

THE IMPORTANCE OF PLANNING DURING PROJECT EXECUTION

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PLANNING & SCHEDULING

Introduction

Twenty-five years ago, I was taught that project management was built upon the premise of “plan and then execute.” To this point, the catchphrase “plan the work and then work the plan” is still commonplace, but today I am not sure that it is entirely correct.

In recent years, project management has shifted from being a truly linear process to more of an iterative one. Techniques such as agile planning, driven primarily by IT project management, have further endorsed the concept that planning and execution are not truly sequential.

This white paper discusses how continued planning, even during project execution, can overcome some of the limitations of traditional scheduling techniques. Tied to this, the topic of SIP is discussed in detail.

Planning Versus Scheduling

I have long been cognizant of the fact that project planning and scheduling are two very different sciences that both contribute to the success of a project.

- **Scheduling**, by definition, is “to arrange or plan (an event) to take place at a particular time.”
- **Planning** is the setting of project goals; identifying project deliverables and then creating a schedule and supporting plans.

Today’s critical path method (CPM) tools are, in my opinion, absolutely brilliant at scheduling. Think about it. A CPM software tool can take a huge list of tasks and by accounting for certain things such as required sequence, working calendars, available resources, etc., the CPM software spits out the earliest and latest dates that the work can be achieved. This seems pretty impressive given the number of moving parts. But it’s only impressive if you assume that all of those inputs including durations are correct. Too often, that’s a huge assumption. The accuracy of the schedule is left to the expertise of the planner to determine.

There are a large number of commercially available CPM tools. Many major construction and engineering projects rely on heavyweight tools such as Oracle Primavera P6, IT projects may use MS Project, and government contractors under compliance scrutiny use tools such as Deltek Open Plan. While each of these tools carries unique capabilities, they all have a high degree of commonality in that their focus is the CPM algorithm to define dates for the execution of work.

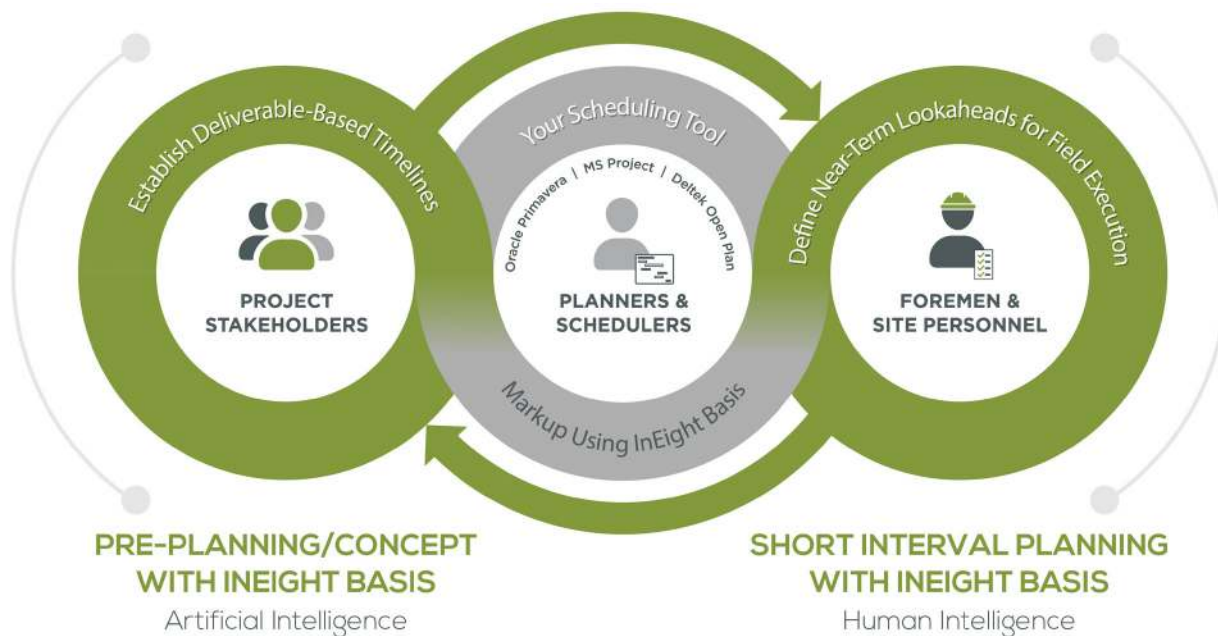
As we illustrated above though, the science of planning is more than just scheduling. It includes answering the following questions:

