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Survey Paper On Low-Cost Housing Using Precast Panel

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Abstract: *The paper presents work on low-cost and sustainable alternative building materials having advantages on areas such as India where concrete or steel housing is expensive. The project addresses the challenges and stereotypes of using these materials as a structural component for low-cost housing and their same capacity for adaptation to the broad spectrum of factors physical, ecological, social, economic and technical—through different products developed which can dictate the production of the construction environment.*

Keywords: Low-Cost Housing, Building Material, Sustainability, etc.

I. INTRODUCTION

Managing the response to the ever-increasing housing needs of the Indian population expanding by 1.3% every year, has long been a problem for its government. Providing affordable housing remains a major concern of the government as 37% of its population remains below the international poverty line (US $1.5 a day). In India, the maximum affordability of a household was defined to be 5.1 times the household's total gross income as compared to the developed countries (In the US it is 0.3 times or less of a household's gross annual income). Based on the development index of a location the average cost per square meter is about $130 in semi urban areas, $130-$173 in B class cities whereas in metro cities it increases to $173 - $258. So, the majority of Indians have per capita space equivalent to or less than a 3-meter x 3-meter room for their housing needs like living, sleeping, cooking, washing etc. Whereas according to conventional norms, the average is 10 square meters per person in rural areas and 11 square meters per person in urban areas.
The use of natural materials like straw, bamboo, fibres (jute, coir), earth etc. is a centuries' old practice in India These materials apart from being locally available have easy workability and speedy construction hence reducing costs Also industrial wastes like fly ash and rice husk possess pozzolanic properties which can act as excellent substitute material. This paper aims to bring together the studies of these materials keeping in mind their affordability.

A. AIMS & OBJECTIVES

- To Make Low-Cost Housing using Precast Panels.
- To save the time required for making structure.
- To solve the problem of our society.

B. PARAMETERS

- Study research papers from the people who did this work.
- Do experiments by visiting a site.
- By talking to experienced people in this field.

II. LITERATURE REVIEW

The construction industry in Ghana is becoming efficient in the area of cost and achieving advanced technologies. Concrete is a major component in every construction project. The use of precast concrete technology has been embraced by the construction industry in Ghana. Precast is defined as a concept that uses standardized structural components produced away from the construction site and transported to the site for assembly.

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These components are manufactured by industrial methods based on mass production in order to build a large number of buildings in a short time at low cost. Precast concrete is defined as the process of casting concrete elements off-site and moving them to the actual building site. The use of precast concrete has various advantages which include the reduction of the site labors, less wastage, less volume of building materials, increases environmental and construction site cleanliness, safety & reduces time of completion. All these indirectly signifies its economic benefits. Precast columns and slabs are the most common in the Ghanaian construction industry. This study seeks to analyze cost estimation of the structural frame (column and slab) by considering cast-in-place and precast concrete slabs and columns, respectively. The study established that precast concrete slabs were on average 23.22% cheaper than the cast-in-place concrete elements and precast columns were averagely 21.4% less than cast-in-place concrete columns. The study established that professionals prefer the use of precast concrete products because of the life cycle cost. For concrete the basic building materials provide strength, durability, and its ability to resist weathering action, chemical attack, abrasion, fire resistance and other forms of deterioration.

The study focuses on the comparative cost of structural frame of some selected public buildings in Ghana. The structural frame will include columns and suspended slabs. The analysis was based on actual working drawings and bills of quantities of completed and on-going projects. The information for the research was obtained mainly from books, interpersonal interviews and actual site measurements.

III. NEED OF PRECAST TECHNOLOGY

Rapid population growth is leading to a major demand for new infrastructure in many large cities in Africa, South America and India, which all have a housing shortage of tens of millions of apartments. People need safer and more comfortable places to live, and prices need to be reasonable. India being a developing country is a land of many slum dwellers. Despite Government efforts to build new houses and other basic infrastructure, most of the people living in slum areas do not have proper shelter. Mumbai is home to Estimated 6.5 million slum people which accounts to the majority of its population. Precast construction is a cost-efficient, fast and sustainable building technology for large housing projects that doesn't compromise on quality.

IV. ADVANTAGES

- Manufacture of precast elements concurrent with commencement of early site work.
- Reduces propping and scaffolding costs.
- Reduce plant, amenities, tools and materials storage on site.
- Once precast installation starts, on-site construction and off-site manufacturing can be overlapped, thereby reducing overall site construction time.
- Reduced build time hence minimizes finance cost.

V. CHALLENGES IN INDIA FOR PRECAST HOUSING

India is experiencing a huge housing crisis today. The current housing shortage estimates to about six crore units. Precast concrete construction technology is one of the promising solutions to meet the huge housing demand. The use of precast concrete systems offers several advantages such as fast and quality construction and enhanced health and safety. Despite these advantages, this industry has not gained popularity in India. To identify the major current challenges faced by the precast construction industry, a round table discussion among various stakeholders was held at IIT Madras.

The findings indicate that the lack of standardization, certification and testing facilities, contractual issues and taxation, non-availability of tools, technology, and equipment, limited knowledge, and lack of government incentives and promotion are some of the major challenges faced by the precast concrete construction industry in India.

As per studies conducted by the Ministry of Rural Development and the Ministry of Housing and Urban Poverty Alleviation, it is estimated that almost a quarter of Indian households lack adequate housing facilities. To meet this huge urban housing demand, the precast concrete construction industry can play a crucial role. In a developing country like India, it is necessary to fulfill the present need of the infrastructure.

Government invests a large amount about 40-50% of the total budget. While constructing the various buildings (commercial, residential, or any other) to achieve the fast and desired quality precast construction technology is used

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nowadays in India, but at an initial stage because it has some problems which are arising during the pre-engineering work, at various construction stages, staking of the members, transporting and erection etc.

VI. CONCLUSION

The design concept of precast buildings is based on the buildability, economy and standardization of the precast components. Precast structures provide for a high quality and fast construction process. The most important parts of precast concrete structures are the connections between the precast elements. The precast construction technology offers advantages such as cost-saving, time savings, quality enhancement, less labor requirement, safety enhancement and reduced wastage etc.

In Indian construction industry precast technology has some challenges. Companies are not following the technique for manufacturing precast concrete elements units in large quantities and industries are very few in India, so dependability on the supply of precast elements is very high and they find it very risky. Investors should promote this technology, because this technology requires very high initial investment. Pollution-free and hazard avoidance environment offered by the precast construction can be a boon for Indian civil engineering. Execution of this required proper roads and transportations to carry the constructions from the factory to the site without any damage or hazard.

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