

A black banner for the PMPC 2018 conference. It features the PMI Bangalore India Chapter logo in the top left and a globe icon with "PMPC 2018" in the top right. The central image is a night view of the NIMHANS Convention Centre, a large, ornate building with a central dome and multiple wings, illuminated with warm lights. Below the image, the text "Project Management Practitioners' Conference 2018" is written in yellow and white. Underneath that, "ARCHITECTING PROJECT MANAGEMENT for Value Creation" is written in white. The dates "July 12th – 14th, 2018" and the location "NIMHANS CONVENTION CENTRE, BENGALURU" are written in yellow at the bottom.

Collaborative Approach to Improve Efficiency in Construction Planning

Construction- Smart Practices

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ABSTRACT

Low productivity, high work stress and reduced performance are the key (people) challenges resulting delays, cost overrun and quality problems in Construction Projects. Inefficient way of managing the project management processes or product processes cause such chaos and crisis in construction projects.

Our study shows that, around 50% daily activities in construction projects are unplanned in nature. Non value adding situations like waiting for information, delay in decisions, rework due to error or quality issues, changes in priority of work, non availability of resources etc causing uncertainty in projects. The probability of a work to happen without any reminder in construction projects are only 25% and project situation demands continuous follow ups, frequent escalations and close monitoring to complete works. In another words 75-80% of activities that are part of project management processes are non-value adding and 'firefighting' to achieve projects objectives.

The collaborative planning approach is the consolidation of simple best practices from Lean Construction and Project Management concepts implemented in systematic and structured way. It provides a practical framework to plan, monitor and control construction projects. The 4 level planning approach ensures value creation at every stage by involving appropriate stakeholders at right time and better manage the 'known unknowns' to reduce the uncertainty. Also commitment based monitoring will helps team to learn lessons from daily failures and better prepare the future works. This approach is implemented in several projects (real estate and infrastructure), recording 15-20% improvement (in terms of monthly target achievement) within 2-3 months time.

INTRODUCTION

Construction project consist of two type of processes, Product processes which specify and create project's product and Project Management processes ensuring the effective flow of project through the life cycle. A proper blending of activities from these two processes in terms of sequencing and establishing dependency results the project schedule. But failure to create reliable and practical schedule leads to crisis management and firefighting in many projects. Following are the major reason leading to improper planning & creating uncertainty in construction projects

- Lack of common understanding on the project scope, both in terms of product and project management processes
- Inability to create action plan to work within the constraints
- Making assumptions without proper validations
- Failure to foresee the Risks & establish suitable response plans

This uncertainty causing repeated issues in projects, demands more time and efforts from professionals. From typical 8 hrs each for work, life and sleep per day to 10-12 hrs for work is required in many construction projects impacting work-life balance of professionals.

This paper discuss the application of collaborative approach to improve the planning efficiency by implementing best practices from Project Management & Lean Construction. With this approach, projects can focus on proactive value adding activities by following the simple practices in structured and systematic way.

NETWORK OF INEFFICIENCY

Project is a network of commitments. Any delay or rework on activities related to execution, approvals or other project management processes will create further delay and cascading effects on other activities and project completion. Low labour productivity, one major problem construction industry is facing today, is inflated in projects due to excessive non-value adding activities occurring because of inefficiency. We cant hold any individual or single organization responsible for the situation, but can see a network of inefficiency in construction projects.

The issues are the centre of attraction in many projects as professionals fail to foresee risks, validate assumptions, and understand scope/ constraints ends up in last minute work arrangements. The uncertainty on the availability of man, machine, material etc , lack of clarity on approvals, incomplete design informations and priority changes make the schedules obsolete and the team is forced to prepare plans every now and then which further leads to running around to ensure completion. As per the study we conducted as part of our training & implementation engagements, on an average 50% of work that happens in a day are unplanned in nature, in some cases, it goes upto 70-80%. The planning become obsolete and people turn skeptic in construction industry due to this.

Lack of proper make ready processes and improper planning creates further delay which leads to rework in many cases. The amount of follow up required is huge to complete such works and we can observe low productivity as well as cost over run. Most of the time issues like improper design information, lack of manpower, machinery breakdown, material non availability etc prevent the work to start, stops it in between and prevents to complete the work. This work situation require close follow ups, lot of rework and firefighting approach which cause 75-80% of project management activities to fall under the category of non- value adding or inefficiency .

