

ADOPTION OF LAST PLANNER SYSTEM USING ENGINEER'S DAY-WISE CARD IN CIVIL PROJECTS FOR CAREER ADVANCEMENT

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ABSTRACT

Lean Construction Management is a Continuous Improvement System that has been practicing around the world in the construction business. But initial resistance on process follow-up seems to have prevented companies from introducing the system. This study was performed, so that Lean and other Continuous Improvement Systems can be implemented in a more effective and smooth way by FM Care (Father and Mother - FM). The Last Planner System converted as performance measuring system with the purpose of achieving the deliverables in a better flow of planning, production, and continuous improvement. In URC Construction (p) Ltd, we start practicing Last planner system by adopting Engineer's Day Card system. Six Executive Engineer's from Tata Realty and Infrastructure LTD (TRIL) site, Chennai were selected to practice the engineer's day card. The process was explained and implemented during September 2014 and practiced till March 2015. In which, execution engineer and Foreman planned their next week task including resource demand based on the milestone and look ahead plan. All the six team members discuss with project in charge and functional members every Saturday to finalize the task. The golden benefit was all the project members aware of each engineer's plan and supported accordingly. The implementation of Engineer's day card improved the individual performance by 30% and project performance by 20%. Detailed study conducted on engineer's day card by reviewing weekly and constrains addressed for effective progress of project tasks.

KEYWORDS: Lean Construction Management, Percentage Planned Completion, Key Result Area, Organizational Development

INTRODUCTION

The Last Planner System⁽¹⁾ is an advanced "operating system" for project management, maximizes project value and minimizes waste in all aspects. Planning takes place an idle position in a series of conversation for achieving the targets. Each conversation confirms and expands project value - that which helps the project people to achieve their targets. The performance of each individual ends with the project performance which add value to the client by achieving milestones. Once all the personnel's achieve their target automatically the project will complete on time. Making workflow predictable reduces waste and pave way for productivity improvement. Current project management practice lacks in day to day monitoring of each engineer's tasks, it cannot reduce the combined effects of dependence and uncertainty. As a result, each craft tries to optimize its own productivity and speed with little concern for predictable release to the next activity. "Partnering" and "Design/Build" try to solve the problem by applying organizational or contractual fixes, but these have limited impact because they rest on incomplete models of work and the way they are managed.

There are two kinds of work in projects namely physical work in which we are involving men, material,

machinery, money (4M) in place to execute the project and the organizational work of making commitments at each level. In principle, we can say that physical works are driven by organizational work. The LPS is a disseminated planning system that manages work by progressively reducing uncertainty and making sequential work ready. Execution engineer prepare phase pull schedules instead of normal practice of push schedule given by planning engineer. Working backward from project milestones, execution engineer establish the best sequence of activities and their durations, and allocate float to maximize plan stability. Irrespective of construction projects the six week look ahead schedule made by the engineer and discussed with planning engineer's to ensure that their plan matches with the master construction schedule. Once it is conformed and agreed by the project team, Look ahead plan is ready.

Activities do not advance from week to week on the Look ahead Plan if the execution engineer loses confidence that the work will not be ready when required. This gives the team and management an alert to intrude attention by spending maximum time to remove the constraint. Assignments are prepared by the Last Planners (foremen, supervisors, etc.) and must meet milestones. Planning system performance itself is measured and improved by identifying cum acting on constrains for its completions. Typical actions include catch-up schedule or revision in planning and logistic systems or training for Last Planners¹ and their supervisors.

This mainly focused on achieving the last planner system by the way of implementing the engineer's day card. The Engineer's day card was structured in such a way to plan one week look ahead schedule, resource required and risk anticipated. The Engineer's day card serves as score card for measuring the individual's performance. It also creates a healthy competition among the execution engineer's and support team by enjoying their deliverables. This process clearly turn around the past system of seeing the team performance in to individual engineer's performance and there by micro planning reviewed daily instead of monthly. This research study was done in Tata Realty and Infrastructure LTD (TRIL) site, Chennai during the period from September'2014 to March'2015.

