

A Study on Performance of Project Management Techniques For Multi Storied Building

Joel Dominic D Almeida¹, Sundip Shenoy²

¹Dept of Civil Engineering

²Assistant Professor, Dept of Civil Engineering

^{1,2}NMAM Institute of Technology, Nitte, Karnataka, India

Abstract- Construction industries are facing a lot of difficulties these days. The success of any construction project is dependent on delivering the project with minimal time and cost overrun. A new management system known as lean construction has been employed in many countries effectively to increase the success probability of the project. This study inspects the efficiency of implementing lean thinking on the performance of construction projects.

Keywords- Lean Construction, Lean Manufacturing, Waste Elimination, Cost Management, Time Management.

I. INTRODUCTION

All over the world the construction industry is various numerous challenges. Construction industry are well known for they are over budgeted and delayed. This paper discuss the various difficulties that the construction industry faces like reduced quality, delay in implementation, over budgeted etc. A few of these problems have been solved by traditional construction techniques. The overall planning of the project is defined by constructing management to finish the project on time, within the budget and up to the targeted quality by appropriate resource assignment. The three trade-offs in a project i.e project cost, project time & project quality known as “Scope Triangle” is show in the below figure1. By combing the required tasks and necessary resources effective project management can be achieved to deliver the project within the specified time and planned budget. [2]

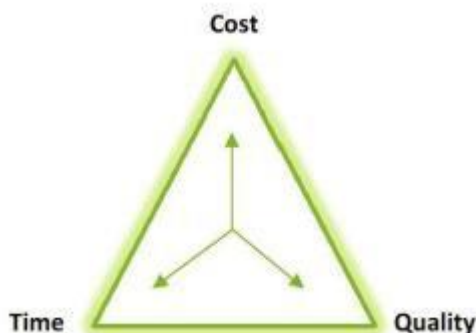


Fig. 1 Scope Triangle.

II. OBJECTIVES

- To conduct literature review.
- Try to plan and schedule the activities for selected project as per lean principles.
- Comparison between the plan and actual progress in site.
- To Carry out Cost & Time Management.
- Determination of current lean construction awareness and appreciation.
- Carrying out survey to know the current status of construction industry.
- Comparison between traditional approach and lean approach.
- Determination of waste activities in construction project.
- Trying to eliminate zero value activities.
- Implementation of lean techniques in construction.

III. CONSTRUCTION COST AND TIME OVERRUN

Table 1 Factors causing construction time and cost overrun

Category	Factors for Time and cost overrun
Material	Variation of costs of materials, delays in payment to contractor/supplier, inadequate Funds from sponsors/clients, variation orders and poor financial/capital market
Money	Financial problems of owner results in delayed payment to the subcontractor or supplier. It results in

	Delay of progress. Difficulties faced by the contractor due to shortage in cash flow because of poor financial control on site
Manpower	High labour cost. Skilled labour shortage. Severe Labour productivity.
Machinery	Equipment accessibility and breakdown. Delay in equipment delivery. Equipment scarcity.
Unexpected Circumstances	Irregular weather situations. Risk and ambiguity related with projects
Administration	Poor experience of Project Manager. Work Complexity. Software availability.
Engineering / Contract	Design changes. Contract documentation inconsistencies
Project Shareholders	Clash between shareholders. Poor performance of suppliers and subcontractors

IV. LEAN CONSTRUCTION PRINCIPLES



Fig. 2 the 5 Guide Principles of Lean.

To maximize project performance projects should be approached as production systems by changing the work structure in both design and construction. The end-users desired value is delivered by optimization of process through team work, waste elimination, developing continuously and satisfying the customer by lean principles.

Lean methodology follows 5 key principles.

- It is necessary to meet the specification and deliver as per customer requirements. The product or service value must be clearly defined. The customer should be the common interest for both the parties that are involved in the project [1]
- Value Stream Identification (Identification of value generating operations): Product delivery mechanism identification or service up to customer satisfaction

and to identify the level of customer satisfaction delivered. It represent the mechanism that delivers max vale to the customer by eliminating any zero valued activities. [1]

- Make the product flow, waiting is waste: The work stream is kept up by proper work arrangement. Waste minimization and customer value in increased by suitable work process in which the administration never stops over the whole value chain [1]
- Use a pull logistic: It implies delivering according to the customer need or in-line to the request of the customer (what the customer needs when the customer needs) [1]
- Seek perfection in all operations: Implementations of suitable techniques and consistent development to the process to maintain precision at all times [1]

V. ELIMINATION OF WASTES

Ineffectively managed system which cause extreme time and cost overrun result in waste generation. As much as 50% of the waste generated in construction projects is credited to inadequacies in design, procurement, material handling

The fundamental reason for lean construction is waste reduction. Waste reduction is the practice of removing the wastes from system in the initial stage itself to provide value to the customer with minimal resources. Types of wastes must be first identifies in order to eliminate the construction wastes The 8 types of wastes are as follows

- Defects
- Overproduction
- Waiting
- Non – Utilized Talent
- Transportation
- Inventory
- Movement
- Extra Processing

VI. VI. QUESTIONNAIRE

A Questionnaire was planned and circulated in one of the well know construction companies in Mangalore. It was designed to identify the major factors impacting project performance in construction and to quantify the knowledge of the employees about lean construction techniques in Mangalore.

