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EFFECTIVE OF COST CONTROL AND COST REDUCTION TECHNIQUES FOR BUILDING MATERIALS

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***Abstract:** This project reviews the cost effective construction materials and techniques for building design in the field of civil engineering. It comprises the important analysis and results from the experimental and literature of many authors. Housing is a great problem in today's world. The most basic building material for construction of houses is the conventional burnt clay brick and cement concrete. A significant quantity of fuel is utilized in manufacturing these construction materials. Also, continuous removal of upper surface of soil mass, in producing conventional bricks, creates environmental problems. This project involves cost estimation of a duplex, first by using conventional building materials and then by alternative building materials to determine the total cost that can be reduced by using alternative building materials.*

***Keywords:** Low Cost Housing, Sustainable Housing, Building Materials, Fly ash brick, M Sand, P Sand, Ceramic tile,*

I INTRODUCTION

Cost effective building materials has taken off in recent year with many builders and new home owners looking for new and different methods of construction that can potentially offset energy cost. Construction of low cost housing by using the low cost building materials increases the access to buildings by low income group peoples. Low cost housing can be achieved by use of efficient planning and project management, low cost materials, economical construction technologies and use of alternate construction methods available. The profit gained from use of such methods can decrease the cost of construction and make the low cost housing accessible to all. The use of low cost alternate building materials also prevents the rise of construction cost due to use of scarce building materials which eventually increase the cost of the project. Some alternative building material can be made out of natural materials, while others can help to lower energy costs of the occupant once built. This project involves layout, analysis, design and cost estimation of a duplex, first by using conventional building materials and then by alternative building materials to determine the total cost reduced by using alternative building materials. For completing the project very popular Civil Engineering software's such as AutoCAD, MSP, BIM, Microsoft Excel for Cost Estimation have been used.

II LITERATURE REVIEW

Bredenoord J carried out study on sustainable Housing and Building Materials for Low-income Households; it is observed that sustainable goals for low-cost housing and applications are achievable. Measures concerning the physical development of neighbourhoods, such as urban density and connectivity are equally as important as measures concerning community development. The final comprise support for community built organizations, small housing cooperatives (or similar forms of cooperation) and individual households – or small groups – that build and increase their houses incrementally. Adequate design and social organization and support are preconditions for achieving sustainability in incremental housing.

F.Pachecotorgal carried out study on Earth construction and Building materials, it is observed that in this paper earth construction has a major expression in less developed countries, on the other hand the mimetic temptations near more poisoning construction techniques based on reinforced concrete and bricks that fired up are likely to favor a change near a clear unsustainable design. In order to disclosure and highlight the importance of earth construction this article reviews some environmental benefits such as non-renewable resource consumption, waster generation, energy consumption, carbon dioxide emissions and indoor air quality.

John M.Hutcheso carried out study on project management of low cost housing in developing countries, it is observed that the study of this paper include designs, cost control systems, communications , contract law and planning. An appreciation of the evidence compounded from the problems portrayed throughout the paper leads to decisions of the need for simplifications of designs, the impact of inadequate local support and hence the need for detailed and complete advanced planning. In addition the conclusions stress the need for the careful collection of self supportive teams of multi-disciplined professionals and sub professionals.

Preetpal Singh carried out study on Low Cost Housing: Need For Today's World; it is observed that Construction cost in India is increasing at around 50 per cent over the average inflation levels. It have enumerated increase of up to 15 per cent all year, mainly due to cost of basic building materials such as steel,

cement, bricks, timber and other inputs as well as cost of labour. As a result, the cost of building by means of conventional construction materials and construction is becoming beyond the affordable limits particularly for low-income groups of population as well as a big cross section of middle - income groups. So, there is essential to adopt cost-effective construction methods either by up-gradation of traditional technologies using local resources or applying current construction materials and methods with well-organized inputs leading to economic solutions. By using Low Cost Housing Technologies, we can reduce approx. 25% of the total cost of housing.

Sengupta Nilanjan carried out study of appropriateness of cost effective building construction technologies, it is observed that this paper studied the acceptability and adaptability potential of different cost effective building constructions through field survey, literature study and technical calculations and tried to find out the most appropriate one among those adaptability potential of different cost effective building constructions through field survey, literature study and technical calculations and tried to find out the most appropriate one among those.

R.Caponetto carried out study on Ecological materials and technologies in low cost building systems, it is observed that the high recyclability of natural materials that can be used in low cost building associated with construction techniques capable of exploiting the principles of bioclimatic architecture for liveliness needs allow us to create building environmentally conscious and responsible. At the same time the project of a special block was developed to meet the needs of sustainability and ease of construction.

