

A STUDY ON ESTABLISHMENT OF FINANCIAL FEASIBILITY PARAMETER FOR PREFABRICATION CONSTRUCTION TECHNOLOGY IN UTTAR PRADESH REGION

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Abstract :- In this research paper, panels have been removed from the building boundary wall and a medium-sized brick wall and an expensive concrete wall. After conducting a survey of the textile industry it was determined how much the industry would cost to set up, and how much boundary wall we would need to build to establish a rope industry that would benefit us by putting our construction industry first.

Keywords :- Prefabrication precast panels& column, Cost In-situ Brick walls, Cost In-situ Concrete wall, Prefabrication Industry setup cost.

1. INTRODUCTION

Prefabrication, assembly of buildings or parts thereof in a non-construction environment. This approach manages construction costs by saving time, salaries and building materials. Pre-selection requires the cooperation of builders, suppliers, and builders in relation to the size of the basic modular units. Those with prefabrication have more plinth space, so it's okay to compare those and research is easier. Selected precast panels are non-load berets. Choice of Boundary Wall Panel and In-Situ Brick Boundary Wall Costs on Situ Concrete Boundary Wall When you compare the costs of these three, we should be told which wall will be cheaper. How much will it cost to set up an industrial building industry and how much of a boundary wall will need to be made so that the costs of the selection industry will come out and it will be cheaper for us to build a border wall after that.

Pre-made wall panel: A building built on a non-spatial structure, building a structure such as a column, beam, slab and panel materials such as concrete, reinforcement etc.

Cost of In-situ Brick wall: One building material, usually brick, used on the exterior walls of buildings is its appearance with solid stones without weight and cost and provides a load-free wall. Brick is a type of block used to build walls, walkways and other materials in stone construction.

Internal cost of concrete wall: The standard in-situ method of constructing a reinforced concrete wall known to the applicant, consists of a series of steps to prepare the construction and distribution of the foundation, adjusting the formula and throwing beams and floor flags, forming and imitation. The reinforced concrete wall is built as a compression member. Reinforced concrete wall is used if the beam is not provided and the load from the slide is heavy or when the thickness of the stone wall is blocked.



Prefabrication boundary wall. In-situ brick boundary wall. In-situ concrete boundary wall.

2. LITERATURE REVIEW

- I. **Julian Thamboo 1, Tatheer Zahra 2, Satheeskumar Navaratnam 3, Mohammad Asad 2 and Keerthan Poologanathan 4, (2021)** :- Pre-selection has been shown to be an effective way to build in a modern context. Although much progress has been made in the construction of reinforced concrete (RC), fragments / structures made of wood and steel, the construction of stone masonry systems has received limited attention in the past. Conventional stone construction is labor-intensive and time-consuming; therefore, pre-construction can be an effective solution to accelerate stone construction to make it more cost-effective. Therefore, in this paper, an attempt has been made to evaluate the effectiveness of the stone masonry plans (PMS) in terms of their structural features and ideas of sustainability in the Australian context. Next, available studies related to PMS and prospects for developing stone wall-building projects were evaluated and reported. To test the effectiveness of PMS, a case study was conducted by designing four types of wall construction plans for a typical Australian housing house. It has been shown that reinforced (RM), post-tensioned (PT) and thin layered mortared (TLM) construction systems are best suited for selection. Later, in order to test the stability of stone-building systems, life cycle tests were performed using the Environmental Performance in Construction (EPIC) database. It has been found that approximately 30% and 15% of savings, respectively, in terms of energy savings and emissions of CO₂ in prefabricated construction than conventional stone construction. Finally, opportunities arise to develop PMS and the need for future research studies in these programs.
- II. **N.Dineshkumar1 , P.Kathirvel2, (2015)** :- The main purpose of this existing project is to study the current situation in the precast construction industry in India. Proposals for industry improvement and a study of the cost-effectiveness of precast concrete construction of multi-storey residential buildings should be provided. A literature search was conducted to find comparisons between ordinary buildings with precast concrete buildings in India and a special visit was made to gather information to investigate the current situation regarding the precast industry in India. To compare the cost of precast construction with in-situ construction, two-storey residential buildings are considered.
- III. **Dezhi Zou1,2* , Cheng Sun1 (2019)** :- At present, prefabricated structures are widely used in residential buildings and industrial plants. The energy-efficient design of its walls has become the focus of the construction industry. Taking the most widely used composite walls of buildings installed inside Inner Mongolia as a research tool, the authors aim to test the thermal performance of building constructions under cold conditions, and to study energy-saving technologies by determining the maximum size of the protective layer. Research has found that the outer structure of a wall-like envelope is the primary means of dissipating heat from a prefabricated structure; as the thickness of the protective layer increases, the temperature of the wall decreases, and the index of thermal inertia increases, indicating better separation characteristics; the thermal conductivity of the composite wall made for the outer layer of the partition was the smallest; the average daily heat consumption in the composite wall with polystyrene plastic interlayer was small, and reduced by 21.65% compared to the inner closure layer. The findings of the study provide guidance and suggestions for the construction of a composite wall and a selection of pre-existing architectural materials in Inner Mongolia.
- IV. **Ravijanya Chippagiri 1,* , Hindavi R. Gavali 1 , Rahul V. Ralegaonkar 1 , Mike Riley 2 , Andy Shaw 2 and Ana Bras 2 (2021)** :- Under India's "Public Housing" program, 20 million urban houses should be built by 2022, which requires the construction rate to be around 8000 houses / day. Previous results from the team indicate that current low-cost construction methods and buildings in India need to be improved. The challenges are the dumping of solid