Questionnaire Structure

The reason for this study is to recognize the knowledge about lean constructions techniques and standards in construction industry around Mangalore.

The Questionnaire is divided into 3 sections as follows:

Section I: To examine the background of the surveyee’s experience in construction Industry and general information.

Section II: To distinguish the elements that impact the general execution of the project in light of the present method employed and steps taken to diminish the weaknesses.

Section III: To Identify the surveyee’s knowledge about lean construction techniques and their application in the site.

Section I: This section examines information about the surveyee’s experience in the field and other general information regarding the conditions in the site. All the projects under survey were newly constructed projects.

1. Variation in orders by engineer or contractor [3]
2. Errors & improper construction leading to rework [3]
3. Improper & poor site management by contractor [3]
4. Financing problem for project by contractor [3]
5. Lack of communication between the Parties & Contractor [3]
6. Implementation of improper methods for construction [3]
7. Inadequate qualification of contractor staff [3]
8. Mistakes and discrepancies in design documents [3]
9. Poor detailing in drawings [3]
10. Project design complexity [3]
11. Material delivery delayed [3]
12. Changes in material specification and type during construction [3]
13. Material damage [3]
14. Low efficiency & productivity of the equipment [3]
15. Qualification of workforce [3]
16. Low Labour productivity[3]
17. Uncertainties in site [3]

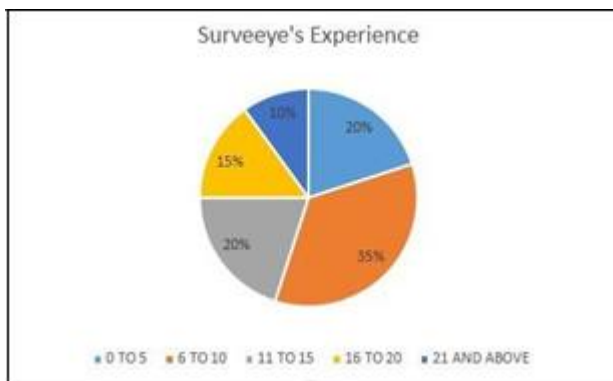


Fig. 3 Surveyee’s experience.

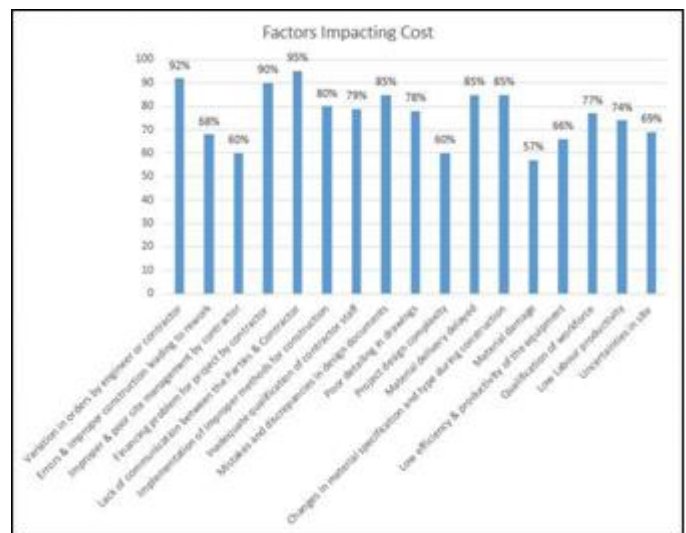


Fig. 5 Factors impacting cost



Fig. 4 Monitoring of unused and unnecessarily purchased goods.

Section II: This section examines the factors that affect the overall performance of the project on the basis of current practices

Major Factors Impacting the Cost & Time of the Project

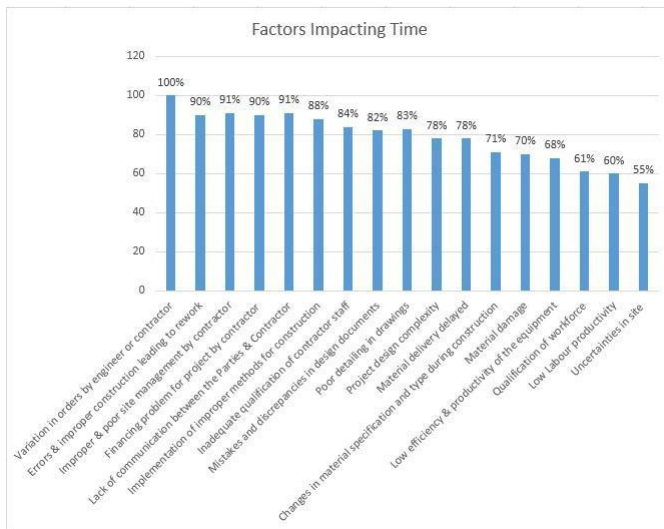


Fig. 6 Factors impacting time.