The objectives of the study includes,

- To implement the Last Planner system in M/s TRIL, Chennai project through engineer's day card.
- To identify the anticipated risks and mitigate in possible time.
- To find out major root cause for the non-achievement and providing support to achieve.

Last Planner System – Implementation ⁽⁹⁾

Engineer's Day Card designed in such a way to implement Last Planner System to bring out the importance of planning and Coordination between the Front level Management ⁽⁵⁾ (Execution Team) to the Top level Management. Initially, we are planning for implementing PPC (Percentage Planned Completion).

About the Concept of PPC

$$\text{PPC} = [(\text{Number of completed tasks}) / (\text{Total number of assignments})] * 100$$

This concept helps in deriving the efficiency level of each major activity on the particular day.

About Engineer's Day wise Card

- First page, shows the details about the person who is going to involve in the particular block and his work place details.

- In center page, to enter the activities, Plan Vs Achievement for the particular week day wise.
- Last page, the space for highlighting constraints and Resource requirements.

Role of Project Personnel's ⁽¹⁴⁾

The Project Manager's Roles are

- On every Saturday, review the weekly target of particular block in-charge and conforming the plan for the fore-coming week.
- Daily interacting with each individual engineer's on their day plan and resolving constrains.
- Reviewing the Current week performance on every Saturday.
- Signing the card after reviewing every day's achievement during 7 pm meeting.
- Coordinating with all functional and project team to solve constrains and arranging for required resources.

The Planning Manager's Roles are

Finalizing the target for next week with the Project manager and fill the planned values in the card by discussing the activities with every block in-charge on Saturday.

- Filling Block in-charge details and their work place (Block name) with weekly targeted values in first page.
- Issuing the Engineer's day wise plan card to the Block in-charge on every Saturday evening.
- Calculating PPC values for each engineer daily and presenting in 7 pm meeting.
- On every Saturday evening, collecting all the filled cards and sent it to RO with team review.

The Block in-Charge's Role are

- Receiving Engineer's day wise plan card for the week from planning engineer's on Saturday evening.
- Recording every day Achievement in center page and interacting with project manager.
- If the achievement is less than planned, the reason/Constrain faced and the solution taken up to overcome the particular problem during the particular day should be filled at the last page.
- Status about the requirement and availability of resources should be updated at last page. The same to be discussed with Project Manager then and there to achieve the target.
- Getting acknowledgment on the day progress from Project Mangers daily.
- Submitting the card on every Saturday to Planning Manager and getting the newly filled card for the next week.

The Regional Coordinators Role are

Reviewing the card along with project manager's ⁽¹⁶⁾ comment and Submitting to Regional Head for acknowledgement on every Monday. Storing the cards in regional office for future follow-up. The main aim for implementing this concept is to bring out continuous monitoring over the work process. Thereby, we could able to

minimize the delay in completing the works and increase the efficiency of process. If the project team extended their support, we can say this system will be effective and gives better output.

CONSTRAINTS AND SOLUTIONS			
Day	Constraints Faced	Solution Provided	PM Sign
MON			
TUES			
WED			
THUR			
FRI			
SAT			
SUN			

RESOURCES REQUIRED FOR THE WEEK									
S. No.	Workers			Machinery			Formwork		
	Category	Req.	Avail	Name	Req.	Avail	Name	Req.	Avail

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ENGINEERS DAY WISE PLAN

Project :
Engineer Name :
EMP Code :
Zone :
Duration : From To
Target Value for the week :
Planned : Rs.
Achieved : Rs.
Regional Head Signature :

Figure 1: Engineer’s Day Wise Card (First and Last Page)

