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"Implementation of Lean Construction Techniques to Minimize Cost and Time of Project."

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Abstract - *This paper aims to evaluate Lean Thinking applications possibilities concerned with the construction job site flows, by identifying the potential of using lean principles to structure implementations, seeking broader results. From one hand, previous studies indicate that it is feasible to use lean tools and techniques in construction sites. On the other, poor implementations of lean concepts are often observed when tools are implemented in isolation, without a full lean system perspective. In a manufacturing environment, mapping the value stream is an essential step in creating a lean endeavor, generally followed by the implementation of flow and pull tools. The authors argue that using the five lean principles is a step in the right direction also on construction sites, enabling the discussion of Lean Thinking applications from a rather fragmented and isolated view to a strategic point of view. Finally, the authors suggest actions for implementing available lean tools as part of a broader perspective, based on lean principles.*

Key Words* : *Lean Thinking, lean construction, construction management, construction site, flow and pull.

1. INTRODUCTION

Lean construction is a "way to design production systems to minimize waste of materials, time, and effort in order to generate the maximum possible amount of value," (Koskela et al. 2002). Designing a production system to achieve the stated ends is only possible through the collaboration of all project participants (Owner, A/E, contractors, Facility Managers, End-user) at early stages of the project. This goes beyond the contractual arrangement of design/build or constructability reviews where contractors, and sometime facility managers, merely react to designs instead of informing and influencing the design (Abdelhamid et al. 2008).

Lean construction recognizes that desired ends affect the means to achieve these ends, and that available means will affect realized ends (Lichtig 2004). Essentially, lean construction aims to embody the benefits of the Master Builder concept (Abdelhamid et al. 2008).One can think of lean construction in a way similar to mesoeconomics.

Lean construction draws upon the principles of project-level management and upon the principles that govern production-level management. Lean construction recognizes that any successful project undertaking will inevitably involve the interaction between project and production management." (Abdelhamid 2007)

Lean construction supplements traditional construction management approaches with (Abdelhamid 2007): (1) two critical and necessary dimensions for successful capital project delivery by

requiring the deliberate consideration of material and information flow and value generation in a production system; and (2) different project and production management (planning-execution-control) paradigms.

While lean construction is identical to lean production in spirit, it is different in how it was conceived as well as how it is practiced. There is a view that "adaptation" of Lean Manufacturing/Production forms the basis of Lean Construction. The view of LauriKoskela, Greg Howell, and Glenn Ballard is very different, with the origin of lean construction arising mainly from the need for a production theory in construction and anomalies that were observed in the reliability of weekly production planning.

Getting work to flow reliably and predictably on a construction site requires the impeccable alignment of the entire supply chain responsible for constructed facilities such that value is maximized and waste is minimized. With such a broad scope, it is fair to say that tools found in Lean Manufacturing and Lean Production, as practiced by Toyota and others, have been adapted to be used in the fulfillment of Lean construction principles. TQM, SPC, six-sigma, have all found their way into lean construction. Similarly, tools and methods found in other areas, such as in social science and business, are used where they are applicable. The tools and methods in construction management, such as CPM and work breakdown structure, etc., are also utilized in lean construction implementations. The three unique tools and methods that were specifically conceived for lean construction are the Last Planner System, Target Value Design, and the Lean Project Delivery System.

What is mean by Lean Construction –

Lean construction defined as "a production management-based project delivery system emphasizing the reliable and speedy delivery of value. The ultimate goal is to carry on the project while maximizing value, minimizing waste and pursuing perfection – for the benefit of all project stakeholders."

Need for Study-

It is observed that 5% to 20% of material wastage occurs on construction sites against the total material purchased on site. To maintain customer satisfaction in market, construction organizations must needs to provide speed, quality and economy in product to satisfy customer. Therefore the construction industries must needs to deliver product and service at minimum possible Rate and Time to customer to remain in business. To achieve minimum cost in constructions, industry must accept value of Lean Construction Techniques.

2. OBJECTIVE OF THE STUDY –

- To find reasons of time and cost overrun.
- To study how to minimize cost overrun.
- To identify effective techniques and implement it.
- To give results and conclusion.

3. METHODOLOGY –

- To prepare questionnaire survey for finding lean waste.
- To find major lean wastes from questionnaire survey.
- To identify lean waste from case study.

- To apply lean tools and techniques for minimizing lean waste.

4. Scope of Study –

- The area of this study is confined to the Indian construction industries that can be approached for the study of seven wastages and its control over the sites.
- The development of a process improvement methodology that can be implemented in any site.
- Application of the developed methodology to various sites to identify the problems in the industries.

Recommendations based on the site study conducted on the same methodology.

5. Outline of Thesis –

This report is divided into 4 chapters which describe the different information, or procedure conducted in this study.

Chapter 1:-

In this chapter introduction & some general information about 'Lean construction is given along the objectives of project work & also chapter includes brief details about Lean construction like what is lean construction.

Chapter 2:-

This chapter includes literature review including review of previous studies carried out by the researchers.

Chapter 3:-

Lean principles & tools are introduced which is important part of this project Comparison between Lean Production & Construction Lean Production & Construction are deeply studied.

Chapter 4:-

This chapter includes information of all surveys, case study, details of questionnaires that are made and their results. Case study includes identification of lean wastes.

6. Conclusion –

1. The area of this study is confined to the Indian construction industries the can be approached for the study of the wastages 7 its control over the sites.
2. The development of a process improvement methodology that can be implemented in any site.

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