

Comparative Study of Last Planner System Over Traditional Construction Processes

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Abstract - In India, the construction practices is operated in traditional way. Traditional construction processes have been always related with inefficiencies, poor management in terms of site management (Resources and materials), waste management, time, and cost overruns. Due to which, at times the expectations of end users and customers are not achieved. Most of construction industries are adopting concept of lean construction to maximize value and minimize cost and project time. This paper includes comparative study of last planner system which is a technique of lean construction to traditional construction management. This paper summarizes the detailed study of lean construction based on literature survey done over the lean and traditional management on construction project.

Keywords – Traditional construction management, lean construction management, Last planner system, Time waste, Cost waste.

1. INTRODUCTION

The term traditional work process can be literally common practice inherited from the long time of delivering the construction project based on fragmented work process. This practice has subjected the construction projects with the separation of aim and construction function. The efficiency of construction project is generally defined as the project should be constructed in minimum time and cost, other words is defined as a procedure that formed minimum or no construction waste with a good quality, non-value adding activities, good construction management, and monitoring and controlling construction flow. Indian construction industry is still running on old traditional construction management. Traditional construction processes always have been related with inefficiencies as it produced a lot of problems. Traditional construction process is always indicated by poor management in terms of site management like resources and materials, waste management and time and cost overruns. Current construction projects also, are not fulfilling the expectations of end users and customers.^{[1][11]}

The concept of lean production started in 1950 by Engineer Ohms, the person who committed to eliminating wastes. By inspiring lean production system

start a movement in lean construction at 1997 by forming lean construction institute.^[13] Lean basically focuses on decreasing time and cost by the elimination of waste. The traditional idea of negotiating with time, cost and quality does not exist in lean approach. Lean construction depends on the collaboration between the owner, contractors, facility managers, and building's occupants at early stages of planning. There are numbers of techniques available which helps to reduce the cost and time, including^[13]

- i. Increased visualization
- ii. 5s process
- iii. Daily huddle meetings
- iv. First run studies
- v. Fail safe for quality
- vi. Last planner system.
- vii. Value steam mapping

In above techniques the last planner system is one of the most effective techniques which provide operational planning to decrease the cost and time, also keeping the intense pressure for production on every activity because reducing the cost and duration of each step is the key to improvement. The lean construction is very beneficial for construction industry in India to improve the values of construction project and eliminate waste by saving time and cost.

2. TRADITIONAL CONSTRUCTION MANAGEMENT

The Indian construction industry gives tremendous power and resources during planning and developing the schedule, cost of project and other requirements that collectively tell project personnel what they “should” do. Project management thereafter monitors and enforce conformance of “did” to “should”. Project management at the beginning of the project is replaced by control during project execution.^[1]

Everything works well until someone causes the delay in his work, which in turn delays the entire chain or work process. The supplier fails to return on time, cause delay in activity, and late delivery to site.^[1]

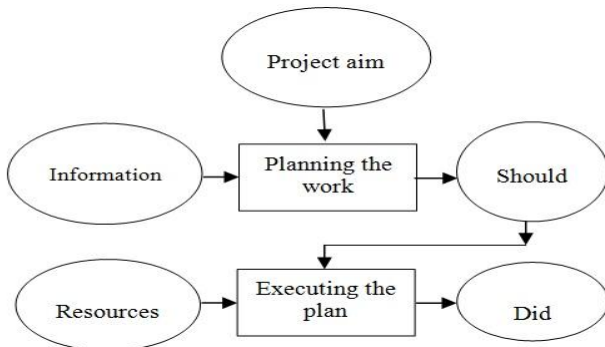


Fig.1. Traditional planning process [4]

3. LAST PLANNER SYSTEM [1][5]

The most of researcher indicates that Last Planner System (LPS) is a technique of lean construction, which gives sequence of work and project variability in construction. The Last Planner is the person/team assign for operational planning, which facilitate to improved sequence of work, completion of individual assigned task at the operational level. In the last planner system, the sequences of work including (master schedule, reverse phase schedules , six-week look ahead, weekly work plan, percent plan complete, Constraint analysis and Variances analysis) provides optimized schedule planning through a pull technique, sequence which matches work flow and capacity for executing work. It will achieve Should Can Will which is the key words weekly work plan “Should” indicates the work required to be done according to planned schedule requirement. “Can” indicates the work with can actually be accomplished on account of various constraints on the field. “Will” reflects the work commitment. Which will be made after all the constraints are taken into account. Various way to improve the work flow are included two-way communication, constraints analysis process for six-week look ahead before activity are executed, the analysis of reasons for variance after activity are completed, the efforts of each planner, and the guidance of the project team. Traditional practices do not consider a difference between what should, can, and will be done, the assumption being that pushing more tasks will result in better results.