- What are we building?
- What is the scope?
- What are the requirements?
- What is our budget?
- Why do we believe the effort is what we estimate it to be?

Once we have determined these requirements and objectives, we can then turn our planning thought process to how are we actually going to execute the work required to achieve these goals. Not only that, but when it comes down to actually being out in the field and executing the work, the likes of CPM and Gantt charts are rarely used. Instead, things like task lists and job cards are used to manage very short-term lookaheads (down to the day or even shift).

So instead of thinking of project planning as just planning, consider it as three separate steps:

- Pre-planning – the development of top-down, **deliverable-based** high-level plans
- Planning – the detailed sequencing of **work** using CPM
- SIP – the **steps** we need to carry out on a daily basis

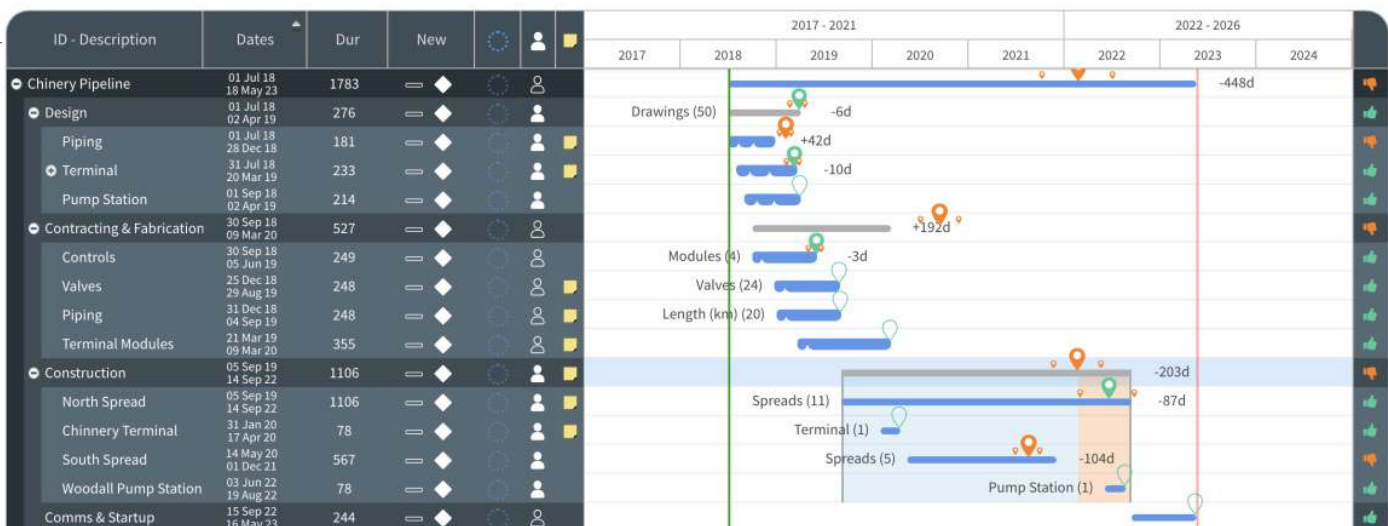


Pre-planning

I have written several articles recently on the concept of pre-planning. In a nutshell, pre-planning is all about defining what it is we are building rather than how we are going to build it. It is the identification of deliverables and associated quantities of such, and then sketching out what we believe to be realistic timescales that will satisfy project stakeholders.