Section III: To identify the surveyee’s knowledge about lean construction techniques and their application in the site.

The questionnaire consisted of scale from 1 to 5 where 1 was marked very low and 5 was marked very high for possibility of implementing new techniques in construction & also for waste reduction.

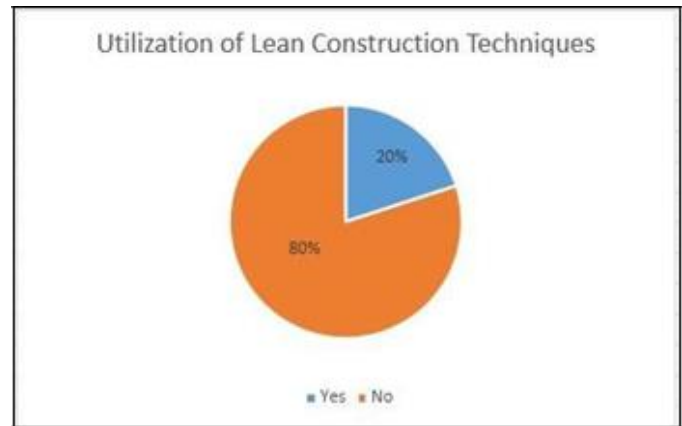


Fig. 9 Utilization of lean construction techniques.

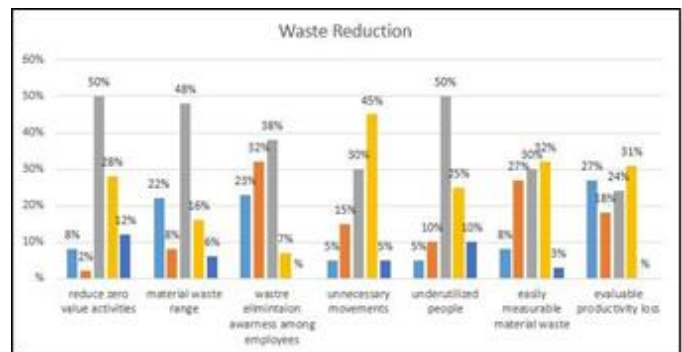


Fig. 10 Waste reduction.

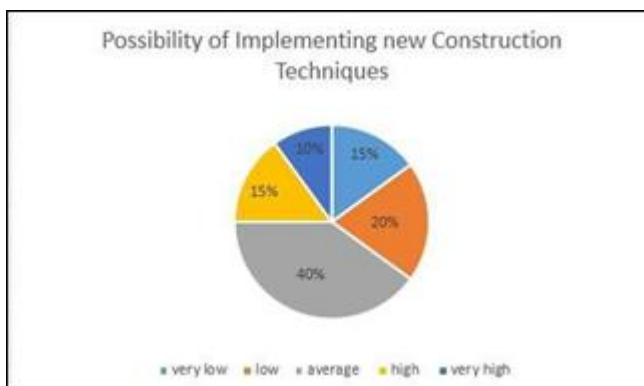


Fig. 7 Possibility of implementing new construction technique.

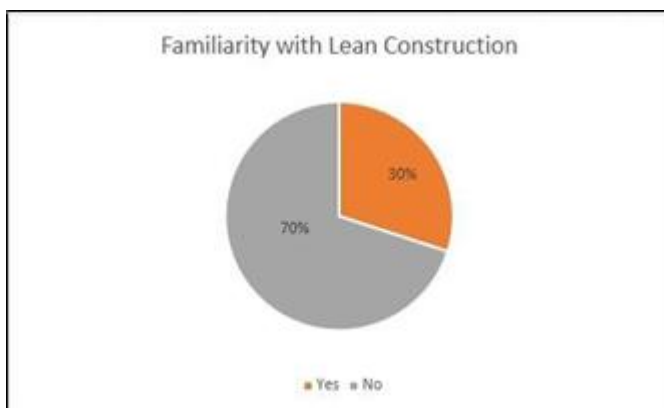


Fig. 8 Familiarity with lean construction

VII. CONCLUSION

1. In around 75% of the sites the unused and unnecessary purchased goods are not monitored.
2. Around 70% of the people in construction site are still not aware of lean construction techniques and only 30% of the people are aware of it.
3. Only 20% of the sites apply lean construction principles.
4. It was found that maximum of around 35% of the people working in the site had 6 to 10 years of experience.
5. Very high possibility of implementing new construction technique was merely 40%.
7. Only 20% of the sites utilized lean construction techniques in some ways where as 80% of the site have still not implemented the lean construction technique in any way.
8. The major factors impacting cost were variation in orders by engineer / contractor and lack of communication between parties and contractor.
9. The major factors impacting time was variation of order by engineer and contractor.

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