The important function of the Last Planner technique is to change optimistic planning by evaluating workers performance of based on their skill to consistently achieve their commitments. The basic aim of Last Planner is to pull activities by reverse phase scheduling through team planning and minimize resources in the long-term. [11]

4. PROBLEMS IN TRADITIONAL CONSTRUCTION MANAGEMENT AND SOLUTION BY LEAN CONSTRUCTION MANAGEMENT [12]

Table (1) influencing factor in traditional construction process their type of waste and there remedial actions using lean principals

Sr. No.	Influencing factor	Type of waste	Remedial actions
1	a) Transportation of material and equipment. b) Worker waiting for material. c) Design changes.	1. Delay in time 2. Rework & Material wastage.	a) Arrange another temporary storage area in middle of the working area. b) Workers suggest bringing necessary, routine material in advance by the use of material/equipment check list.

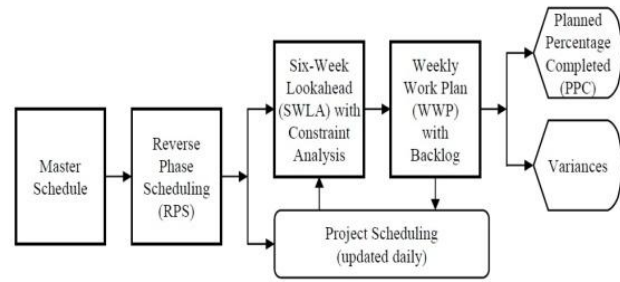


Fig.2.The Sequence of Last Planner Process [2]

3.1. Sequence of last planner system [9][10]

1. Master Plan

This is to obtain a general plan and identify all the work packages for the whole project showing the main activities, their duration, and sequence.

2. Phase planning

It is about dividing the master plan into various phases detailed work plan and provide aims that can be considered targets by the project team. Phase planning is a gap between the master plan and look ahead planning.

3. Look ahead Planning

In the look ahead planning management focusing and give attention on what is supposed to happen at some time in the future, and to take actions in the present that cause that future work.

4. Weekly Work Plan

This is the plan taken from the contractor tasks for the next day or week via weekly meetings. Weekly meeting help to plan the work that will be done in the next week. The weekly work plan meeting covers the weekly plans, safety issue, quality issue, resources, construction methods, and any problems that occur in the field.

5. Percent Plan Completed (PPC) & analysis of reasons for non-completed tasks

In this improving the project planning by continual evaluation and learning from stoppage. PPC is determining of the percentage of promises made that are delivered on time. PPC can be calculated as the number of activities that are completed as planned divided by the total number of planned activities, and it is presented as a percentage.

3.2. Benefits of Last Planner System (LPS) [10]

1. Smooth work flow.
2. Expected work plans.
3. Reduced cost.
4. Reduced time of project.
5. Improved productivity.
6. Greater collaboration with field personnel and sub contractors.