S.No.	Activity	Unit	Date								Total Qty. for the week	
				Day	MON	TUES	WED	THUR	FRI	SAT		SUN
			Plan									
			Achieved									
			Plan									
			Achieved									
			Plan									
			Achieved									
			Plan									
			Achieved									
			Plan									
			Achieved									
			Plan									
			Achieved									
			Plan									
			Achieved									
PM Signature												
% Achievement for day/week												

Figure 2: Engineer’s Day-Wise Card (Center Page)

Implementation of Engineer’s Day Card at TRIL Project

Tata Realty and Infrastructure LTD (TRIL) is one of the flagship companies of the TATA group. The total development is over 70 Lakhs sq.ft of build-up space. Out of which 50 Lakhs sq.ft of Built-up space was completed under Phase I development. Phase II development is another 20 lakhs sq.ft of built-up space. Total build-up area 19 Lakhs sq.ft (approx.), Structure 3 Basements + 2stilt + 12 Floors of **E&F towers**. For operational convenient the total basement floor plate was divided in to **11 pours**.

Each pour was executed by individual engineer in charge. Engineer’s Day Card given to all the pour in charges in order to analyze the respective pour performance activity wise daily and cull the major root causes for the non-achievement of daily progress. Immediate action will be taken to rectify constrain with suitable action. Engineer’s Day Card had center page that divided into several columns which contains activity, unit, date, plan, achieved, Total quantity for the week. This

have to be filled daily by the execution engineer's and discuss the PPC at 7 pm meeting. After a week, the planned and achieved percentage has been calculated.

Analysis of Engineer's Day Card

By analyzing the Engineer's Day Card daily, major constrains are identified for non-achievement. Project team workout the necessary action on constrains to perform next day. The final report of each day 7 pm meeting will be circulated as minutes of meeting to all concern persons. We have analyzed the six Executive engineer's namely Mr. Jeevanandham (E1), Mr. Kandaswamy (E2), Mr. Venkatesh (E3), Mr. Prakash (E4), Mr. Muthukutty (E5), Mr. Muthu (E6) with the Engineer's Day Card and given suggestion in order to help them to develop their career life as well as to improve the quantity of the work in the TRIL Site.

The daily performance was converted into PPC score and displayed in notice board. During 7 pm meeting the project in charge allows the engineer's to explain their plan of the day and their achievement in each individual task. By way of highlighting constrains and requirements by other team member it is very easy for obtaining best solution on time. Since the discussion happening in open forum in front of all the members who are involved directly and indirectly can understand the realistic fact of respective pour. The table summarizes the seven month PPC scored by each engineer.

Table 1: PPC Percentage Month Wise

	M1	M2	M3	M4	M5	M6	M7
E1	50%	92%	88%	85%	90%	85%	95%
E2	48%	57%	52%	50%	90%	78%	80%
E3	59%	57%	40%	65%	75%	70%	72%
E4	81%	55%	100%	75%	85%	90%	85%
E5	85%	87%	92%	98%	94%	94%	88%
E6	29%	49%	61%	65%	75%	80%	95%
Percentage of work progress in the site							

Data

Data has been collected from the engineer's day-wise card. The completion activities and non-completion activates are gisted to formulate Planned Percentage Completion (PPC) and it converted into percentage in order to compare the PPC of the individual Execution Engineer's in the TRIL Site and the collected data analyzed.

Process

After collecting the Engineer's Day Card from the each pour in the TRIL Site it was reviewed and recorded in excel as the weekly work progress. After reviewing once again with the Executive Engineer's, work done was converted into Planned Percentage Completion PPC. With the PPC analyzing, major root causes for the non-achievement in the site are identified. The work achievement was cross checked with daily progress report to ensure the number.

