

AFFORDABLE HOUSING AND LOW COST CONSTRUCTION MATERIALS TECHNIQUES

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Abstract - Low-cost homes have a different concept of cost-effectiveness and adherence to strategies that help reduce construction costs through the use of remotely available materials and improved technical capabilities without losing the power, function and health of the building. There is a widespread misconception that affordable housing is suitable only for low-skilled workers and is constructed using cheap, low-quality building materials. The fact is that affordable housing is made possible by proper resource management. Economics are also achieved by postponing the completion work or doing it in stages. Reduction costs are determined by the selection of the most efficient materials or by the improved design. The construction of affordable housing using low-cost building materials increases access to low-income housing. The advantage of inexpensive building materials is to prevent land pollution, reduce energy consumption and use of natural resources, and reuse building materials. A techniques of the management of various cheap structural designs is presented in this paper..

Keywords: Low cost, Building Materials, Construction, Affordable,

1. INTRODUCTION

In the creation of countries, for example, India, only 20 percent of the highest paid workers, are able to afford the cost of regular housing. It is important to have your own shelter. The housing market has undergone a steady turnaround over a long period of time. And it has changed for the better. Endless homes are coming to various lands. Lots of low-income nationals often do not have access to the housing market. Therefore, affordable housing becomes more important, it is a general concept and more closely related to planning and attempts to reduce development costs through better management, proper use of close proximity, skills, and innovation but without producing a show. And structural life. (Tiwari 1999). It should be noted that cheap houses are not houses built with low quality materials. A low-cost home is planned and upgraded as another house in terms of design, design and quality. Cost savings are achieved through the efficient use of locally available building materials and processes that are robust, conservative, client-friendly, and that do not require expensive maintenance (Miles 2000). The economy is equally achievable by delaying graduation and making progress in installments easier. High staff performance, reducing system wastage and utilizing large administrative tests, can also be achieved. It is about the use of neighboring materials

and indigenous structures, nearby skills, energy saving, and flexible choices.

1.1 Housing Concept:

Man is a different kind of creature because of the intelligence he has. The desire for life or intuition for self-conservation is the intuition men have. The will to live later means the whole of work, because, without work, there is no food, no clothes, no covering, and, in this way, no life. A shelter is the second most important element in building a city or network for what is important to one's life. From now on the system of the residential unit and its natural features are important components. The main reason for the residence is to maintain the high quality of the person and the rest of the world. There is no doubt that a man's progress is probably the best way to maintain it. The daily life of an ordinary person is full of work and takes the quality taken from food and rest at home. From now on after work, he should rest and relax, protected from the cold and harsh conditions, from discomfort and noise. Therefore, the sanctuary should be at the very bottom of each of its parts and guaranteed against the soggy approach from all sides and prevent degrading elements.

Perhaps the most important physical needs mentioned earlier should be met first. Or it may be, man has a second life of soul, too. A life of desires, emotions, memory, and more. Deep life, in all its intricacies, is a life we truly feel, and it is inseparable from the body, and it should be given part of the meaning independent of desi thinking and network. They all need both physical what is above, the rest of the world must be fulfilled in network and in the city.

2. OBJECTIVES

Housing is one of the biggest necessities and affordable housing offers affordable housing. Following this, the following objectives are proposed in the current investigation.

- ❖ Study the different types of building materials and techniques used, to reduce construction costs.
- ❖ Unique and inexpensive building materials used for sustainable development.
- ❖ Identify the total cost required to complete the project using standard and cost-effective technology.
- ❖ Comparing cost reduction and time using different materials and methods for a major project.

3. LIERATURE REVIEWS

Harry and win (1998) has shown that the new ductile hybrid FRP bar is improved, this new reinforcement has a double stress factor used by institutions in concrete construction. It has

high strength, low weight and stainless steel material. A sample of each 50 * 100mm cross-sectional plan with a length of 1.2m and 5mm dia. hybrid reinforcement 3 was developed and tested on a bench-mounted universal test machine controlled by 44.5 volume removal. Test results showed that ductile behavior was obtained with good repetition and beam failure occurs after significant inelastic transformation.

Tam (2011) described the practical cost of using affordable housing technology in construction. It is found that 26.11% and 22.68% of construction costs can be saved through the use of affordable housing when assessed by conventional construction methods.