			<ul style="list-style-type: none"> c) Set up of assign material and equipment done by foreman. d) Provide movable storage trolley to transport necessary equipment and material
2	<ul style="list-style-type: none"> a) Unsynchronized processes. b) Excessive wasteful activities (like material shifting, late start of work). c) No standard procedure/method. d) Gap between planned work & actual achieved. 	<ul style="list-style-type: none"> 1. Delay in time 2. Material wastage Cost increase. 	<ul style="list-style-type: none"> a) The idea is not only to know about the delay, rather to detect, correct, & prevent the root causes, i.e. not only monitoring but also taking action and correct it.
3	<ul style="list-style-type: none"> a) A supplier does not supply the material on time. b) Variation in labour efficiency. c) Delay in payment of contractor. 	<ul style="list-style-type: none"> 1. Delay in time 2. Low productivity 	<ul style="list-style-type: none"> a) Value Stream is the way a Project is described in Lean terms, and all improvements are done to make the whole Value Stream better.
4	<ul style="list-style-type: none"> a) A supplier does not supply the material on time. b) Material mismanagement c) Rework due to design changes d) Poor quality. 	<ul style="list-style-type: none"> 1. Delay in Time 2. Wastage of Material due to rework. 	<ul style="list-style-type: none"> a) The sequential mode of planning changes too simultaneously with assigning tasks, an approach of teamwork and alteration is taken for the various agencies involved. b) Create standard procedure to be followed by all workers
5	<ul style="list-style-type: none"> a) Unfilled commitment. 	<ul style="list-style-type: none"> 1. Delay in Time. 2. Increased costs 	<ul style="list-style-type: none"> a) A progressive explanation of the value (customer) is done at different stages, flexibility is a major part for the project planning, and The Last Planner is used for planning.
6	<ul style="list-style-type: none"> a) Gap between planned work & actual achieved b) Assignment of inappropriate manpower. c) Proper manpower not assign by contractor for particular activity. 	<ul style="list-style-type: none"> 1. Delay in Time. 2. Wastage of Material. 	<ul style="list-style-type: none"> a) Pull and Flow are the Lean principles on which activities are planned for the project. It is enhanced by decentralized decision-making based on the Pull principles of Lean. It brings transparency in all activities.
7	<ul style="list-style-type: none"> a) Late arrival and early departure to/from construction area 	<ul style="list-style-type: none"> 1. Delay Time waste 	<ul style="list-style-type: none"> a) Encourage worker involvement in housekeeping issues. b) Performance-based incentive scheme might improve team work.

5. COMPARISON OF TRADITIONAL CONSTRUCTION MANAGEMENT TO LEAN CONSTRUCTION MANAGEMENT

Table (2) Comparison between traditional construction management and lean construction management

Sr. No.	Traditional construction management	Lean construction management
1	In traditional construction management, the errors between the dependencies of the activities are not considered.	In Lean construction methodology, primarily the errors are taken into account before making the dependencies between the activities.
2	In traditional construction management focus is on increasing the productivity of each activity which results in errors and reduced quality of work resulting in reworks.	In this, main focus is on the proper flow of activities as per dependencies which results in reduced errors and reworks.
3	This method at times does not consider the customer's requirements which results in reduced customer satisfaction.	Due to the consideration of customer's requirement and proper planning, there is surety of customer satisfaction.
4	In the traditional method, customer is not involved in planning stage.	End user/ customer are involved in start to end planning and design, through cross functional teams.
5	Traditional method relies on variance detection after the completion of tasks.	In lean construction, controlling is practiced during the task performance.
6	In Traditional management, push techniques manages the release of information and materials.	In the lean approach, pull techniques govern the flow of information and materials, from upstream to downstream.
7	Doesn't consider adjustments for (power and record are adjusted to absorb variation. advice loops, included at every level, help ensure minimum inventories)	Capacity and inventory are adjusted to absorb variation. Feedback loops, included at every level, help ensure minimal inventories and rapid system response
8	Traditional construction management not tries to	Lean construction tries to mitigate variation in every aspect

	mitigate variation in (product quality, rate of work).	(product quality, rate of work) and manage the remaining variation
9	In Traditional construction management does not pay attention to continuous improvement.	Lean approach tries to make continuous improvements in the process, sequential workflows.
10	In Traditional construction management, decision making is centered to one manager some times.	In lean construction, decision making is distributed in all those who are involved;
11	Traditional construction management does not consider transparency in between the customer, managers, and labours.	Lean construction tries to increase transparency between the customer, managers and labours, in order to know the affect of their work on the whole project
12	Traditional construction management does not have policy like (developing new forms of profitable contract to give incentives to suppliers for quality work flow and minimization at the deliverable to the client level)	Lean construction utilizes new forms of profitable contracts to give incentives to suppliers for reliable work flow and optimization at the deliverable to the client level
14	Traditional construction management persists on optimizing each activity	Lean construction, system is designed to resist the tendency in the direction of local sub optimization.
15	The approach of Traditional construction management is only considers managing a project at the macro level. This is necessary but not sufficient for the success of projects.	Lean Construction approach in Project and Production Management, and formally recognizes that any successful project undertaking will without doubt involve the interaction between project and production management.

6. CONCLUSION

This study concludes that there is much chance to eliminate the disadvantages in traditional construction using project process. The last planner system, applied can improve traditional method and implying a culture of continuous improvement and reducing time and cost simultaneously.

Following can be stated as benefits of last planner system

- (1) Personal commitment of last decision makers (last planners).
- (2) Coordination of the last planners through regular meetings.
- (3) Use of a basic indicator called planned tasks completed as planned (PPC).
- (4) Obtained weekly results.

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