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COMPARISON OF PREFABRICATED MODULAR HOMES AND TRADITIONAL R.C.C HOMES IN TERMS OF IMPACT ON ENVIRONMENT

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Abstract— This paper represents the study of traditional R.C.C homes and prefabricated modular homes in terms of Impact on environment .The main aim is to provide a framework of the implications and trade off of both construction methods and determine which method has minimum negative impact on environment The methodology consists of comparison of prefabricated modular homes and R.C.C homes by calculating waste generated by both construction methods and then deciding which method generates minimum waste and overviews of the benefits of each construction method over the other. Quantitative analysis which compares both methods in terms of Waste generated during construction. 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.

Keywords— Prefabricated Modular homes , R.C.C homes , Impact on environment , framework , quantitative analysis

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 has minimum impact on environment, 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 factors causing impact on environment such as comparison of waste generation during both construction methods and benefits of each construction method for a home, to determine which method is more environment friendly.

I.I. 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 independent 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

I.II. 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

I.III. OBJECTIVES

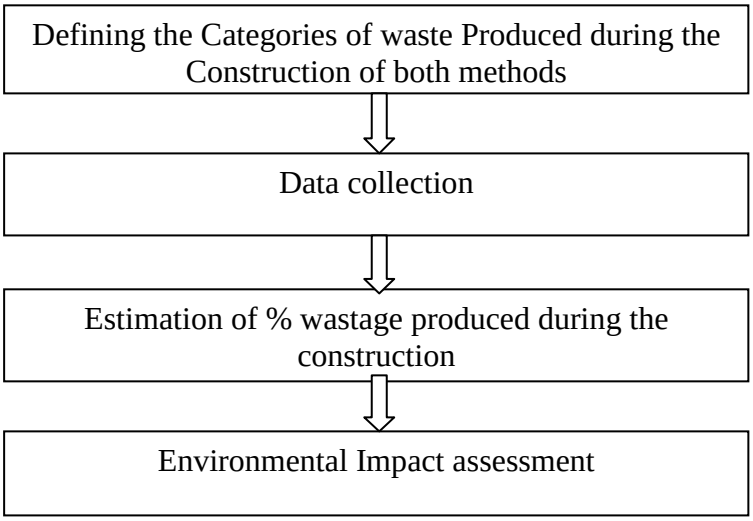
The objectives of this study are as follows;

1)The main objective of this project is to compare both construction methods i.e Traditional R.C.C home and Prefabricated modular home in terms of wastage produced during their construction

II. METHODOLOGY AND CASE STUDY

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 is analyzed by both R.C.C and prefabricated modular homes construction method. In this we have shown all common waste material which are generated during the construction of bunglows by both methods i.e R.C.C and Modular. and we have calculated the percentage wastage generated by both methods by observing the construction of both methods. methodology is shown in figure below



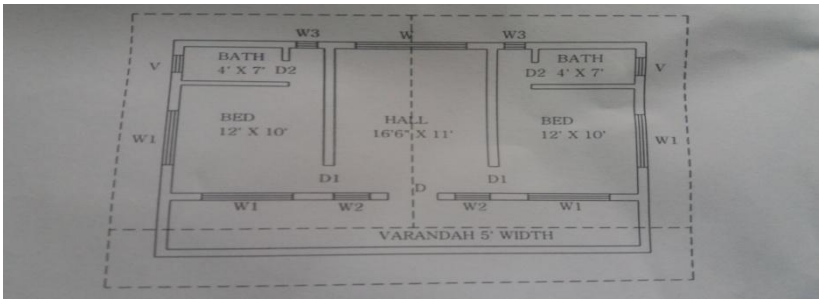
Flow Chart of Methodology

III. DEFINIG THE CATEGORIES OF WASTE PRODUCED DURING CONSTRUCTION

WASTE TYPE	DESCRIPTION	SOURCES
Wood	Dimensional lumber	Formwork,roof truss
	Plywood	Formwork
	Timber props	False work
	Sawn timber	Formwork,roof truss
Concrete	Substructure	Footing,piling
	Superstructure	Beams,coloumns,floor slabs
Metal	Reinforcement bar,	Reinforcement fixing
	Wire mesh	Reinforncement fixing
	Roofing sheet	Roof
	Aluminum Frames	Aluminum frames
Brick	Laterite stone/Clay brick	Wall fencing works,gutters
	Cement Brick	Wall fencing works,partition walling
Others	Packaging	Cement packaging,plastics,cardboards
	Gypsum and cement board	False ceiling
	Plaster	False ceiling,finishing work
	Ceramic	Roofing tiles,floor tiles,wall tiles
	PVC pipe	Plumbing work
	Conduit and wiring	Electrical work