Fei and Dale explain that glass fiber reinforcement is a new technology pre-distributed. Glass fiber reinforcement is made of reinforced concrete or reinforced concrete panels. This type of wall is widely used in Australia and the wall when tested has high axial bearing and shear strength.

Chowdhury and Roy (2013) describe the prospect of affordable housing in India, it is noteworthy that in this paper other building materials especially natural materials such as bamboo, grass, bagasse, man-made materials such as fly ash, aircon panels were tested and their strength. Material to be used as another building material is removed.

Najjar et al (2014) investigated the use of natural hemp fiber in response to an improved load of composite clay, a total of 6 unlabeled samples of 7.1cm dia and 14.2cm length were prepared with a reinforcement of hemp fiber of 0, 0.15, 0.3, 0.4, 0.5 and 1% in PVC pipe, the sample was assembled and cut and tested on a triaxial testing machine the result showed that hemp fiber insertion had a positive effect on ductility and shear strength increased from 0.15% to at 1% when the active fiber content was 0.5-1%).

Mangesh and Sachin (2010) explain that the SBA dumped was used in the construction case. The SBA was tested and proved its suitability as a pozzolanic and Cementous material with a thermal stability of 650 degrees. The SBA brick was repaired with a fixed boundary structure and tested physiochemical. Test results showed that brick was lightweight, durable and energy efficient.

Taur and Devi (2009) describe affordable housing. Notably, this paper aims to debate the diversity of previously constructed low-cost housing styles by highlighting the different construction methods and the cost savings gained from their use. In the construction of the foundation wall, flooring, column, slab, is an important factor. The main construction method here is a building block wall, a wall of a few blocks, RC precast planks, front concrete / Ferro cement panels are considered.

Huma Yun and Pasha (2015) read about the Fly ash-based brick aggregate binder used for ash is given as 1: 4. The average size of a fly ash brick was 230 * 110 * 75mm and a combined mortar 10 to 12 mm. It is also tested using uniaxial monotonic compressive displacement loading with a 250KN actuator. The result showed that WA was 18.3% higher, and construction failure methods showed that a good bond could be obtained with a high degree of mud.

4. PARAMETERS FOR MATERIAL SELECTION

The existing pattern of structure is pre-construction, construction, and postal. Each phase of the building should have a final goal to help conserve energy. These three phases show the continuity of building materials through the various stages of the structure.

The pre-construction stage consists primarily of a separate compound for preparation, compression, and transport. The building phase primarily includes development, operation, maintenance, and removal.

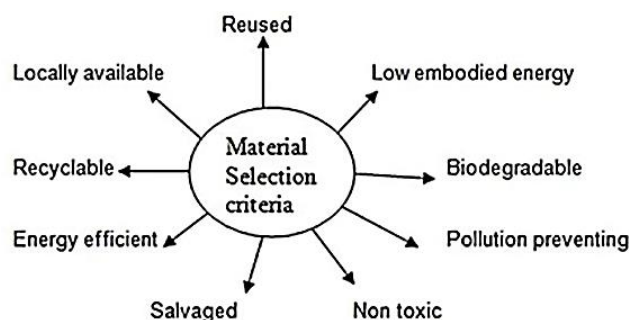


Fig. No.-1 depicting the material selection criteria

3.1: Does not care about the environment

Collection of building materials should be in line with the situation. Efforts should be made to study and refine new materials to bring about the best possible integration. Materials that are functional and should be developed waste generated during production.

3.2: Recycled Waste

Reusable spasms can be used for masons while wood spas can be used for compacting compressed wood or soft sheets.

3.3: Utilization of Low Environmental Cost:

The total energy needed to build material is called typified energy. The greater the merger of the combined power of the object, the more significant the use of non-combustible resources. It is therefore advisable to use building materials or composite materials that have been wasted.

3.4: Local building materials:

The use of local materials reduces the reliance on transportation that you are committed to the cost of building materials is high on key milestones. The use of locally available building materials reduces development costs and is suitable for nearby environmental conditions.

3.5: Energy-Building Building Materials:

The energy efficiency of a building material can be measured by various factors such as R-esteeem, coefficient of coefficient, brilliant production. Energy-saving devices must reduce the amount of energy created.

