

## **ADVANCES IN CONSTRUCTION: LEAN CONSTRUCTION FOR WASTE MINIMIZATION- A REVIEW**

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*Abstract: Construction industry is one which suffer low productivity and high case of cost and time overrun. Most construction companies even multinational also suffer same problem. This paper includes literature review of such a literate which include lean principles and lean implementation in industry and results of different case study. Lean philosophy can help to improve productivity and trace the progress flow in the construction production as well as construction execution work.*

**Keywords:** Construction execution, Lean philosophy, Lean principles, Productivity

### **INTRODUCTION**

The construction industry is one which suffer low productivity and implementation of new technologies. The traditional approach in current competition cannot meet with desire quality and cost as well as time. Many projects including multinational companies also suffer time and cost overrun as well as poor productivity.

Lean concept was developed by the Toyota manufacturing at the end of 1930 when local market was dynamic and demand of customer were varying with short duration. Lean concept and principles are used to develop and maintain the monitoring system to identify the non-value adding activities. Trapping and removing non-value adding activities will help to reduce waste and improve the quality and value of project to maintain the customer value.

### **LITERATURE REVIEW**

Womack and Jones describe Lean thinking as “a cycle of five guiding principles where the implementation of the first four lead to achieving the fifth, and ultimate goal is to get minimum waste.”

*The principles are described below:*

#### **1. Identify the value stream**

This process to identifying all the steps in the process of production and manufacturing industry. This is about identifying all the steps in the value stream in order to determine activities that do not add value and seek for their elimination.

#### **2. Make value flow without interruption**

This is done by minimizing delays, inventories, defects and downtime.

**3. Use pull logistics**

All components and information are made and supplied at the necessary time to deliver the product or service to the customer at exactly the time the customer wants it.

**4. Pursue perfection**

Lean consists of continuously improving through collaboratively identifying and removing wastes to provide the desired results.

According to Chick G. et al, “waste is more than the physical wastes that are the focus of construction site activity, in fact waste is any activity (or inactivity) that does not add value to the product or service”.

According to Dulaimi and Tanamas, managing construction under lean construction is different from typical contemporary practice because it:

1. Has a clear set of objectives for the delivery process is aimed at maximizing performance for the customer at the project level
2. Designs concurrently product and process
3. Applies production control throughout the life of the project

The lean principles were developing for the production industry to minimize the wastes and non-value adding activities to the process and maintain the customer values. In the paper the author apply the lean principle on the cement industry using Taguchi orthogonal array to identify the different variability that can occur within the cement production. In the paper author identify the main variables and factors that control the system. Author develop the system of process streaming on the cement industry to understand the system and non-value adding activates and develop the recommendation index to eliminate and minimize non-value adding activates.

To identify the barriers to implement Lean Principles in the Indian construction industry the author did research in India and author prefer the methodology of the questionnaire survey in the region and identify the factors which affect most on the implementation. In the research, major factors/ barriers are Lack of exposure on the need for lean construction and uncertainty in the supply chain.

L&T prefer the lean and green technology, to understand the benefits of implementation of green and lean method in construction, in the paper author did case study on the ongoing project of L&T, they apply 5-S model to minimize and identify the wastes in the project.

NO.	Description	Detail	Factor
1	Sort	Distinguish item before work “What is needed? and What is not?”	Organization
2	Set in order	Place the things in right way and right manner	Orderliness
3	Shine	Clean the work place, tools and equipment for working and organizing	Adherence
4	Standardize	Maintain and monitor the above processes to achieve safe environment for work	Adherence
5	Sustain shitake	follow to the rules and regulations for long term operation to maintain uniqueness for reverse analyses	Self-discipline
6	Safety	Safety and security at workplace	Safety of human

## CONCLUSION

Through the reference of the literature,

- Many people in the industry doesn't know about the lean concept and theory
- Lean concept is help to identify the wastes in the continue production industry as well as construction industry.
- Implementation of lean concept in the Indian construction industry have some barriers in which management and administration factors are main.
- Lean concept can help to implement new technologies in the construction industry and forced them to think over the conventional approach of construction industry.

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