



Survey on Equipment On Profitability based on Prefabrication Technology

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Abstract : Construction materials consists more than 50% of the total cost of the project. Efficient materials management plays a key role in the successful completion of the project within estimated cost and time. In seminar to explore current practice of material management to construction project and Inventory control techniques such as ABC classification and EOQ analysis are performed to maintain the inventory in an optimum level and S curve Analysis performed to compare the Actual work performed cost and budgeted cost of work performed. By applying inventory control techniques such as ABC classification and EOQ analysis the stock out problems of some A-class materials can be avoided. After the application of ABC and EOQ analysis, the total cost of inventory will be reduced. ABC and EOQ analysis applied to maintain sufficient stock in inventory and any given point of time, to protect the material in the inventory against damage, to reduce inventory holding cost, to overcome stock problem and to maintain the inventory in an optimal level.

Keywords: Prefabricated elements, sustainable construction, environmental protection, profitability

I. INTRODUCTION

General Prefabrication has been widely regarded as a sustainable construction method in terms of its impact on environmental protection. One important aspect of this perspective is the influence of prefabrication on construction waste reduction and the subsequent waste handling activities, including waste sorting, reuse, recycle, and disposal. Never the less, it would appear that existing research with regard to this topic has failed to take into account its innate dynamic character of the process of construction waste minimization; integrating all essential waste handling activities has never been achieved thus far. This report proposes a dynamic model for quantitatively evaluating the possible impacts arising from the application of prefabrication technology on construction waste reduction and the subsequent waste handling activities.

Aim and Objectives:

Aim:
The aim of the research is to check the profitability that prefabrication implementation can bring in the construction industry. This topic aims to propose the possible impact arising from the application of prefabrication technology on construction activities. Prefabricated building and structure are mounted from uniform prefabricated three-dimensional units, providing strength, pre-set thermal properties of structures, dynamic stability, immutability of geometric dimension of prefabricated elements during their manufacture, transportation and installation in special and difficult conditions. The main aim of this project is to identify the use of prefabricated elements in construction industries and to carry a comparative analysis of cost and duration on the site using MSP software.

Objectives:

- To study construction process of prefabrication systems.
- To compare prefabrication construction with conventional construction in terms of cost, work breakdown structure and feasibility.
- To identify the cost benefit analysis to change parts of RCC building with prefabrication parts for instance doors and windows frame, prefabrication walls, w.c., bath.

II. NEED FOR PROJECT

Prefabrication is one of the key elements of industrialization in construction. • Prefabricated construction methods are presenting a range of techniques to improve the building construction, quality and how to reduce the negative impact of building production on the environment. Prefabricated structures are used for sites, which are not suitable for normal construction method such as hilly region, and also when normal construction materials are not easily available. • PFS facilities can also be created at near a site axis done to make concrete blocks used in plane of conventional knick. • Structures which are used repeatedly and can be standardized such as mass housing storage sheds, godowns, shelter, bus stand security cabins, site offices, fool over bridges road bridges. Tubular structures, concrete building blocks etc., are prefabricated structures.

III. LITERATURE SURVEY

Prefabricated construction, or “prefab,” is a method of construction that is becoming increasingly popular all over North America, especially in places like Los Angeles and Arizona. This strategy uses components made off-site in a factory, which are then transported put together on-site to create a structure. There are a couple different popular forms of prefab with different benefits to offer. Depending on your specific construction project, you may want to consider implementing some of these options. We’ve pulled together information about the different kinds of prefab as well as the benefits of using this strategy in order to help you decide.

‘To Study Impact Of Prefabrication On Profitability Over Traditional Construction- A Review’ Nitesh j Ramchandani (2019) Prefabrication helps in terms of its impact on environmental protection and widely regarded as a sustainable construction method. The goal of prefabrication is to offer a way to get a well-designed building that is at least roughly tailored to resident needs. It could be stated that prefabrication system in building construction have the most effect on time and cost. One important aspect of this is the influence of prefabrication on construction waste reduction and waste handling activities including waste sorting, reuse, recycle, disposal. In recent research this topic has failed to take in to account its character of the process of construction waste minimization; integrating all essential waste handling activities has never being achieved. Prefabrication to be used to create a bland, monotonous landscape is an issue that developed countries’ construction professionals must grapple with. Countries such as India are undoubtedly suffering a greater banality in the built environment by embracing prefabrication. Prefabrication is touted as offering a more sustainable solution to building, but developing counties already rely on vernacular practices for design and construction that require relatively low life cycle energy.

Following are the main findings from above: • Evidence from several studies showed that precast concrete construction, besides the improvement of a building’s sustainable performance, include shortened construction time; overall reduced costs; enhanced quality and durability; improved health and safety, conservation of materials and energy; waste reduction; and finally reduced environmental emissions.

‘Evolutionary Analysis of Prefabrication Implementation in Construction Projects under Low-Carbon Policies’ Qianqian Shi et.al. (2022) In prefabrication, building components are manufactured in factories and transported to the construction site for installation. This approach improves construction efficiency and quality, and reduces labor requirements and resource consumption. It is found that prefabricated buildings achieved an average of 15.6% embodied carbon reduction and 3.2% operational carbon reduction compared to conventional buildings. However, little attention has been paid to evaluating the influence of the mixed low carbon and subsidy policy from the government on prefabrication implementation.

Following are the main findings from above: • In different periods of market development, the government should adopt different policies. • The subsidy policy should be biased towards the prefabricated market that needs to improve its maturity.