3.6: Non-toxic building materials:

The use of building hazardous materials can have a significant impact on the development of individuals and tenants of the building. In this way, it is appropriate to use non-toxic building materials in development. There are a few synthetic compounds that include ammonia, pitch resin protective chemicals, decorative ply boards, and building materials. The impact on the potency of these toxins should be considered during selection and should be used where necessary.

3.7: Longevity, Stability, and Care:

The use of solid development materials not only improves the life of the building, but also, reduces the cost of supporting low maintenance costs that usually save a ton of operating costs. The materials used in construction determine that the longer the blade can work.

3.8: Reusable and Reusable:

Assets should be accessible to a building that can be reused or reused. For example - plastic waste can be used for recycling and innovation. A piece from steel can be used to make RCC bars, spread limits, and other things that already occur in building development.

3.9: Biodegradability:

Equipment should have an option to disassemble normally when discarded. Ordinary materials or natural materials will be severely degraded.

NATURAL ITEMS

4.1: Random soil or stable coconut fiber

Grass mortar is an ancient material and has been used in many lands for a long time. The use of modern geotechnical methods in this content can improve both quality and durability. From the wet-dry test results, coconut fiber provides better strength. In the event of a sulfur cap being placed on compacted grass soils, water resistance is eliminated. A mixture of grass soil can also reproduce the root structure of the contaminant.



Fig. No.-2 Random Straw

4.2: Tile roofing sheet with bamboo

Effective improved roofing material for the common item comes from the Bamboo Board. It is eco-friendly, lightweight,

and durable and has a low fire risk compared to coverings and other roofing materials. These sheets can be used for roofs, walls, doors and windows, and other building materials.



Fig. No. 3 Corrugated Roofing Sheet

4.3: Earth

Earth is the most invented thing in the world. In any case, its unrestricted use is being undermined by factors such as water intrusion, erosion of walls at ground level by groundwater spraying, termite infestation and pests, high care requirements, and more by using a combined earth block and an immovable mud slide

4.3.1 Pressure Ground Block:

A compressed earth block is a created type of ground block, commonly known as an adobe block. This new program offers a financially sound, flexible climate. Balanced earth blocks are produced by bonding the unruly material with a solid, for example, cement or lime using a hand-held soil press.

4.3.2 Non erodible Mud Plaster:

Central Center for Architectural Research, India has embarked on a consistent but effective cycle of securing mud walls by installing impermeable cement mortar. The impermeable mortar is set by combining the reduction of bitumen (a mixture of Bitumen oil with Kerosene) with the identified mud. The walls of the muddles are unavoidable and water resistant. The Center for Science for Villages, Wardha India has developed a strategy to provide a line of tiles made of clay to mud walls that protect them from rain and water.

4.5: Wood

Wood has been used as building material for many years in its natural state. Today, processed wood is gaining the highest quality in industrialized countries. Wood is the result of trees, and part of the time of the multi-stranded plants, used for development purposes when they are cut or pressed into the wood regularly, for example, loading boards, and related materials. It is a unique building material and is used in the construction of almost any type of building in many cases. The wood can be completely flexible under weights, retain quality while twisting, and be incredibly strong when pressed straight up. There are many types of flexible features of different types

of wood, even between the same tree species. This suggests that the obvious varieties are more equipped for different uses than the others. Also, creating conditions is important in choosing quality. Raw wood (timber, stem, bole) becomes wood when the wood is "modified" (sliced, cut, split) as the types of wood that is not treated properly packed on the head of the main material with the wood structures are fire. Risk-related problems and humidity.



Fig.No. 4- Bark of Tree

5. MATERIALS AND METHODOLOGY

5.1 General

- Like any other developing countries, India too is passing through a phase of acute housing.
- There are generally two methods of construction i.e. 1. Conventional 2.non conventional.
- Conventional method generally consists of old and traditional methods of construction.
- Non-conventional method consists of use of advanced materials.
- Both this method is generally compared on the basis of parameter like time, cost, quality, maintenance, etc.
- Based on the above concluded observations the method which is more suitable can be adopted so as to save both time and money.

The work is generally organized in following stages. Whole project is carried out by finding out alternative method of construction rather than conventional method in each step with main aim focusing toward low cost.