The high level of inefficiency further leads to under utilization of resources including the project manager, for example physical presence of project manager at work location become mandatory to complete the concrete work which could have been easily managed by a project engineer if resources are properly allocated and design informations are clear. Our studies shows that the probability of a work to happen in construction project is only 25% and project situations demand close follow up, frequent escalations and close monitoring to complete the works.

COLLABORATIVE PLANNING APPROACH

Project can achieve its objectives with less resistance when people get involved, processes become supportive, and organizations align their targets with project goal instead of working towards the silo objectives.

Collaborative planning approach is not a new concept but establishing a practical framework incorporating the best practices from various management concepts like Project Management, Lean Construction etc to have an improved communication, better coordination and effective collaboration among project professionals. The Last Planner System ® by Lean Construction Institute and Project Management Plan mentioned in PMBoK ® published by Project Management institute inspired to establish collaborative planning approach and framework best suited for construction projects. Its nothing but simple application of practices followed in systematic & structured way which can significantly improve the project performance and productivity of people.

Projects are complex and there is no way it can be planned & controlled by a single person or one organization. Approach to planning, style of monitoring and controlling should change according to the visibility and nearness of works to be performed. 4 level planning in collaborative approach will help the project to have

1. Well defined strategy on how to achieve the objectives (Master Plan)
2. Preparations to be made for operational plans (Monthly Plan)
3. Make ready arrangements to be set for action plans (Weekly Plan)
4. Establish a commitment based monitoring to learn daily lessons and control the variances to improve future plannings. (Daily Plan- to do list)

Each stage require people from above & below to collaborate each other, which will further improve the information transparency in projects and bring more responsibility & accountability among professionals. Figure 1 shows the responsibility matrix for a typical client- contractor mode of engagement.

4 Level Collaborative Planning					
	Client/ Management	Project Director	Project Manager	Project Engineer	Supervisor/ Foreman
Master Plan	Collaborate	Responsible	Collaborate		
Monthly Plan		Collaborate	Responsible	Collaborate	
Weekly Plan			Collaborate	Responsible	Collaborate
Daily Activities				Collaborate	Responsible

Fig 1: Collaborative planning- Responsibility matrix

Collaboration will eliminate the necessity of multiple schedules in a project and make our schedules more reliable as well as predictable. More importantly the planning becomes effective when everyone in project is involved.

(A) NEED OF COLLABORATION

Number of people involved in a construction projects and interdependency are high compared to other industry projects. The performance targets set for departments to ego of individuals can create silo goals in a project which may drag it away from the project goal and objectives. For example a target to reduce 2% on vendor cost set for a procurement team may lead to late entry of contractors to poor performance which will have cascading impact on time, cost and quality performance of project.

Project have to face multiple issues like delay in finalizing vendor, waiting for approvals, error in drawings etc which will lead to crisis and require firefighting unless such issues/ problems are identified at early stage, channelized to the right people and resolved jointly. Project professionals from relevant department and organizations looking into the various stage of work, with an interest to identify the constraints and make ready the arrangements before the work starts, is the level of collaboration we require in construction projects.

(B) ESTABLISH CLARITY

The biggest mistake our professionals making is to start preparing the schedule as first step of planning. Most of the time activities and work targets are directly entered into planning software to prove that projects can be completed within the project timeline. These schedules may satisfy the documentary need or contractual obligations but fail to provide real picture. We have seen many schedules, large in size but doesn't cover majority of works and have only single major path/sequence to complete the work. Capabilities of tools and capacities of teams are under-utilized in such cases and people don't believe or follow these schedules in projects.

Project consist of product processes (sequence of activities to be performed on ground to complete the work) and project management processes (set of activities required to ensure proper availability of information & resources to provide a perfect environment to perform product processes). We should establish a clear scope of project in terms of deliverables (WBS), steps involved in completion of processes like procurement, design etc and approval required in terms of legal, design, material etc at the start of project.

Work breakdown structure (WBS) for product processes and process/ action tracker for project management processes will bring clarity on what to achieve and how to achieve the project deliverables. The schedule becomes practical by sequencing the activities and incorporating the dependencies prepared in collaboration with relevant stakeholders.

