



Application of Principles of lean management in Construction Industry, A technique in the Indian construction industry

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Abstract— The construction industry has been severely vexed by several problems, and one of the major attributors being ‘the construction waste’. There is a severe need for identifying the sources of wastes and to improve the competence and to cut back on these wastes. For this Lean construction and its tools have been introduced as a new management principle for better implementation. These include reducing variability in production and production cycles. The tools that shall be used to achieve this include following a push-pull approach, use of multifunctional, multi skilled teams, and scrutiny of the following by just in time schedules. There are countless challenges in the implementation of lean concept in construction industry. The implementation of lean management in Indian construction industry is scarce. Due to lack of attention and illiteracy towards the lean management principles and application of its tools the owner, contractor, engineers etc. are still acquiring training to implement this principle in their projects. This project mainly focuses on to identify the possibilities of implementation of lean management in construction industry. It will be achieved by preparing the questionnaire and also conducting the interview with the project personals like top management, engineers and site supervisors etc., via cyber mass media. The questionnaires shall then be evaluated to adopt the best suited techniques through statistical methods. This paper focuses on the possibilities of effective utilization of lean management principles in construction industry, which can surely increase the quality of work and profit rate by eliminating the wastage of material.

Index Terms — Lean, construction, management, implementation.

I. INTRODUCTION

In India, the second largest industry after agriculture (Lascar and Moorthy 2004) is the construction industry. It is diversified and involved in all pellet of construction like as following:

- Roads
- Railways
- Urban infrastructure
- Ports
- Airports

To improve the productivity in construction industry, lean

construction has been introduced as a new management approach. Lot of researches is going on towards the lean concepts and principles to get results of the successful adaption of lean ideas from car manufacturing industry to the construction industry. The construction companies struggling to transform their current forms of project Objective of the study

The following are the objective of the project:

- To sketch the implementation of lean techniques;
- To determine the source of wastes classified under lean construction industry;
- Identify the general perceptions of the conventional construction industry with the lean construction principles of practices;
- Methods to reduce and eliminate wastes;
- To examine lean construction in India and performance improvement in construction organizations, activities.

II. DEFINITIONS

Lean: The core idea is to maximize customer value while minimizing waste. Simply, lean means creating more value for customers with fewer resources.

Construction: Building construction is the process of preparing for and forming buildings and building systems. Construction starts with planning, design, and financing and continues until the structure is ready for occupancy.

Management: The organization and coordination of the activities of a business in order to achieve defined objectives. Management is often included as a factor of production along with machines, materials, and money. According to the management guru, Peter Drucker (1909-2005), the basic task of management includes both marketing and innovation.

III. BACKGROUND ON LEAN MANAGEMENT

A. Origin of lean principles

The credit of the development of the lean principles goes

to the Toyota Car Company of Japan which has remodeled the way of manufacturing of automobiles. From the mass production theory which was being followed by Henry Ford by US, the manufacturing industry today has certainly come a long way. But before unfolding the contributions of Toyota in the development of lean principles, it is important to find out the reason behind the need of a new manufacturing technique when Ford was going great guns in delivering the customer a cheap and yet an efficient product.

B. Overview of Lean Management

The lean management principle was first originated by Japanese manufacturing industries (Toyota Car Company). It was implemented by a researcher named John Krafcik in the year 1988.

C. Lean Construction

Lean construction is defined as the continuous process of eliminating waste, meeting or exceeding all customers Requirements, focusing on the entire stream and pursuing perfection in the execution of the project work.

D. Waste Elimination

Waste elimination is very important process in the construction industries to improve the quality and value of the project. Waste may be produced directly or indirectly during the construction activities in the construction industry.

IV. LITERATURE REVIEW

Daeyoung Kim, Hee-Sung Park (2006) had analyzed about assessment of lean construction principles, techniques and concepts for better implementation and to get results of the successful adoption of lean ideas from car manufacturing application in the construction industries [1]. Eic Johnansen, Lorenz Walter (2007) had done questionnaire survey among the German construction companies to discover the current understanding of lean principles and perceptions of lean and trends in lean development [2]. Sepani Senaratne, Duleesha Wijesiri (2008) carried out Lean Construction as a strategic option: Suitability and Acceptability in Sri Lanka study to explore the suitability and capability of Lean Construction in Sri Lanka. The study adopted an opinion survey using Delphi Method to collect empirical data [3].

V. RESEARCH METHODOLOGY

The following methodology shows figure (a) is proposed to analyze and implement the lean management principles in construction industry:

Literature Review

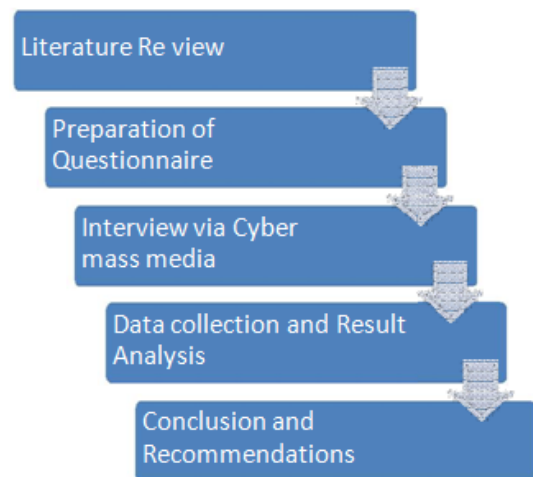


Figure (a)

B. Identification of waste

In this step, the wastages that shall be generated during the project are to be identified and examined, causes are analyzed. Based on the questionnaire survey collected from the companies they shall be batched together and mapped related to their usage and divided into seven categories as follows:

- Resource Wastes
- Management related Wastes
- Design related Wastes
- Operational related Wastes
- Wastes due to Labor
- Waste while Procurement
- Miscellaneous Wastes

Resource Wastes:

The resource wastes (cement, brick, steel etc) are the major problems in the construction sites. It happens frequently at all sites because of negligence of unskilled labors.

Management Wastes:

The management related wastes comprise of slow decision making processes, poor coordination amongst project participants, poor planning and scheduling, poor provision of information providing to the members related to the various activities etc.

Design Wastes:

Mostly it happens due to errors in contract documents, incomplete at the commencement of project, change in design after commencement of project. Designers have to be compelled to incorporate explanations of specifications in every material and element that's

required within the contract. Sometimes, ordered material cannot attain the location on time, forcing them to use substitute material due to very short time. Within a restricted time, designers are susceptible too pt for material that's low in quality rather than the initial demand.

Operational Wastes:

Operational wastes mainly happens due to erroneous practices by some trade person or laborer, faulty equipments, equipment frequently breaking down, uncertain equipment, harsh climatic conditions, accidents, damages caused by subsequent trades, use of incorrect material requiring re placement etc.

Laborer Wastes:

Every year, owner operators, engineering, procurement, and construction companies, and contractors are hit with billion s of dollars in construction claims (direct and indirect costs) as a result of inefficiency factors impacting labor.

Procurement Wastes:

Ordering error, over ordering, under ordering, suppliers error, damage during transportation to site, inappropriate storage etc causing the wastage while procurement.

VI. DATA ANALYSIS:

The gathered data from all the sites needs to be analyzed by using Statistical Methods and each waste parameter shall then be graded and the most damaging waste shall be identified and necessary actions could be taken.

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