5.2 Site selection

Cost of site plays an important role in overall construction cost as total cost generally depends upon land if the cost of land on which construction need to be carried out is high then the total cost of construction will also high.

5.3 Foundation

It is lowest part of the structure on which entire structure rest. The main function of foundation is to transfer complete load of

structure uniformly to the soil bellow it. About 10% to 15% of total cost is spend in foundation. Therefore, alternative methods like micro piles instead of H piles are generally used to lower the cost.

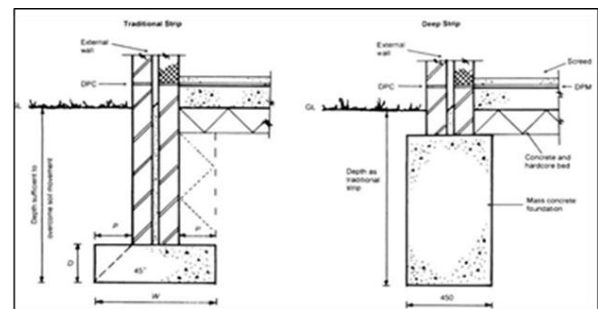


Fig. No. 5 Paper Insulation

5.3.1 Deep Strip Foundation:

Deep fiber bases are less expensive and are used when world conditions are favorable. The essential dimensions of the foundation for the concrete wall construction frame and the wooden wall construction are the same. The size and shape of the strip are directly related to the width of the wall. Strip foundation can be used for a lot of subsoil but is best suited for soils with good fertility. They are best suited for loading a simple structure where the base of a large concrete slab can be used.

Profit

- Ability to withstand heavy loads
- Easy to build there is no need for special training
- Very long service life
- The price is much lower than that of cast in situ structure
- You can make the floor better when you use the base of the line.

5.3.2 Helical Pile Foundation

Helical Piles steel shafts with a series of round metal plates are welded to the strategic areas near the shaft. Plates provide the foundation with the ability to carry pressure and pressure that enables them to be used for a wide range of applications across a wide range of industries and sectors.

The piles can be connected in groups using a metal transfer grillage and wrapped directly into the ground with mechanically hydraulic or electric drilling rigs. Helical Piles make the use of concrete for foundations a thing of the past.

Profit

- ☐ Effective, fast cost installation

- No concrete required, which saves both time and money for treatment.
- Construction of a small base to be used in restricted areas.
- Removable and reusable
- Low noise and low vibration during installation.

5.3.3 Driven Pile Foundation:

The propeller is a relatively long, thin column, provided to provide support or resistance, made of prefabricated materials with pre-determined shapes and sizes that can be physically tested before and during installation, such as hammers, vibrations or pushing on the ground. Driven piles are often the most effective solution for deep foundation. You only pay for what you need. There are no additional hidden costs or additional costs for cleaning the area. The variety of materials and shapes available for driven piles can be easily made or defined high structural strength, allowing them to be driven by modern hammers to work positions thus requiring fewer piles per project, leading to significant cost savings on the foundation.

Benefits.

- Driving piles can be easily used in areas where it is advisable to dig holes for fear of contact with water under pressure.
- Drop piles are the most popular working over the water as piles in port buildings or jets.
- Traction piles maintain their status during installation. They do not swell under soft soil conditions and are generally harmless to subsequent clusters.
- Traction piles do not require healing time and can be driven in natural order rather than skipping other piles, thus reducing equipment movement and speeding up the installation time.

5.4 Column

Column in building engineering is a structural element that transmits by congestion, the weight of the building above to the element of the building below. The column is usually a compression member.

The column is an integral part of the structure as the entire load of the slab and beam is transferred to the column. Therefore, it is necessary to build a column with the necessary energy and struggle to go to the economy. The different ways of building a column are Reinforced column. With the advancement of science and technology, it has been found that some types of bamboo have the same strength as those of soft metal when harvested. By examining the calf that the strong storage capacity of some bamboo species is comparable to that of soft steel and varies from 140N / mm sq to 280N / mm square bamboo is flexible due to its high yield strength in terms of weight, easy operation and availability. It is also found that bamboo performs very well in binding but due to the low

pressure then compared to steel because it is not straight it may not be very good. In addition it is found that the failure of bamboo is very small as the high absorption of energy is combined. Some specific bamboo material is given below.