Benchmarking these timelines against standards or historical projects then gives us something to use to judge the realism of our big-picture forecast. It justifies and validates our estimated values.

InEight Basis was developed to assist with this pre-planning exercise. The sketching out of deliverables and having the InEight Basis AI engine make suggestions on duration and cost are huge time-savers. This also ensures that project scope is properly identified and accounted for across the entire plan. The result is a framework that you can then start to build your detailed schedule.



Top-Down Deliverable-Based Planning

Planning

Once your pre-plan has been established, you then move onto determining detailed dates for your plan using CPM to develop your schedule. As mentioned, CPM is a complex algorithm when accounting for all of the nuances that may arise, but the net result is quite simple. For each identified activity, a range of start and end dates are established (falling in between what are known as early and late dates). Execute each activity within these date ranges, and your project will finish on time. Mathematically brilliant yet also a work of art!

During this schedule development phase, InEight Basis helps the process by enabling the planner to capture team member opinion through a markup review cycle. This validates what has been established in the CPM schedule.

ID - Description	Dates	Dur	ΔDur	ΔEnd	2017 - 2021					2022 - 2026				-50%	-25%	-10%	OK	+10%	+25%	+50%	
					2017	2018	2019	2020	2021	2022	2023	2024									
Chinery Pipeline	01 Jul 18 21 Feb 23	1697																			
Construction	05 Sep 19 20 Jun 22	1020 (826)																			
North Spread	05 Sep 19 20 Jun 22	1020 (473)																			
NS 1	05 Sep 19 25 Oct 19	37 (37)	0	0																	
NS 2	28 Oct 19 10 Dec 19	32 (32)	0	0																	
NS 3	11 Dec 19 30 Jan 20	37 (37)	0	0																	
NS 4	31 Jan 20 23 Mar 20	37 (37)	0	0																	
NS 5	24 Mar 20 27 May 20	47 (37)	+10	+14																	
NS 6	28 May 20 17 Jul 20	37 (37)	0	+14																	
NS 7	20 Jul 20 02 Sep 20	33 (37)	-4	+8																	
NS 8	03 Sep 20 23 Oct 20	37 (37)	0	+8																	
NS 9	26 Oct 20 29 Dec 20	47 (37)	+10	+22																	
Royston Crossing	30 Dec 20 09 Feb 22	291 (388)	-97	-112																	
NS 10	10 Feb 22 28 Apr 22	56 (37)	+19	-88																	
NS 11	29 Apr 22 20 Jun 22	37 (37)	0	-86																	
South Spread	28 May 20 01 Feb 22	615 (567)																			
Chinnery Terminal	19 Aug 20 02 Dec 20	106 (254)																			
Site Prep	19 Aug 20 04 Sep 20	13 (11)	+2	+203																	
Foundations	07 Sep 20 16 Sep 20	8 (6)	+2	+205																	
Steel Structure	17 Sep 20 14 Oct 20	20 (11)	+4	+211																	

Capturing Team Member Feedback Using Markup

CPM-based plans are highly effective for establishing dates for both simple and incredibly complex projects. However, in both cases, they rely very heavily on the planner being able to accurately articulate what is known as precedence logic. For example, you can't physically build the roof before you've built the walls, and you can't build the walls before you've built the foundations. While this is adequate for long-term planning, when it comes down to say daily planning, precedence logic starts to fall away in terms of relevance. Within any given shift or work day, the exact order in which tasks are carried out can change without impacting the overall plan. In fact, re-sequencing work can often cut down on labor inefficiencies, unnecessary moving of materials, as well as overcoming unforeseen delays from other work fronts - hence the need for SIP.



Short Interval Planning

SIP is a means for those actually executing the work on site to have a bought-in plan of attack for the work they are being asked to carry out. A SIP is typically no longer than a three-week lookahead. A SIP may include work that is included in the CPM schedule, but it may also detail work that may not otherwise be identified in the schedule. For example, supporting work such as moving scaffolding or bringing materials from a lay-down yard may require extensive time, but wouldn't typically be identified even in a highly-detailed 20,000-activity CPM plan.