waste created by agricultural industry activities and the need for high energy in the hot and cold days. It is proposed to build urban-based infrastructure that can adapt to the weather. The installation of sustainable materials such as industrial agricultural products and textiles has resulted in effective environmental sustainability and climate change. Precast sections are highlighted as an appropriate solution for this purpose and to meet the need for more housing. India has a small record in the use of this prefab technology compared to the global perspective. For the first time, a novel and sustainable prefab housing solution is being tested using industrial ashes (CBA) industrial waste ash and the results are presented here. The model house of the actual scale measuring $3 \times 3 \times 3$ m³ was considered the base case and compared with the other 17 compounds of the model house with different adjustment of prefab panels. Comparisons are made with commercially available fly ash and CBA bricks with a standard roof slab. Simulation studies were conducted with respect to cost and power analysis in all 18 cases. Various brick and panel construction and CBA housing construction were attempted and the top design was selected. Similarly, 18 model-scale houses are modeled, with different combinations of brick or panel walls and different construction methods, taking into account the impact on electric cooling and cost. The results show that high cooling load can be reduced six times by bio-based prefab panels. Pre-considered construction can be considered for large houses ranging from more than 100 houses, each with an area of 25 m².

- V. **Marzena Kurpinska , Beata Grzyl and Adam Kristowski * (2019) :-** Global economic growth has led to an increase in the use of natural resources, especially in the construction sector. Excessive use of electricity contributes to climate change. Therefore, it is necessary to look for solutions, which will allow to reduce the exploitation of natural resources. One of the many opportunities to do that is the use of recycled materials. The authors of the given article analyze three types of construction solutions. One of them was the construction of building walls from reinforced concrete made of a layer of styrofoam. The second variation of the analysis is that the walls are first made of lightweight cement, made of composite clay with foam cells. The proposed third variation was a multi-row wall system, made of heavy-duty concrete with granulated aggregate aggregate (GEGA). The main objective of this study was to evaluate the use of lightweight GEGA, with a focus on economic and technical aspects of the solution. The authors reviewed all construction costs; roofs and stairs were considered reinforced blocks. In the calculation, the weight of the items is taken into account, taking into account the cost of travel and lift. Based on this cost analysis, it is concluded that the use of recycled material, made of heavy cement and GEGA, could be the solution, the most widely used to date. The analysis also showed that the use of GEGA-based priorities is economically sound, as it allows for time-saving construction. In addition, the solutions, proposed here, allow to conserve natural resources and adopt a more environmentally friendly and environmentally friendly attitude.