(C) MANAGE KNOWN UNKNOWN

Why can't we plan our daily works? Why should we look for information, resources, and work front availability to plan daily work?. Uncertainty is the only thing certain in many construction projects. This demands the direct involvement of people at every stage, nullifies the importance of schedules and under utilization of resources in projects.

Why do people work 10-12 hrs on 6 days of a week and even more during project or milestone completion time? No one is sure about what is to be done next and so everyone is required to be present in and around the execution area! Most of the time spend in project locations are either waiting for information, approval, resources etc or resolving repeated similar issues & fighting each other to resolve issues.

Our professionals know what they require to do to complete the projects but the question is do they really have the required information to proceed and complete works. The 'known unknowns' of our project is the real killer and caused mainly due to poor application of management tools and lack of collaboration. Delaying basement completion due to hard rock (assumption failure), rework because of quality rejection by client (failed to work within constraints) and damages due to floods (inability to foresee the risk) are some examples of issues in our project sites due to the 'known unknown' situation.

Validating the assumptions, defining action plan to work within the constraints and establishing a risk response plan to manage the negative uncertainty in project will help us to prepare a better baseline and reliable plans. Possibility of 'unknown unknown' is there in every projects. But reducing the 'known unknown' factor and increasing the 'known known' will help project manager to better handle unforeseen situations.

(D) RESOLVE ISSUES & MAKE READY THE ACTIVITIES

Do we need to wait for our supervisor and foreman to revert with reason for non-completing the work like non availability of machine or error in design information or should we proactively ensure that all ingredients required to complete the work is ready even before assigning the work?

Issues and problems are part of a complex or even simple projects. The age of pending issues and time taken to resolve the issues decide the fate of projects. Many projects and project managers have no clue about the prevailing issues in their projects and they are busy firefighting the yesterdays problem, missing todays need creating future challenges.

The monthly and weekly planning exercises should focus on following than just recreating set of new commitments in place of failed promises

- What is required for a smooth flow of work (Drawing, Resource, work front etc) and make ready plans
- What can go wrong and action plan to avoid such situations

Our professionals can spend 60-90 minutes to firefight or argue with each other to prove a point or blame each other to pass the bucks but less interested to spend 30 min to resolve issues and make ready the activities before the work starts. Location Based Planning (figure 2) can help the professionals to detail the micro activities, define the inter trade dependencies and plan proper sequence of works sitting in the project office rather than the current way of directing the supervisors by waiting at location or running around the execution sites.

Micro Planning for Block works												
	Marking		Blockwork- 1st Raise		Door Frame	Lintel	Blockwork- 2nd rise	Bull Mark/ Inspection	Electrical Piping& Box	Plastering- Ceiling	Plastering- Wall	Plastering- Windows
	Plan	Actual	Plan	Actual								
Flat 1												
Foyer												
Guest Room												
Dining												
Bed-1												
Bed-2												
Bed-3												
Store												
Kitchen												
Family room												
Toilet 1												
Toilet 2												
Toilet 3												
Wash Area												

Fig 2: Location Based Micro Planning for Block work (Real Estate Projects)

More important is to have a proactive way of identifying and removing constraints, or work within the constraints by make ready efforts, than reactive way of firefighting or searching for 'Jugads'.

(E) LEARN FROM DAILY LESSONS

Project planning effectiveness should be evaluated based on the successful completion of activities planned for a day not the efforts we put for planning. We don't have to wait till project completion or milestone failure to know our mistakes and take corrective actions. Monitoring the daily target failure and clear measure of what went wrong on

a day in terms of providing a smooth flow of work is important to improve the future planning activities. The daily lesson learned will help the team to self improve and control the projects as 99% people are part of the system.

