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STUDY ON LEAN PRACTICES IMPLEMENTATION ISSUES IN INDIAN CONSTRUCTION INDUSTRY

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Abstract - Lean is a philosophical way of working, which emphasizes the removal of wastage within the process. Lean process emphasizes on getting the right things done in the right place at the right time in the right quantity. The objective is to achieve perfect sustainable work flow, while minimizing waste and maximizing the value of the final output. In 1980s' the Toyota Production System (TPS), has introduced the lean manufacturing concept and hence are considered to be the key originators of this philosophy. Over the years the concept of lean has made its way into many sectors and construction industry is one of them. For the successful implementation of the very same, the joint combination of technical and human elements i.e, socio technological design is essential. Lean culture can be influenced by a wide variety of contributing factors, which include, the professional and educational background of the people, the geographic location of operations, the longevity and experience of people working together and the practices adopted by the leaders within the organization towards the employees. Lean transformation of an organization includes instigating a sense of lean culture among the people of the organization. This transformation is intended to advocate a positive change in the organization. Our study focuses on identifying the factors that affect the adaption of lean culture by the employees. It also helps in understanding better about the barriers in the successful implementation lean principles. This paper also indicates that the existing organizational culture can be improved by identifying and focusing on those aspects that prove to be a hindrance in implementing lean principles. Some of the basic assumptions on which, the lean tools work are people will change when there is a need to change. It has been observed that more than 50% of change efforts fail to meet expectations, the studies reveal that the tools don't cause failures and similarly willingness to change, also does not cause failures, however a small combination of these two lead to failure. The crux of the current research focuses on understanding the aspects that prove to be barriers in lean practicing construction companies.

Key Words: Lean Principles, Implementation of Lean Techniques, Construction Industry, Factors influencing lean.

1.INTRODUCTION

Toyota way principle which is an equivalent term for lean thinking has gained popularity and has become recognized as strategic means that can substantially contribute to improving quality, productivity and other performance indicators. Attempts have been made to seek their implementation both inside and outside of manufacturing. The success in implementing lean practices can be attributed to various factors, including a shift in thinking, organizational behavior and the culture that focuses equally on waste elimination and development of human resource. The methodology of lean principle focuses on designing production systems, which ensures reduction in wastage of materials, time and effort resulting in highest possible value. The principal purpose of minimization of non-value adding activities can be achieved when the principles as well as practices of lean philosophy are not only the process oriented and people oriented. Similarly, the concept of value creation should also be process and people oriented.

A lean organization understands customer value and focuses its key processes to continuously increase the value of the output. The ultimate goal is to provide perfect value to the customer through a perfect value creation process that has zero waste. To accomplish this, lean thinking changes the focus of management from optimizing separate technologies, assets, and vertical departments to optimizing the flow of products and services through entire value streams that flow horizontally across technologies, assets, and departments to customers. Eliminating waste along entire value streams, instead of, at isolated points, create processes that need less human effort, less space, less capital, and less time to make products and services at far less costs and with much fewer defects, compared with traditional business systems. Companies are able to respond to changing customer desires with high variety, high quality, low cost, and with very fast throughput times. Also, information management becomes much simpler and more accurate.

A.RESEARCH AIM

The aim of this study is to examine how various factors affect the implementation of lean practices in the construction industry.

B.RESEARCH OBJECTIVES

The purpose of this research is to know, what is the level of awareness of lean practices and its implementation among construction management professionals. More specifically, this research has the following objectives:

- To evaluate and rank the various factors affecting the successful implementation of lean practices in construction industry.
- To identify the most predominant factor that affects the successful implementation of lean practices in the construction industry.

2.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 wants 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, labour 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.

3.QUESTIONNAIRE SURVEY ANALYSIS

A pilot study is a small scale preliminary study conducted in order to evaluate feasibility, duration, cost, adverse events, and improve upon the study design prior to performance of a full-scale research project. Pilot study are frequently carried out before large-scale quantitative research, in an attempt to avoid time and money being upon on an inadequately designed project. I carried out pilot study with the construction industry people across all the departments during our summer internship training period. As a result, various factors that affect the successful implementation of lean practices in the industry were identified.

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 .The lists are

- 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

4.RESULTS ANALYSIS AND FINDINGS

An exploratory research was conducted through questionnaire survey as a technique to analyze the issues in implementation of lean practices in the construction industry in the country, which is inclined towards the objectives of the project. This survey is circulated among the experienced individuals across different verticals within the construction industry. A total of 73 responses have been collected.