3. METHODOLOGY

After surveying the prefabrication industry, the cost data of setting up the prefabrication industry has been collected and the cost of manufacturing prefabrication panels and columns has been found out from the fabrication industry. To find out the UPPWD Govt. 2020-21 Schedule of Rates Material Cost and Labor Cost. The Cost In-Situ Brick Boundary Walls & In-Situ Concrete Boundary Walls. Find the minimum thickness of concrete wall using code IS 456:2000.

4. Data Collection

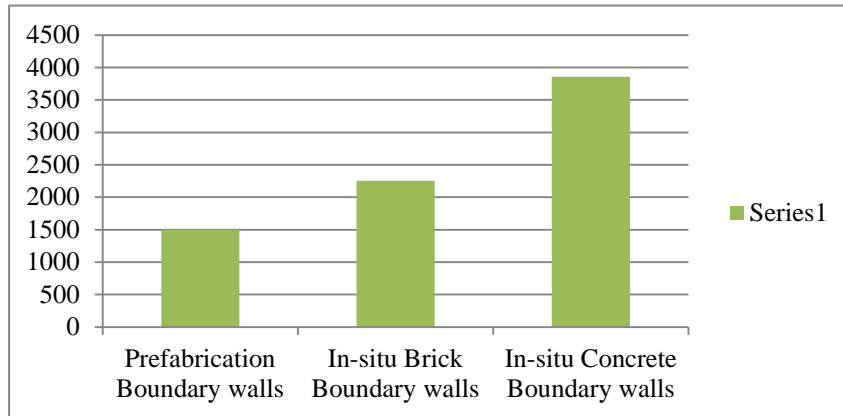
This chapter describes the data collected from the survey. Data collection should be done in different companies to get the rate details about the precast construction and as well as conventional construction. In the data collection we can also know the procedures of the construction work and also find out the difficulties of the work. This collection is helpful to find out cost of the project for the both constructions. We also find the project duration of the construction by using these enquiries.

CASE STUDY :- Rolex Fab Engineers (Bhavnath Park, Maviya Road, Raiyni Nagar, Gondal).Rolex Fab Engineers went to survey the industry, we saw that – Manu : Cement Mould, Vibration machine, Y Mould, Fencing Mould, Column Mould, Garden Bench Mould, 3 mm Wire Selling and all type of heavy Fabrication Work.

After surveying the prefabrication industries it was found that to set up an industry at the site for making prefabrication boundary wall, it would cost Rs 98 1180. Prefabrication boundary panel size is 2010*300*50mm, column size is 150*150mm. The cost of a prefabricated panel is Rs107 per panels and the column is paneled at a cost of Rs158 per columns.

5.COMPARISION TABLE

- The area of the three people is 3.34 square meters and the different cost of these three people has come out as shown in the chart.



- When we compare all three boundary walls, we find out that the wall cost separately, it shows that the panel is the cheapest is the prefabrication boundary wall and it does not take much time to setup and we can remove it and make the boundary wall at another place
- It is economical as Compared to Brick Wall & Concrete Wall.

6. RESULTS

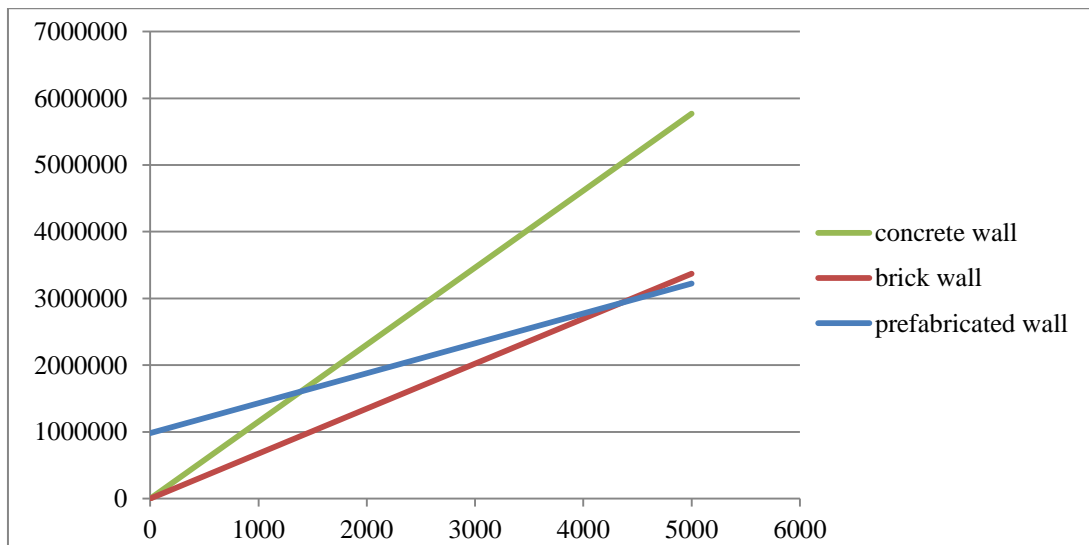
After making all the three walls, after calculating the different cost of all the three walls, it was found that the cheapest prefabrication boundary wall is in comparison to brick wall and concrete wall.