Analysing the work planned as part of product processes and the commitments made to fulfil project management processes on daily basic (at actuals against weekly plan, not on a % basis) will help the team to establish reliability factors for trades and organizations involved. Consolidating the reason for non completion (anything less than 100% achievement is incomplete) will facilitate the project team to understand their weakness or area of improvement and define a suitable controlling measure to overcome the challenges. For example we can understand how many activities are not completed in a day, week or month due to non availability of material or machinery or lack of skilled manpower etc. (Fig 3 Example)

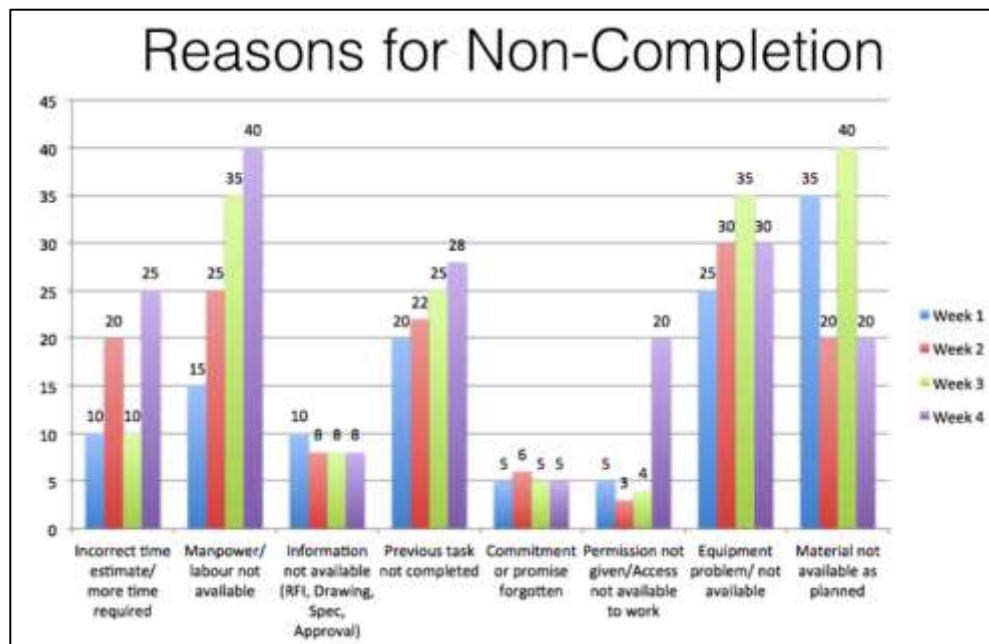


Fig 3: Example of Reason for non completion of activities (Multi-story commercial project)

Hiding all inefficiencies under the shade of current problems (example poor coordination between site and procurement team gets covered under the design error made by consultants or payment delay by clients or vice-versa) or people holding the issues as a cover to protect own failure or exposing the issues on a need basis can be eliminated by proper sequencing and establishing measurable target on a weekly basis followed by daily monitoring.

(F) BENEFITS OF COLLABORATIVE PLANNING APPROACH

Smooth flow of activities can ensure timely completion of projects within the budget, quality & EHS expectations. The collaborative planning approach will enable planning & execution team to continuously supply the information as well as resource required to complete the works. It will improve the trust in system because people will be

looking for Why & How than Who, as problems can be exposed at early stage and has sufficient time to resolve it jointly.

Collaborative planning approach can establish practical framework to plan, monitor and control projects by

- Defining clear product and project management processes during master planning
- Establishing a reliable and predictable baseline by validating the assumptions, identifying constraints and foreseeing risks
- Providing collaboration opportunity at monthly & weekly planning and improving the make ready activities
- Establishing a measurable and clear target for day and opportunity to learn lessons on daily basis to improve the planning processes.

Figure 4 explains the typical collaborative approach to establish a practical framework in construction projects.



Fig 4: Typical Collaborative Planning Approach implemented in Construction Projects

Project is a network of commitments and planning approach should identify the weakest chain during the monitoring and control by extending required support at right time.

The approach is implemented in infrastructure and real estate projects and has resulted excellent improvement in team work and project performance. The subcontractors realized the benefits in a month when implemented in an ongoing project. The extra cost in terms of rework, idle labour and under utilization of equipments (some of low hanging fruits) got reduced by the proactive make ready efforts as part of collaborative planning approach. This in turn makes the project team to set higher monthly target and achieve 15-25% more compared to previous months.

CONCLUSION

Collaborative planning approach is not a new theory or concept but a way of managing project by implementing best practices from various management concepts including Lean Construction and Project Management. This can reduce the GAP between theory and the way we manage the projects.

The ultimate aim of any management concept to improve the efficiency of system and reduce the stress on people is applicable here also. The collaborative planning approach will facilitate people to focus on proactive making ready of product and project management activities, required to complete the work.

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