1. Certain gravitational force- 0.575 to 0.655
2. Medium weight- 0.625 Kg / m
3. Fracture Modulus -610 to 1600 Kg / cm sq.
4. Final pressure --794 to 864 Kg / cm sq.
5. Operating pressure safe from pressure- 105 Kg / cm sq.
6. Operational safety pressure at tension -160 to 350 Kg / mm sq.
7. Safe working pressure in shear-115 to 180 Kg / cm sq.

5.5 Fiber reinforcement.

FRP reinforced concrete column is defined as a FRP reinforced concrete structure. Such reinforcement may be of various types and shapes. But the most widely used are GFRP, CFRP, and AFRP. Among these reinforcement bars, CFRP is more expensive compared to glass and aramid. When cost becomes a major consideration in a project, the GFRP reinforcement bar is widely used. Many ordinary steel structures have been plagued by corrosion of metal due to exposure to rusty surfaces and have been very important to them. A sea structure. Most of them will be exposed to chloride sulfide etc. For that reason the FRP becomes another way of strengthening. Today, in-house reinforcement technology with a combination of FRP is very popular and many studies have been done to prove that it can be successfully replaced by conventional steel reinforcement.

5.6 Flexural Members.

A flexible member is a member who experiences both tension and pressure within its depth. The beam is usually a flexible member as the applied load will usually cause the lower flange to get into compression and the upper flange to be compressed. Most columns are not flexible members as they are loaded which means the entire column is under pressure.

As a strong load is carried by a flexible member and the compressive load will be designed in such a way that it can withstand all the force satisfactorily.

5.7 Traditional Building Methods Used in Bhopal:

The detailed steps for each step used in the traditional construction methods used in Bhopal are as follows: (Tam, 2011)

5.14.1: Foundation

The foundation is the lowest part of the structure provided to distribute the loads on the ground thereby providing a super-structure foundation. Excavation work is done first, then ground work is supplemented with available soil and ends with irrigation and compaction in a 6" layer.

5.14.2 Plinth:

Empty concrete cement is used to build a straight surface in the excavated soil. Part of the 1: 4: 8-volume concrete mix (cement: sand: mortar), with a 6 veldt layer of stone foundation and column feet is used. Empty concrete is finished in a series of sand dug and mixed by hand process.

5.14.3 Construction of Wall:

The size of the foundation stone is built into the outer walls and heated bricks of 9"thick layer on large walls and 4 ½ thick layer on all interior walls. High-quality brick-shaped bricks are used for construction.

5.14.4 Slab and Beam:

The usual procedure for casting a reinforced concrete slab is to do shuttering and provide reinforcement and concrete. Fine metal or plywood formwork is used, with suitable block blocks between the bars. Both sand and gravel used are clean, compact ¾" graded. After the concrete is poured, it is well mixed.

5.14.5 Past:

Plastering is used for roofs, interior and exterior walls. The joints are filtered before concussion and proper healing is guaranteed.

5.14.6 Low:

For laying purpose, the soil is well filled and compacted in a ratio of 1: 4: 8 (cement: sand: compound) concrete.

5.14.7 Water pipes

High quality building materials are used and passed hydraulic testing before use.

5.14.8 Drawing and finishing

Prior to the painting process, the surface is coated with putty and primer and ready-made paint is applied.

6. Modern Construction Techniques That Can Be Used:

6.1 3D Volumetric Construction:

Using this new invention, 3D units are built in controlled processing areas using the necessary upgrades and building materials. Completed units are moved to the site by different modules, key squares, or finished units with all the luxury introduced, for collection. Blocks can be quickly raised on site with solid-like fire retardant structures, noise resistance, warm bulk is trapped.



Fig. No. 6 3D Volumetric Construction

6.2 Precast Flat Panel Modules:

These wall and floor modules were made away from the actual site and later transferred to the site for installation. Load-bearing parts such as decorative cladding and insulation panels can also be created. Similar to the so-called cross-divider development, the establishment has become stronger due to consistent adherence to decisions than and as straightforward as the speed of development.

6.3 Tunnel Formwork System:

With this excavation strategy, the development is aligned with the cell structures of the disused patterns with the structure of solid partitions or units in the individual work of each day. Quick work is accomplished by submitting formwork and prepared concrete mixed with the luxury and jewelry of the industrial center environment. Forms in tunnel form are packed and used on site by cranes.



