

A Literature Review on Application of Lean Principles to Identify Performance Improvement of Building Construction

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Abstract - India's 16% population is depending on the construction industry. There are so many other small industries which are depending on construction industry. The construction industry contribute 5% in the GDP of India by create assets worth over 200 billion. 40% of the development investment from last 50 years has been made in construction industry by Indian government. But the main reason behind the slow improvement of the construction industry is the cost and time overrun. Around 70% of the industry faces time and cost overrun during their construction period.

Key Words: lean construction site, time overrun, cost overrun

1. Introduction

The construction industry is facing so many changes from last many years, which are increasing competition, affecting to economy, productivity and quality. And because of it the productivity of the construction industry is reducing from many years. And the main factors or reasons behind this are cost overrun and time overrun.

There are many project management approaches have tried to improve performance in the construction industry. Lean construction is one of them. The main aim of lean construction is to design system to minimize wastage of time and materials to generate maximum possible amount of value. Lean construction is one of the new production philosophies which have the potential of bringing innovative changes in the construction industry. The principles and concepts of lean are to make the construction process leaner by removal of waste which is regarded as no value generating activities

1.1 Definitions

- A set of techniques to identify and eliminate waste from operations. System of organization principles to maximize value and eliminate waste.
- Yahya and Mohamad (2011) Lean construction is about managing and improving the construction process to profitability deliver what the customer needs by eliminating waste in the construction flow by using the right principle, resources and measure to deliver things right first time.
- Koskela (1992) Advantages of the new production philosophy in terms of productivity, quality, and indicators

were solid enough in practice in order to enhance the rapid diffusion of the new principles.

- Howell (1999) Lean construction is much like the current practice as the goal of better meeting customer needs while using less of everything.

- Lukowski (2010) Lean construction is the practical application of lean manufacturing principles, or lean thinking, to the building environment.

Waste: losses which can be time or money generated by any activities that generate cost (direct or indirect) but do not add value in final product

1.2 Principles of Lean

- Base management decisions on a long-term philosophy
- Create process "flow" to surface problems.
- Uses pull system
- Level out work load.
- Stop when there is quality problem.
- Standardize task for continuous improvement
- Use visual controls so no problems are hidden.
- Use only reliable, thoroughly tested technology
- Grow leader who live the philosophy.
- Respect, develop and challenge your people and teams.
- Respect, challenge and help your supplies.
- Continual Organization leaning though kaizen.
- Go see yourself to thoroughly understand the situation.
- Make decision slowly by consensus, thoroughly considering all options; implement rapidly

1.3 Advantages of Application of Lean

- Well manage team process
- Better management
- Increase team productivity
- Reduce cost
- Reduce waste
- Reduce total time
- Improve quality
- Add value to the final product
- Better risk management
- Improve safety
- Greater customer satisfaction

- Proper material management
- Proper labour management
- Inventory management
- Create continuous improvement cycle

2. HISTORY

After the 2nd world war IT companies of Japan were on the rebuilding phase and there is no chance of them to catch up with the other companies of world. At that time they introduce lean production. Lean pioneers, euji toyoda and taiichi ohno of the Toyota motors developed the principles of lean. The history says that Japanese companies almost catch up with America with in 3 years all because of lean. Japanese companies shift their focus to the product quality and for that they also equipped with good quality tools to achieve it. And this step goes very well. After the success Toyota production system presents an outline of the foundation of lean production.

3. METHODOLOGY

Time and cost overrun is the major problem in construction industry, for the solution of that author applies the principles of lean on the site and compare the result and analysis if there is any change in time and cost. These are the steps of the research

1. Visit the site on regular basis

This step is for site investigation or we can say that y this step one can hive general information about construction site. All the General information like budget, workers, location, etc are collected in this step

2. Collection of data

This step is all about collecting all the information about site activities. In this step the information about starting and ending time of activity, cost of material and material used are gathered.

3. Analysis of data and problem identification

The data which is collected in previous step is analyzed in this step. Timing and costing of activities are analyzed. After that the problem identification timing and costing is done

4. Application of lean principle

After the step of problem identification the application of lean principal on that is very important step. To reduce activities completion time and cost of activities the principle of lean are applied on next bunch of activities

5. Comparison of data

After the application of lean principle on the activities the data of completion time and cost were taken. After that data collection the comparison of first and second data is done.

6. Result

After analyzing comparison of first and second data author conclusion that application of lean principles on construction site can be helpful in reducing time and cost

4. CONCLUSION

The study which is taken after the application of lean principles on construction site clearly showed improvement compare to the initial situation. After application of lean principles it was possible to control time and cost overrun at some stage. The research shows that the result of application of lean principles is quite good. By Application of lean principles one can identify activities which are waste or non value adding. And by removing these activities we can improve time estimation. Also by removing those activities and after application of some lean principles we can improve cost estimation. At at the end the conclusion is application of lean principles is useful for timely completion of project at less cost show thinking of application of lean principles on construction site is welcomed.

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