An Analysis on Promoting Prefabrication Implementation in Construction Industry towards Sustainability , Zezhou Wu (2021). The construction industry contributes significantly to global economic growth. However, its rapid development also produces adverse effects on the environment. According to the International Energy Agency, the most energy consumption and CO2 emissions come from the building industry. Besides severe environmental damage, conventional construction methods could also cause economic and social issues, such as long construction periods, low labor productivity, and a high frequency of safety accidents.

Following are the main findings from above: • The findings of this study help readers holistically understand the current status of prefabrication implementation, including its technology development, impacts on the sustainable development of the construction industry, promotion strategies, and future research directions. • The study makes contributions to both the body of knowledge and various stakeholders.

Impact of Prefabrication Technology and Equipment On Profitability. Mrunali Neskar et.al. (2020) Prefabrication is the Practice of assembling components of a structure in a factory or other manufacturing site and transporting complete assemblies to the construction site where the structure is to be located. The practice of prefabrication is popular in foreign countries and the interest in prefabrication in India has been increasing in recent years, India still shows reluctance towards this adoption. But it is gradually being adopted by a lot of developers, builders and contractors because of obvious advantage. At present precast concrete buildings are the advanced construction techniques available over worldwide. Being its wide applicability, the total precast concrete buildings systems are becoming a popular choice for many construction. Precast concrete available in many shape, sizes, including structural elements and unreinforced pieces. The prefab industry is the backbone for the development of new ideas in construction business of

any country; Factory buildings, residential buildings and the industrial township are needed practically by all the sectors, either to support the manufacturing or services of any industry.

Following are the main findings from above: • The main advantage of prefabrication is saves construction time, reduces construction waste, together with increased quality. • It is remarkably seen that the cost of building constructed using prefab technology is significantly less and duration of construction is also much lesser as compared to traditional method. • The prefab construction method helps in reducing the adverse impacts on the environment and offers an environmental friendly construction.

IV. BASIC CONCEPT

4.1 Prefabrication

It is the practice of assembling components of a structure in a factory or other manufacturing site, and transporting complete assemblies or sub-assemblies to the construction site where the structure is to be located. The term is used to distinguish this process from the more conventional construction practice of transporting the basic materials to the construction site where all assembly is carried out. It is not generally used to refer to electrical or electronic components of a machine, or mechanical parts such as pumps, gearboxes and compressors which are usually supplied as separate items, but to sections of the body of the machine which in the past were fabricated with the whole machine.

Prefabricated parts of the body of the machine may be called 'sub-assemblies' to distinguish them from the other components.

4.2 Process of Prefabrication:

An example from house building illustrates the process of prefabrication. The Conventional method of building a house is to transport bricks timber, cement, sand, Steel and construction aggregate etc., to the site, and to construct the house on site from these materials. In prefabricated construction only the foundations are constructed in this way. While sections of walls floors and roof are prefabricated structures with windows and door frame included and transported to the site lifted in to place by a crane and boiled together.

V. CONCLUSION

The study of prefabrication process is done which finds that prefabrication reduces activities related with repetitive body movements, ergonomic challenges & ergonomic problems & workers reported that use of prefabrication preassembly reduce hazards related to material handling on site & that reduction of scaffoldings through use of prefabricated preassembly or precast components would lead to less fall on site. By changing parts of RCC building with prefabricated parts like prefabricated walls, w/c, bath, doors & window frames we come to conclusion that prefabrication construction reduces time as well as cost required to project for completion and it can be successfully applied on the construction site.

VI. REFERENCES

1. Abhishek K.Taware 'Prefabrication, Sustainable Technique in Building Construction' Volume 1, Issue 2, February 2017.
2. Aki Aapaoja "the Challenges of Standardization of Products And Processes In Construction" Proceedings IGLC-22, June 2014.
3. EvanjalineLibie "Impact of Prefabrication On Profitability Over Traditional Construction" ISSN: 2455-5797 Vol. (2), No. (3): June 2016.
4. Elzbieta Radziszewska -Zielina, Monika Glen. "Studies of the Prefabricated Housing Construction Market in Poland" Journal of Civil Engineering Vol. 9, Issue 2, 2014.
5. Gerhard Girmscheid, "Industrialization in Building Construction – Production Technology or Management Concept" Vol. 8, Issue 1, 2012.
6. H. W. Lee "Macroeconomic Labor Productivity and Its Impact on Firm's Profitability" Journal of the Operational Research Society August 2013.
7. Hamza Khan "Study on the Trends & Usage of Prefabrication and Modularization: Increasing Productivity in the Construction Industry" ISSN 2278-3652 Volume 8, Number 2 (2017).
8. Hong Xue "Factors Affecting the Capital Cost of Prefabrication—A Case Study of China" Published: 24 August 2017.
9. M. Muhammed Ansar T.Subramani, "Impact Of Prefabricated Technology & Equipment On The Profitability Using Primavera" ISSN 2278-6856 Volume 6, Issue 3, May - June 2017.
10. Mohamed Nor Azhari Azman "The Perspective View Of Malaysian Industrialized Building System (Ibs) Under Ibs Precast Manufacturing" The 4Th International Engineering Conference 2012.

11. N.Dinesh kumar “Comparative Study on Prefabrication Construction with Cast In Situ Construction of Residential Buildings” ISSN 2348 – 7968 ,29 September 2016.
12. Ong Ying Rui1 “The Productivity Rate of Prefabricated Pre-Finished Volumetric Construction (PPVC)” Construction management Vol 2, November 2016.
13. Omid Reza Baghchesaraei “Behavior of Prefabricated Structures in Developed and Developing Countries” ISSN 1229 – 1234 Vol. 85, 2016
14. T. Subramani “Impact Of Prefabricated Technology And Equipment On The Profitability Using Primavera” Volume 6, Issue 3, May- June 2017.

