18670.27	14.28
13	FLOOR TILE	28887.98	19879.55	31.18
14	WALL TILE	9283.19	11052.83	-19.06
15	PAINT INNER	4697.85	3119.56	33.60
16	PAINT OUTER	12922.18	8485.56	34.33
17	MAIN GATE	11550	11550	0.00
18	CIRCULAR STAIR	21978	17998.2	18.11
19	GRIL WINDOW	6840.6	4208.1	38.48
	TOTAL COST OF BUILDING	877606.964	532021.05	39.38
	ADD 4% FOR WATER SUPPLY SYSTEM	35104.27856	21280.842	39.38
	ADD 2% FOR SANITARY SYSTEM	17552.13928	10640.421	39.38
	ADD 5% FOR ELECTRIC SUPPLY	43880.3482	26601.0525	39.38
	NET COST	937103.9818	568150.413	39.37

5:- Conclusion- The dream of owning a house particularly for low-income and middle-income families is becoming a difficult reality. It is necessary to adopt cost effective, innovative and environment-friendly housing technologies for the construction. This paper examined the cost effectiveness of using low cost housing technologies in comparison with the traditional construction methods. By adopting this low cost housing technologies we can save about 26% of material cost and 22% of labour cost. The percent saving in materials using this technology is as following:

- Rat trap bond-
- Brick saving- 19%
- Mortar saving- 40%
- Total saving in walling- 40%
- Plaster- 70% of plastering

- *Fibre door*- About 55% saving as compared to wooden door
- *Filler slab*- 23% saving as compared to RCC slab.

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