IV. ESTIMATION OF % WASTAGE PRODUCED DURING THE CONSTRUCTION

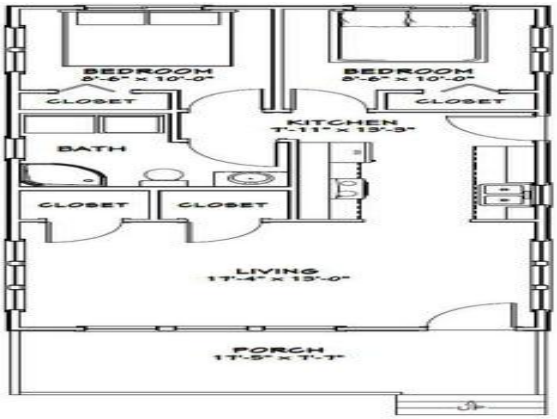
IV.I)For R.C.C bunglow construction(G)



Line Plan of R.C.C home

Sr No	Activity Description	Construction material used for activity	% Wastage of material	Reusable wastage or not (yes or no)	% of reuse
1)	Footing	Concrete Steel Wood	4 to 5% 0 10 to15%	No - yes	- - 50%
2)	Plinth beam	Concrete Steel Wood	4 to 5% 1 to 2% 10 to 15%	No Yes Yes	- 30% 50%
3)	Rubble soling	Rubble	nil	-	-
4)	Coloumn	Concrete Steel Wood	2 to 3% 3 to 4% 5 to 10%	No Yes Yes	- 40% 20%
5)	Slab,Beam etc	Concrete Steel Wood	5 to 6% 5 to 8% 5 to 10%	No Yes Yes	- 70% 80%
6)	Masonory work	Chira (laterite)	7 to 8%	Yes	100%
7)	Plastering work	Cement mixture(mortor)	10 to 15%	Yes	20%
8)	Flooring	All types of Tiles	10 to 20%	Yes	10%
9)	Plumbing	pipes	2 to 4%	Yes	20%
10)	Electric wire	wires	nil	-	-
11)	Door and windows	Wooden and aluminium material	30 to 40%	Yes	10%
12)	Grill iron work	Iron material(M.S)	nil	-	-
13)	Painting work	paint	2 to 3%	No	-

IV.II) For Prefabricated modular bunglow construction(G)



Line plan of modular home

Sr No	Activity description	Construction material used for activity	% Wastage of material	Reusable wastage or not (yes or no)	% of reuse
1)	Foundation	Rubble soiling	nil	-	-
		P.C.C	4 to 5%	No	-
2)	Binding material used for modular parts joining	Screw	1 to 2%	Yes	100%
		Cornise	4 to 5%	Yes	100%
3)	Wall, partition i.e main modular material	Wood Plastic Composite	2 to 3%	NO	-
		Modified bituminous	2 to 3%	NO	-
		Aluminium Composite material	2 to 3%	NO	-
4)	Plumbing	Pipes	2 to 4%	Yes	20%
5)	Flooring	All types of tiling work	10 to 20%	Yes	10%
6)	Electrical work	wires	nil	-	-
7)	Door and windows	Wooden and aluminium material	30 to 40%	Yes	10%
8)	Grill Iron work	Iron material	nil	-	-

V. ENVIRONMENTAL IMPACT ASSESSMENT OF R.C.C AND MODULAR HOME

1) By above observation we can conclude that almost 10 to 15 % wastage is produced during the construction of bunglow by R.C.C method

2)) By above observation we can conclude that almost 5 to 7 % wastage is produced during the construction of bunglow by Prefabricated Modular method

VI) CONCLUSIONS

1) We have done environmental impact analysis by using wastage produce during construction of R.C.C and modular construction method of g bunglow it is concluded that R.C.C construction is Produces more wastage during their construction phase than modular construction.
2) So ultimately modular construction method is producing less negative impact on environment than R.C.C construction..Modular construction is more environment friendly
3) Modular home has advantages like 1)It is independent 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
4) 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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