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Comparison of prefabricated Modular Homes and Traditional R.C.C Homes

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Abstract – *This paper represents the study of traditional R.C.C homes and prefabricated modular homes .The main aim is to provide a framework of the implications and trade off of both construction methods and determine which costs less. The methodology consists of comparison of prefabricated modular home and traditional R.C.C homes in terms of cost and overviews of the benefits of each construction method over the other. Quantitative analysis which compares the cost of The finished home per square meter to determine which one is more cost effective. Both analyses are conducted by evaluating two case studies of single family house through the proposed method it is possible to evaluate the cost effectiveness of the two construction methods for home projects which could serve a valuable tool for decision making.*

Key Words: **Prefabricated Modular homes , R.C.C homes , cost effectiveness , framework , quantitative analysis.**

1. INTRODUCTION

The construction of building is increasing tremendously in the developing countries. There are mainly two methods of construction i.e. R.C.C and prefabricated modular. In recent year the new technology of building home is introduce i.e prefabricated modular home and it is quickly becoming famous in home building. This paper seeks to answer the question which method of construction is more cost effective, R.C.C or Modular? Thus main aim of this study to provide framework of the implications of R.C.C and Modular home as well as a comprehensive analysis of the cost and benefits of each construction method for a home, to determine which method is more cost effective and what are the tradeoffs when choosing the most cost effective of the two

1.1 Definition of prefabricated modular home and its advantages

Modular buildings and modular homes are sectional prefabricated buildings or houses that consist of multiple modules or sections which are manufactured in a remote facility and then delivered to their intended site of use. The modules are assembled into a single residential building using either a crane or trucks. Following are some of the advantages of modular homes 1)It is imdependent of weather condition.2)components produced at close supervision. So quality is good.3)Clean and dry work at site.4)it saves lot of time and manpower

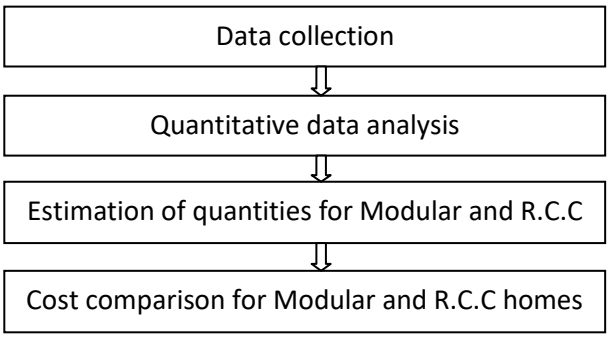
1.2 Definition of R.C.C home and its advantages

RCC is simply know as reinforced concrete construction methodology used to build strong buildings with immense strength and ductility generally this is a basic construction method used to build residential houses or town homes to withstand natural calamities like earthquake, tsunami ,tornadoes and others. following are some advantages of R.C.C home 1) Reinforced concrete has a high compressive strength compared to other building materials. 2)due to provided reinforcement, reinforced concrete can also withstand a good amount tensile stress 3)fire and weather resistance 4) the reinforced concrete building system is more durable than any other building system

2. Methodology and case studies

This paper performs quantitative analysis of the two construction methods. i.e. R.C.C and Modular

To perform the quantitative analysis, case study is analyzed. in that single family home which is having floors G+1 is analyzed by both R.C.C and prefabricated modular homes construction method. For both homes the actual manufacturing and construction costs incurred in building the homes were broken down and analyzed to calculate the total cost of the finished home per square meter which is comparable unit of measure and ultimately which alternative is more cost effective is decided. The methodology is shown in figure below