Output

Through the engineer's day card, daily/ weekly/ monthly performance had been analyzed according to their daily work plan given in the engineer's day card. PPC was analyzed with its root cause and mitigation plans provided to achieve

in coming weeks. The output was displayed in notice board and best performer of the month was recognized with gifts and cash voucher. From the analysis of six engineer's performance through Engineer's day card in TRIL site, we found minimum output during starting months and slowly they increase their output with their daily cum week plan. From engineer's day card, the engineer's can easily identify the daily plan and the weekly plan, according to that resources are identified well before starting of the work. With this Engineer's day card,, Engineer's themselves identified their lag and rectified and which directly leads to complete of each task on time as well as overall project completion on time . The final outcome shows the development in their career path.

Findings by Engineer's Day Card

After analyzing the Engineer's Day Card the major root causes for the non-achievement in the TRIL Site had been found. Some of the major root causes for the non-achievement were given in the below pie chart. According to that major root cause for not achievement was due to delay in material supply and next is due to less man power. Later, delay in clearance and drawing were found and analyzed with the help of the engineer's day card.

The second major finding was with respect to internal functional departments. By reviewing the engineer's day-wise card, constrains in which department lagging are found and necessary steps are taken for resolving the same.

The third finding was with respect individual engineer's performance and the reason why they failed to achieve the task. Due to close monitoring of each engineer with their task status it is very clear to pinpoint the skill-gap of engineer.

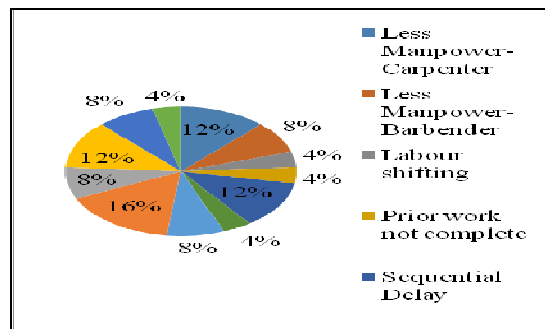


Figure 3: Constrain Chart ⁽⁶⁾

RECOMMENDATIONS & SUGGESTIONS

Hence lean construction ⁽⁷⁾ is a construction management philosophy focused on creating value to the customer (eliminating waste that does not add value) using the least resources and also to increase collaboration among the project participants in the entire project lifecycle. We can recommend that engineer's day-wise card is one of the best method to implement in construction projects for effective monitoring of all activities.

We can suggest that engineer's day-wise card is a better tool for organization to monitor the progress of work, Key Result Area (KRA) for measuring people's performance. It is a good system for implementing in construction projects and the success for implementation comes only if it is monitored and reviewed on time every time.

CONCLUSIONS

As per the Last Planner System and its implementation of the Engineer's Day Card in the TRIL Site, we conclude that effectiveness and efficiency of the organization can only be improved by adopting advanced technologies. Adhering to the above principle we in URC Construction (p) Ltd., intend to implement all the required advanced technologies for our

organization development. Engineer's Day Card can increase the capabilities of each individual engineer in the TRIL site by analyzing the individual task concern and giving appropriate suggestions on time. We can conclude that any system or process was understood till root and implemented with whole heartily like raising our kids, the success is pre-defined. We can proudly conclude by thanking our Managing Director, CEO and other colleagues for accepting and succeeding the Last Planner system through Engineer's day-wise card by which it leads to organization development and to uplift employees career.

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AUTHOR DETAILS



Er. R. UdhayaKumar has completed his Diploma in Civil Engineering (1999) from NPT, Pollachi with state Rank. He continued his academic career in Coimbatore Institute of Technology, Coimbatore and perused his B.E (Civil) with First Class in the year 2002. He joined M/s URCC in the year 2002 as Junior Engineer. Parallel to his Professional Career he also firmed up his Academic Career by completing his M.E(Infra) from VMDU-Salem in the Year 2007 , MBA(HR) from Bharathiar University, Coimbatore in the year 2010, Post Graduate Program in Construction Management (PGP-CM) from NICMAR – Pune in the year 2011 and MSW from Bharathiar University, Coimbatore in the year 2014. He is now perusing his Doctorate in Management (PhD) with Human Resource Management as Major from Bharathiar University, Coimbatore.

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