

Barriers for Implementing Lean Concepts in Indian Construction Industry

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Abstract— Lean construction is as an effective management tool to enhance the productivity in construction field. Large research is being done in recent past and is an ongoing process to adopt lean principles from manufacturing industry to the construction industry. In order to improve the efficiency, reduction of waste, the lean construction has been introduced as new management tool. There are many challenges in implementing the lean concept in construction industry in India. Due to lack of attention and illiteracy towards the lean management principle, stake holders associated to this like builder, contractor, and engineering and project management firms etc. are still in process of adopting this principle for construction project. In this paper efforts are made to find out main barriers towards the implementation of lean techniques in Indian construction industry with the help of questionnaire survey. For that 30 construction companies were visited, and Questionnaire data analysis were done and graphically plotted. It also explains in detail about the concepts of lean, its principles, wastes in the construction sector, Application of lean in Indian construction industry and Benefits of lean.

Keywords— *Lean techniques, Value added activities, Value Specification, Flow, Perfection.*

I. INTRODUCTION

Lean construction is termed as a “Way to design production systems to minimize waste of materials, time, and effort in order to get the maximum amount of value”.

Lean in its simplest form means eliminating waste from every aspect of the work process while ensuring that value-adding activities are completed in the most efficient and time-effective manner. Lean has been successfully applied in all sectors of business, service and project delivery, resulting in improved performance in quality, time, cost and bottom line profit. Lean also helps organizations to develop their people, at the same time creating a culture of continuous improvement. In Indian construction industry, availability of skilled labors is a major problem. Due to the unskilled labor and poor workmanship, sometimes the quality of the project is in question. To avoid such a problem, and to build a quality, construction firms require use of latest innovative technology. One of such a technique used in the study is called lean management. Lean management helps in addressing the problems related to labor and some other problems related to construction quality. The implementation of lean techniques in the construction industry will help in increasing the profit and quality of project in reasonable time. The main prospect of lean management principle is "Drive

more value by using less of everything”. But they are many challenges faced for implementing lean concepts in our Indian construction industry

A. Objective

- The aim of our project is to find out the barriers in the construction sector for the implementation of lean concept by questionnaire survey
- In order to minimise the waste and duration of the project period when compared to conventional method, the usage of lean construction should be adopted.
- The quality of the construction should be achieved efficiently.

B. Scope

The scope of research are as follows

- To implement the method of lean construction not only for larger constructions as well as small scale construction projects after finding the barriers
- To eradicate the waste completely during construction and to increase the profit
- To reach this lean concept all over the developing countries
- To improve the value creation that is what the client really wants successfully from the owner

II. BRIEFING ON THE AREA OF STUDY

It includes Collection of references like journals, technical reports and books. Data's obtained from internet, past studies, related researches, similar work details were chosen. These can be considered as good reference for examining and obtaining clear idea about the concepts. These data are essential for the successful completion of project. It includes the detail explanation about lean, its concepts, principles, various waste generated in construction industry, application of lean in Indian construction sector and Benefits of lean principles.

A. Concept of lean

Lean is a thinking that makes an evolution in management system and is accepted as standard system of management. The core idea of lean management is to eliminate every kind of waste found in production process to smooth workflow by early study of constraints and variances. A lean organization

understands customer value and focusses its key processes to continuously increase it. Lean focusses on what customers want not on what company can give to customers. Lean management system focusses to produce the right product at the right time in the right quantity for the customers and to provide exactly what he needs and nothing more with fewer resources.

B. Lean Principles

- **Value specification:** Precisely specify what creates value from the client's perspective
- **Value stream identification:** Clearly identify all the steps in the processes (value stream) that deliver exactly what the customer values and remove everything that do not add value to the customer.
- **Flow:** Take actions that ensure continuous flow in the value stream,
- **Pull:** This means to produce only what the customer wants just in time; and
- **Perfection:** Always strive for perfection by delivering what the customer wants and expects through a continuous removal of waste. Through process improvement to deal with the challenges in the construction.

C. Wastes in Construction

Wastes in the construction industry are in different ways. According to new production theory, wastes are from the equipment, material, labor or initial investment in large quantities. Overproduction, Waiting, Transportation, Unbecoming process, Movement, Inventory and Making imperfect products. Manufacturing and construction waste involve the excess cost of quality, time overruns, far distance, rework, lack of safety, unnecessary transportation, handling the materials & equipment, inspection, poor decision making and management strategies and requirements. Wastes are classified into process and operational waste. Process Wastes are produced through the over production, inventory, unbecoming process, transportation and making imperfect products. Operational Wastes are from unnecessary moving of equipment and people that is movement and waiting.