A.RELATIVE IMPORTANCE INDEX – RII

RII Calculation:

$$RII = \Sigma W / (N * A)$$

Where,

W = weighting as assigned on Likert's scale by each respondent in a range from 1 to 5,

A = Highest weight (here it is 5),

N =Total number in the sample(73)

Scale:

1- Strongly Disagree
2- Disagree
3- Neutral
4- Agree
5- Strongly agree

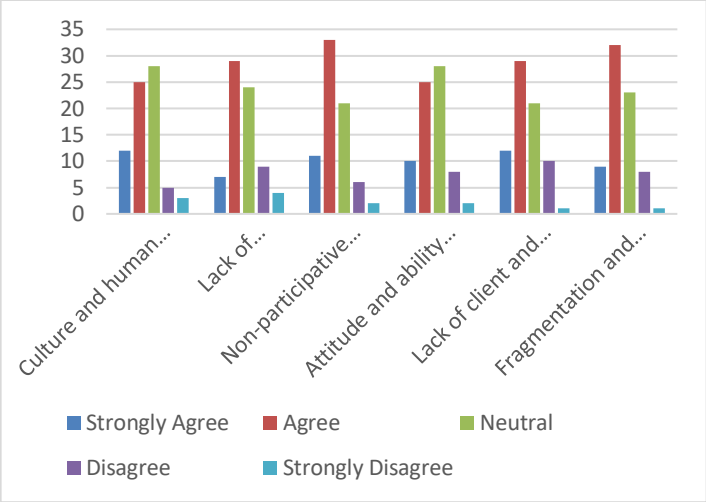
Barriers in implementing lean construction practices:

Table 1. RII for barriers in lean implementation

BARRIERS	No of responses	5	4	3	2	1	RII	Rank
Culture and human attitudinal issues (mindset issues)	73	12	25	28	5	3	0.704	4
Lack of commitment from top management	73	7	29	24	9	4	0.671	6
Non-participative management style for workforce	73	11	33	21	6	2	0.723	1
Attitude and ability to work in group	73	10	25	28	8	2	0.69	5
Lack of client and supplier involvement	73	12	29	21	10	1	0..	2
Fragmentation and subcontracting	73	9	32	23	8	1	0.71	3

Table 2. Ranking of barriers in lean implementation

BARRIERS	Rank
Non-participative management style for workforce	1
Lack of client and supplier involvement	2
Fragmentation and subcontracting	3
Culture and human attitudinal issues (mindset issues)	4
Attitude and ability to work in group	5
Lack of commitment from top management	6



Based on relative importance we have arrive the rank list of all barriers, from the above showed table (1.1) we understood, non- participative management is a main barriers of implementing the lean construction. Most of the people not Considered the lack of commitment from the top management barrier in lean construction.

We finally analysed using relative index formula Non – participate management style for work force is main barrier (shown in table 1.2) of implementing the lean construction in India.

5.CONCLUSION

The most predominant factor affecting the successful implementation of lean was found to be Non – participate management style of work force.

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.

6.REFERENCES

[1] O'Connor, R Swain, Implementing Lean in construction: "Lean tools and techniques – an introduction", CIRIA publications, ISBN: 978-0- 86017-732-6, 2013

[2] Remon Fayek Aziz, Sherif Mohamed Hafez, "Applying lean thinking in construction and performance Improvement, Alexandria Engineering Journal, 52, 679–695, 2013

[3] Richard Hannis Ansah, Shahryar Sorooshian, "Lean Construction Tools", International Conference on Industrial Engineering and Operations Management Detroit, USA, September 23-25, 2013

[4] S. Dinesh, R. Sethuraman, "The Review on Lean Construction An Effective Approach In Construction Industry", International Journal of Engineering Research and Modern Education, ISSN: 2455 – 4200, Impact Factor 6.525, Special Issue, April, 2017

[5] Tejas Vidhate1, Asst. prof Ashwini salunkhe, "General overview of Lean Management in Construction Industry", International Research Journal of Engineering and Technology, Volume: 05 Issue: 07, ISSN: 2395-0072, 2018

[6] Vinaya D. More1, Dr. Shrikant Charhate, "Lean Construction Techniques in Indian Construction Industry: Some Analysis", International Journal of Civil Engineering Research, ISSN 2278-3652 Volume 7, Number 1, pp. 59-65, 2016