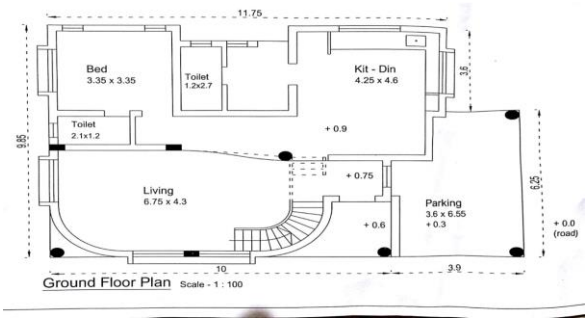
3.Quantitative data Analysis

Table -1: Estimation of quantities and costing of R.C.C home

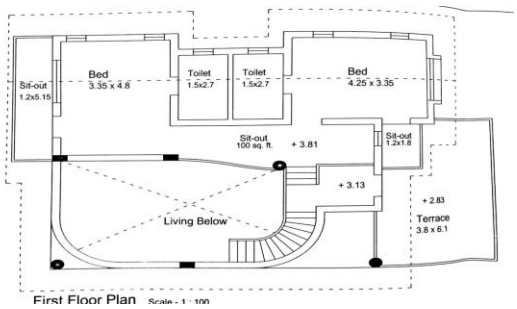
COSTING OF R.C.C homes					
SL NO	Quantity	Description	Rate	Per	Amount (rupees)
1	192.68	Earth work excavation and preparing bed for foundation,rubble soiling,in situ concreting	747.99	Meter cube	144122.7
2	23.98	R.C.C work in foundation	4700	Meter cube	112706
3	51.57	Filling in plinth and floors with soil	250	Meter cube	12892.5
4	66.27	R.C.C for column, plinth beam,slabs,lofts ,lintels	4491	Meter cube	297620
5	177.63	Stone mashnory	2700	Meter square	47960
6	32.49	Doors and windows	2445.24	Meter square	79446
7	2.87	R.C.C waist slab,parapet,cchajja	6200	Meter cube	17794
8	7	M.S steel and tar steel used for r.c.c	49168	M.T	344128
9	912.31	Plaster	175.21	Meter square	159850
10	343.59	Flooring	674.61	Meter square	231792
11	3.23	Kadappa tiles	6200	Meter square	20026
12	17.82	Grill work for windows	1000	Meter square	17820
13	64	Plumbing	703.43	Per unit	45020
14	15	C.I vent pipe,bib to brass socket	345	Per unit	5175
15	912.2	Painting and white wash	25.88	Meter square	23608
16	24.10	Water proofing	600	Meter square	14460
17		Electrical work		4% of whole bunglow costing	70584
18	65	Glazed tile work and sand filling	700	Meter square	45472
19		Miscellaneous		5 % of whole bunglow costing	88231
			total	cost	2332624

Total cost of R.C.C home is 2332624rs and it is 169 meter square of area.

Now per square meter price of house is 13802.50rs .



Line plan of R.C.C home ground floor



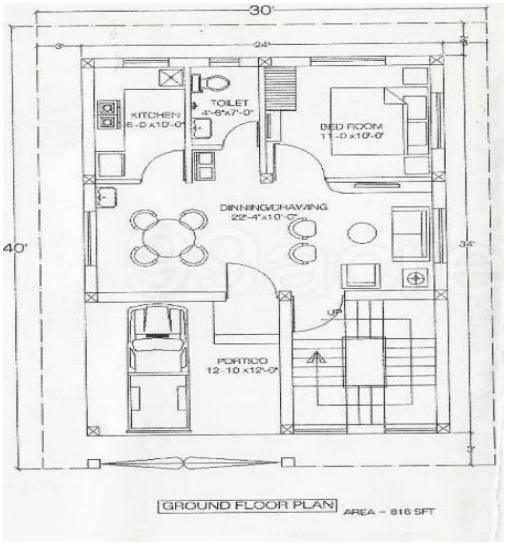
Line plan of R.C.C home first floor

Table -1: Estimation of quantities and costing of Modular home

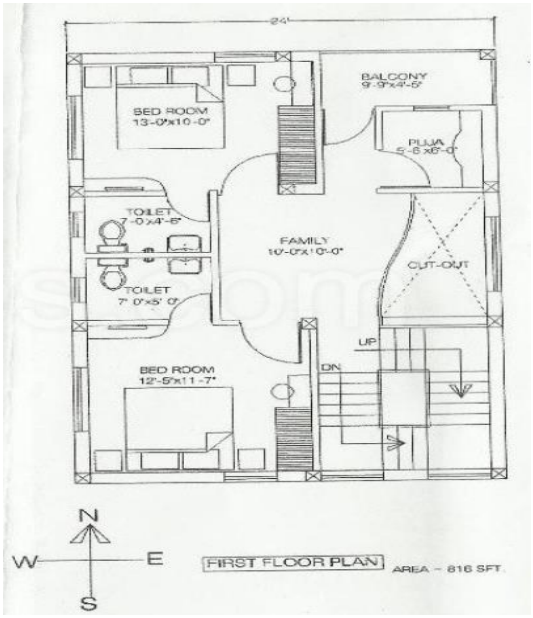
COSTING OF MODULAR HOME					
Sl.no	Qty	Description	Rate	per	Amount (rupees)
1	953	Modular material aluminium composite panels	2000	Meter square	1906176
2	lumpsum	Delivery of all products to site	lumpsum		70481
3	lumpsum	Installation of home on site	lumpsum		405062
4	1080	Flooring	150	Meter square	163200
5	17	Windows	3717	Per unit	63189
6	11	Doors	9090	Per unit	99990
7	lumpsum	Module connections	lumpsum	Per unit	90000

8	lumpsum	Shipping damages	lumpsum		50000
9	lumpsum	Interior finishing	lumpsum		130000
10		Electrical work	1.5 % of whole bunglow cost		55000
11		Mechanical work	>1% of whole bunglow cost		15000
12		Plumbing work	>1.5% of whole bunglow cost		51680
13	7	Foundation for the home by excavation preparing bed	15000	Meter square	105000
14		Miscellaneous	5% of whole bunglow cost		163200
			Total	cost	3205778

Total cost of Modular home is 3205778rs and it is 151.61 meter square of area.
Now per square meter price of house is 21144rs.



Line plan of Modular home ground floor



Line plan of modular home first floor.

3. CONCLUSIONS

1) After cost analysis of g+1 bunglow of R.C.C and prefabricated modular bunglow it is concluded that R.C.C construction is cheaper than prefabricated modular construction
2) But modular home has advantages like 1)It is imdependent of weather condition.2)components produced at close supervision. So quality is good.3)Clean and dry work at site.4)it saves lot of time and manpower
3) And R.C.C has advantages like 1) Reinforced concrete has a high compressive strength compared to other building materials. 2)due to provided reinforcement, reinforced concrete can also withstand a good amount tensile stress 3)fire and weather resistance 4) the reinforced concrete building system is more durable than any other building system

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