Prefabrication Industry Rent early area cost Rs 1,80,000. Prefabrication Industry machine cost Rs 2,68,500. Total Cost of prefabrication Industry setup Rs 9,81,180. Total Cast of Prefabricated Boundary Wall Rs 1498. Total In-Situ Break Boundary Wall of material cost Rs 1,881.97. Total In-Situ Break Boundary Wall of labor cost Rs 336.55. Total Cost of In-Situ Break Boundary Wall setup Rs 2,251.79. Total Material Cast of In-Situ Concrete Boundary Wall Rs 2,502.87. Total Labour cost for laying Reinforced concrete Rs 1,017.67. Total cost For Centring & Stuttering Rs 95.9. Total cost For Reinforcement work for RCC Rs 181.3. Total Cast of In-Situ Concrete Boundary Wall setup Rs 3,884.74.

7. CONCLUSION

From the above studies it can be concluded that the cost of prefabrication wall panel is lowest as comparison to the in-situ brick wall & In-situ concrete wall.

Hence it can be concluded that prefabrication wall panels are economically feasible and easy to install minimum duration of time.



This chart is showing that if we compare the cost of both prefabricated wall and concrete wall, it has been found that if we make more than 1500 square meters of prefabricated boundary wall, then our prefabrication industry is right to setup. Which will cost Rs. 9,81,180 & after constructing 1500 square meter of me prefabrication panels, the company will run on benefit.

This chart is showing that if we compare the cost of both prefabricated wall and concrete wall, it has been found that if we make more than 4500 square meters of prefabricated boundary wall, then our prefabrication industry is right to setup. Which will cost Rs. 9,81,180 & after constructing 4500 square meter of me prefabrication panels, the company will run on benefit

8. REFERANCES

- [1] Julian Thamboo 1, Tatheer Zahra 2 , Sathees kumar Navaratnam 3,* , Mohammad Asad 2 and Keerthan Poologanathan 4, Prospects of Developing Prefabricated Masonry Walling Systems in Australia (2021).
- [2] Giuseppe Margani 1, Gianpiero Evola 2 , Carola Tardo 1,* and Edoardo Michele Marino 1, Energy, Seismic, and Architectural Renovation of RC Framed Buildings with Prefabricated Timber Panels (2020).
- [3] N.Dineshkumar1, P.Kathirvel2 Comparative Study on Prefabrication Construction with Cast In-Situ Construction of Residential Buildings (2015).
- [4] Dezhi Zou1,2* , Cheng Sun1, Analysis for Thermal Performance and Energy-Efficient Technology of Prefabricated Building Walls (2019).
- [5] To find out the UPPWD Govt. 2020-21 Schedule of Rates Material Cost and Labor Cost.
- [6] Find the minimum thickness of concrete using code IS 456:2000.
- [7] Ravijanya Chippagiri 1,* , Hindavi R. Gavali 1 , Rahul V. Ralegaonkar 1 , Mike Riley 2 , Andy Shaw 2 and Ana Bras 2, Application of Sustainable Prefabricated Wall Technology for Energy Efficient Social Housing (2021).