III OBJECTIVE

1. The purpose of cost control is to help deliver the project on time, within the scope and the budget.
2. Cost control is a broad set of cost accounting methods and management techniques with the common goal of improving business cost-efficiency by reducing costs.
3. It is important to ensure that there should not be any under claim or over claim of the work done.
4. To gain the maximum profit within the designated period within the budget.
5. Controlling how much is spent on a certain item on project. Anything above a certain amount needs approval of higher authority.

IV METHODOLOGY

4.1 Details of the Project

The plot size for the project is 116.11 M^3 or 1250 Ft^2 Accordingly the building has been laid in the centre of the plot leaving ample space on all the sides for land scaping and pathways for cars and for parking. General layout details are shown in table

Table 1 Plot Details

Area of Built Up	116.12 M^2
Plot Details	Front – Main road, Left & right side – Private residential buildings
Number of floors	G+1
Type of construction	Duplex

4.2 Cost Effective Building Material

The cost effective building materials used for the project in place of conventional building Material are shown in table no. 2

Table 2 Conventional building material used

Conventional Building Materials	**Cost Effective Building Materials**
Clay Bricks	Fly Ash Brick
River Sand (For Brick Work)	M Sand
River Sand (For Plastering)	P Sand
Granite Flooring	Ceramic Flooring

4.3 Abstract of Cost Using Conventional Building Material

Sr. No.	**Description of work**	**Quantity**	**Unit**	**Rate/Unit**	**Amount**
1.	Clay Bricks	12730	Nos.	10	127300
2.	River Sand(For Brick Work)	6.68	M^3	10000	66800
3.	River Sand (For Plastering)	2.24	M^3	11000	24640
4.	Granite Flooring	73.30	M^2	270	19791
				Sub Total	238531
				Add 5% Contingencies	11926.55
				Total	250457.55
				Round off	0.45
				Grand Total	250458

4.4 Abstract of Cost Using Cost Effective Building Materials

Sr. No.	Description of work	Quantity	Unit	Rate/Unit	Amount
1.	Fly Ash Brick	12730	Nos.	8	101840
2.	M Sand (For Brick Work)	6.68	M^3	6000	40080
3.	P Sand (For Plastering)	2.24	M^3	8000	17920
4.	Ceramic Flooring	73.30	M^2	205.2	15041.16
				Sub Total	174881.16
				Add 5% Contingencies	8744.05
				Total	183625.21
				Round off	0.79
				Grand Total	183626

4.5 Total reduction in cost

The total reduction in cost by using cost effective building material is **Rs 66832/-**

V CONCLUSION

1. Fly ash is an industrial waste from the power stations; there rise a big problem of utilization of fly ash. Fly ash can be used for different purposes as it shows the cementing properties when mixed with water. The fly ash bricks can be manufactured easily and show sufficient strength. Cost of the fly ash brick is very low as compared to conventional clay brick. Conventional clay bricks can be replaced with the Fly ash brick
2. It is well graded in the required proportion for M Sand and P Sand, It does not have organic and soluble compound that affects the setting time and properties of cement, thus the necessary strength of concrete can be maintained. It does not have the existence of impurities such as clay, dust and silt coatings, increase water condition as in the case of river sand which damage bond between cement paste and aggregate. Thus, increased quality and durability of concrete. M-Sand is obtained from exact hard rock (granite) using the state-of-the-art International technology, thus the essential property of sand is obtained. M-Sand is cubical in shape and is manufactured using technology like High Carbon steel hit rock and then rock on rock process which is identical to that of natural process undergoing in river sand information. Modern and imported machines are used to manufacture M-Sand to ensure required grading zone for the sand.
3. It can be seen that mixes with artificial sand as a fine aggregate gives better strengths than mixes of natural sand due to sharp ages of the particle in artificial sand provide better bond with cement than rounded particle of natural sand. P Sand creates a very smooth and even finish to your plastering. The P Sand shall consist of natural sand, crushed stone sand or crushed gravel sand or a combination of any of these. The sand will be hard, durable, clean and free from adherent coatings and organic matter and shall not contain clay, silt and dust more than specified. Plastering Sand is a very fine grade of sand. This product is used for plastering and creating renders both internally and externally. Thanks to its fine particles, this Plastering Sand creates a very smooth and even finish to your plastering.
4. Ceramic tiles are low cost in market as compare to granite flooring, Ceramic is easy available in market and its handling are easy, Ceramic tile for construction labour charges are low, Ceramic tile are light weight.

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