Fig. No. 7 Tunnel Formwork System

6.4 Precast Foundation Technique:

Foundations can be quickly constructed with precast concrete units delivered to the production line and high in the remaining quality. Strength is provided by foundation-related building materials through piles of connected concrete. This strategy allows development work to continue even in extreme weather conditions and reduces the excavation process.

6.5 Hybrid Concrete Building Technique:

This approach facilitates the improvement of the transition time by combining the benefits of cement pre- projecting with in-situ construction. Quality improves, while development costs go up. Crossover concrete structures are not difficult to assemble, are naturally sensitive, and perform reliably.

6.6 Thin-Joint Masonry Technique:

The use of this method results in a reduction in the amount of mud used by cutting its depth from 10mm to less than 3mm. Therefore, mud can be quickly applied with improved performance on more painted wall panels. With larger concrete blocks measured, high technology upgrades and significant cost reductions can be achieved. Within one day, the number of prescribed mud lessons is high as the recovery of the mud occurs quickly without dealing with the grip of power to bring about the elimination of the skimming problem.

6.7 Insulating Concrete Formwork (ICF) Technique:

The ICF method uses polystyrene barriers that form twin walls and can be quickly assembled to form a building wall. The formwork is then integrated with a large, well-prepared, industrial area made of concrete. The scale of the building development becomes idiot proof and the resulting structure has an important level of sound protection and warmth.

7. ANALYSIS AND RESULT

Analysis:

The aim is to integrate visual development into a cost-effective construction (EWS 60%) without compromising the quality of the building. Part of the useful materials such as Flyash bricks, Robo sand, Basalt Rebar, UPVC windows, and Vitrified tiles are used in this test to reduce costs and result in eco-accommodating work. This research paper looks at the cost of common and other materials used in buildings. It has been found that 20% of development costs are reduced, by using less expensive materials.

7.1 Common and Traditional Materials used for analysis

In this study, the basic ideas are designed to adopt some of the building materials for the reinforced concrete frame used in large design projects. This paper analyzes common and unique features and reduces costs for foundation, wall, roof, flooring, and lintel. These variables are reflected in many reliable journals, which mean that these variables are generally accepted for quality, durability, and well-being. As a result of these tests, a plan, strategy, development processes and options are introduced. An estimate is being made and it has been found that about 20 percent of the construction cost can be protected by using less expensive materials. Cost savings were determined as the basis of actual costs and related operating costs. The feature structure includes a variety of building frameworks and materials that place great emphasis on management. The foundation of a typical building is the need to minimize the environmental effects of buildings and other

supporting structures, without losing comfort or well-being. To be fair, a conventional structure uses primarily material that is rich, flammable, reusable, or reusable.

7.1.1 Indigenous Equipment currently in use

According to common practice, we use the following materials in construction:

- **Steel:** Concrete has no effect on delays and provides durability and compensates for the use of stainless steel. From the beginning of the concrete, the metal goes with it. This catch cannot be broken due to heavy buildings but in the case of rural houses there is another option. A few experiments have been ongoing to increase the quality and durability of the concrete by adding a few mixes and different set options, and more. However, with regard to rural housing, there is no need for things like quality and other limitations. What is needed is not all that is important and does not require much consideration. However, adopting such procedures goes as a partial replacement and does not reduce costs in a convincing way. So the only way left is to get another metal option.
- **Concrete:** The most notable innovation of the nineteenth century is concrete. Since its inception, its use rate has never dropped. There are a few experiments that offer improvements in increasing concrete quality and the use of non-renewable waste. However, this may increase the total cost, this paper does not focus on its alternatives.
- **Bricks:** In the case of brick building construction is used to cover the surface of a building. They may have clay bricks or ashes. Both types are commonly used today. Ordinary house, about 25% of the total cost is explicitly spent on bricks; if we can change it and add alternatives this can be economical.
- **Mud:** This type of mud is used to plaster brick buildings. This is made of cement and good adhesives in a ratio of 1: 6 (Depending on requirements). Nowadays, access to consolidated fines has dropped which has increased its costs. Reducing the use of integrated fines will affect the overall cost of development. Removing this by adding alternatives that reduce the use of good adhesives and cement may improve the cost of construction.