D. Application of Lean in Indian Construction Industry

In India, the awareness of lean concept is very low. The implementation of lean concept had not taken place in significant manner. Anecdotal evidence were discussed by the experts, they suggested the following reason for the non-adoption of lean practices in Indian construction industry.

- Resistance for changing
- Formal planning is avoided
- Issues related to HR
- Inadequate trained and skilled labour force.

The hurdles, training and awareness are overcoming by improving the proper implementation of lean construction in Indian Construction Industry. The pioneer organization for proper consultancy and training required for implementation

of lean construction technique in India are Indian Lean Construction of Excellence (ILCE) and Indian Institute of Technology, Madras (IITM). Lean concept is used any construction industry and we can minimize the cost, complete the projects in required time.

E. Benefits of Lean Principles

- Precisely specify value from the perspective of the ultimate customer.
- Clearly identify the process that delivers what the customer values. Delivering projects on time or in some cases ahead of schedule and eliminates all non-value adding steps.
- Crating a smooth workflow and eliminates the waste.
- Improving relations with vendors and improving customer satisfaction.
- Increases profit and market share.
- Pursue perfection by continuous improvement.

III. QUESTIONNAIRE SURVEY ANALYSIS

The questionnaire was prepared after thorough study of literature and by understanding the lean construction techniques with its advantages and challenges. Questionnaire consists of total 100 questions. All the questions are framed in yes/no type format so that it can be easily answered and wouldn't take much time. Some of the measure barriers are listed after studying the literature properly and are asked to scale from 1 to 5 in respect of their probability of occurrence. The questionnaire was filled by visiting 30 construction companies and taking interviews with professionals including contractors, site engineers, government employees, project managers etc. And they were requested to answer the same as per their point of view. The answers are analyzed on the probability of their occurrence and the most probable barriers are listed in the result. The answers to the questionnaire received were compiled so that we could get a clear view of most probable barriers.

There was a quick response from the consultants and contractors, but few other companies and government employees neglected to answer although they handle very large community and social projects. Most of the consultants are not aware of lean and but they think that it would be a good initiative for Indian construction industry to minimize the waste and time factor. The survey concludes that following are the major barriers for implementing the lean in Indian construction industry which needs to deal with as shown in Figure 1.

- Lack of lean awareness and understanding
- Human attitude issues
- Commercial pressure
- Lack of proper training for employees
- Lack of consultants available for guidance and implementation
- Long implementation time required
- Employee attitude issues

- Lack of proper communication between client and contractor
- Fragmentation and subcontracting
- Financial issues

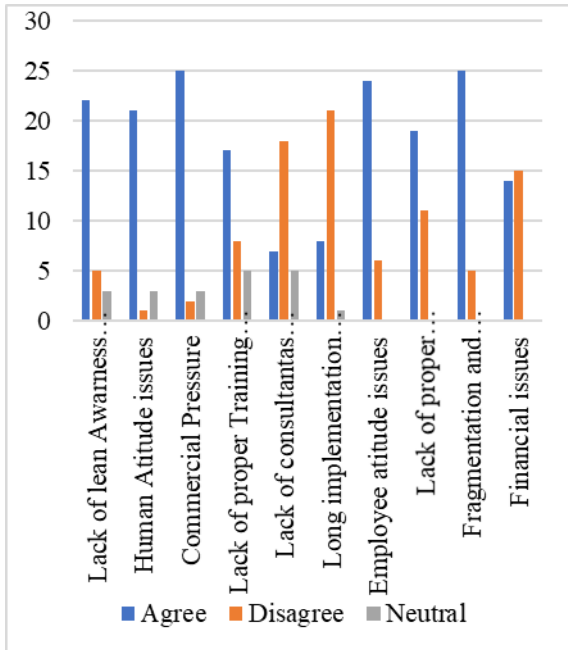


Fig 1 Analysis of questionnaire

The chart shows the responds of 30 construction companies towards 10 barriers listed. The X-axis shows the number of respondents and the Y-axis represents the barriers. Most of the companies are facing lack of lean awareness and understanding. Even after the implementation of lean it will

take little bit time for efficient success since it will take time for the employees to cooperate with the new methods and principles.

IV. CONCLUSIONS

From the study, it is concluded that about 80% of the respondents are not aware about lean tools and techniques, and more that 80% of the companies are facing commercial pressure which cause delay in actual project duration. Lack of communication by the contractor, changes carried out in issue orders by the owner and discrepancy in delivering documents, are further other issues. Using this paper, a brief description about lean can also understood.

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