10.1.2 Other Resources

The study suggested the following alternatives to traditional ones: -

- ✓ Fly Ash Bricks (FAB) is a development material that provides the same features as clay bricks and is used for construction work. These blocks are introduced in a logical, simple way, low heat inserts, etc. Therefore, no Plastering is required where Fly Ash bricks are located.
- ✓ Quarter sand is also called M sand taken from rock dust in the Quarry area. This sand can be used instead

of river sand. It restores the strength of concrete compared to ordinary sand and provides high durability, high quality, usefulness, and so on.

- ✓ Basalt Rebar is a fiber material produced using Volcanic Rock. This is used abroad to control construction costs. It regenerates a much stronger force compared to conventional metals. These are just some of the goal setting shareware that you can use.
- ✓ UPVC windows are durable and thus prevent seawater from being contaminated and contaminated. The material is durable, strong and durable, easy to protect, lightweight, and the most expensive fruit.
- ✓ Vittrified tiles included in the vittrification cycle; from now on it has become a solid and consistent commodity. Vittrified tiles are scratched and safe. It is difficult to match and these tiles are much more basic than different tiles.
- ✓ Organic fibers have many advantages, such as low cost and prepared accessibility, their use to strengthen cement-based materials combined with its moderate reduction low elastic modulus, its water-retaining properties, resistance to fungi and insects, and the diversity of structures between fibers.

7.2 Result:

7.2.1 General

In order to achieve the economy in construction it is necessary to choose the most appropriate method. If we look at the economy we will also remember the strength of the structure. On the basis of the construction method mentioned above we knew that. Site selection can be made at the lowest cost of building a building in the city by choosing an area close to the city or in urban areas.

7.2.2 Foundation

The foundation is an integral part of the structure as 10-15% of the total construction costs are considered under the foundation based on the data provided in the table (comparison of the cost of building the foundation) that provides a comparison of the different foundation system.

8. SUMMARY AND CONCLUSIONS

Summary

The use of modern technology that can improve the strength and durability of many inexpensive existing materials should be encouraged. In this study, other building materials were studied and the strength of the material to be used as other building materials was purchased.

Conclusions

- The dream of owning a home, especially for low-income families and low-income families, becomes a reality.

- It is necessary to use affordable, new and environmentally friendly housing for construction.
- This study evaluated the efficiency of the cost of using affordable housing technology compared to conventional construction methods.
- Two case studies found that about 22 to 26% of construction costs, including material costs, could be saved by using less expensive housing methods than by conventional construction methods.
- This proves the benefits and practices of using affordable housing technology.

REFERENCES

- [1]. Harry G Harris, win somboonsong. (1998), "New ductile hybrid FRP reinforcing bar for concrete structure". ASCE.
- [2]. Emad El Sayed Eltmam. (2014)," Innovative hybrid reinforcement for flexural member", journal of composite construction.
- [3]. Caponetto R and Francis G (2013), "Ecological materials and technologies in low cost building system" international general for housing sciences.
- [4]. Taur R and Devi T (2009)," Low cost hosing", ACSGE-2009.
- [5]. Salem S Faza (2000)," A new generation of fiber reinforced plastic rebar for bridge deck reinforcement", Advanced technology in structural engineering.
- [6]. Syed humayun, Pasha Hemant and Kaushik. (2015)," Evaluation of nonlinear property of fly ash brick masonry under compression and shear, Journal civil engineering.
- [7]. C K Madheswaran, P S Ambily, J K Dattatray, N P raja mane (2014)," studies on use of copper slag as replacement material for river sand in building constructions",
- [8]. Mangesh V Madhurwar, Sachin A Mandavgane. (2010)" Development and feasibility analysis of bagasse ash brick", Journal of energy engineering.
- [9]. Ar Vidya, Ar Radha (2008)," Alternative low-cost building materials'.
- [10]. Tam V.W.Y. (2011)," cost effectiveness of using low cost housing technologies in construction", procedia Engineering.
- [11]. Raspall F and Arora M (2014)" Building from the end of life: an alternative approach for low cost housing:
- [12]. Choudhury S and Roy S (2013)" prospect of low cost housing in India" geomaterials.