A SIP can take several forms. It can be as simple as a list of tasks broken out into hours or shifts that a foreman may use to communicate to a construction worker what is required. It can be a more formal matrix-type plan that shows not only the short-term tasks required, but which crews, resources, and materials will be required. It can also be as involved as a Gantt-chart style schedule reflecting logic and working time.

In all cases, a SIP is used to communicate what needs to be done, and it also provides a means for project executioners to track their progress.

One of the compelling aspects of SIP is the fact that it enables a very dynamic approach to short-term planning. Modifications to project scope usually require a formal change order process. Changes to a CPM schedule typically require a schedule update and perhaps even a re-baseline. Both of these are major efforts and don't happen all that frequently. However, changes to the daily plan of work occur very often (daily in fact!) and so having the flexibility to manage these daily fluctuations allows us to maintain the overall agreed upon plan, yet accommodate the fluid nature of on-site execution.

From a software perspective, we have embraced this approach and incorporated it into InEight Basis. InEight Basis is the perfect tool for field executioners to manage their short-term plans while remaining in harmony and in sync with the project planner who's building and maintaining their overall plan in a CPM tool. In fact, through planning delegation in InEight Basis, a planner can let, for example, multiple foremen concurrently plan their respective three-week lookaheads while still maintaining linkage back to the overall plan. The planner gets to see how the very detailed, short-term SIPs align with their overarching plan, while the foremen get to plan using their inherent site knowledge without feeling artificially constrained by the complexities of having to do CPM planning. It's a win-win for all, and the SIP provides a natural feedback loop back to the planner in regard to field-execution progress.

When to Plan

So, it's really OK to plan before the planning phase as well as execution. It's how humans think. It's just not necessarily how the software tools to date have allowed us to plan. That needs to change.

By thinking about pre-planning even before we build out a schedule, we are ensuring that we properly identify what we are building, as well as setting realistic expectations and goals. InEight Basis provides your team the opportunity to establish this agreed upon plan as well as validate it against historical achievements.



Building a schedule using CPM is mission critical as it tells us when we can execute work based on the raft of assumptions that we feed into the model. Having the likes of AI help not with the actual CPM or scheduling bit, but instead validating the building blocks that go into a CPM schedule further drives the realism of the plan. InEight Basis sits alongside your CPM tool of choice to help with those validations and suggestions.

When it comes to field execution, we simply divide and conquer. We break down daily or weekly forecasts into shift or even hourly-based task lists. What is important here is that these SIPs consider the current state of the construction site/project. They account for actual site constraints and material availability; they account for real-time productivity rates, while considering circumstances like weather and crew availability. InEight Basis provides a bridge between your CPM schedule and your in-field, short-term execution list in the form of SIP. Having the two inherently integrated then gives the project direct insight as to whether execution is keeping up with the plan or not. Or to look at it another way: is the plan reflective of what we are actually able to achieve?

Conclusion

Projects are a funny thing. We get multiple opportunities to plan a project, but only one chance to execute. Giving more emphasis to planning by breaking it out into pre-planning, planning, and SIP ensures that we are establishing a realistic plan that combines big picture objectives with very short-term practicalities/changes during execution.

About the Author

In 2018, InEight acquired BASIS, which Dan founded, and he became a member of InEight's executive leadership team. He now focuses on expanding upon his vision of creating next generation planning and scheduling software solutions for the construction industry.

As a globally recognized project analytics thought leader and software entrepreneur, Dan has more than 20 years of experience building project management software companies. Throughout his career, Dan has focused on solution innovation and project management, including advanced scheduling, risk management, project analytics and AI.

Dan is a certified Project Management Professional (PMP) by the Project Management Institute (PMI). He attended the University of Nottingham in the UK where he earned a bachelor's degree in civil engineering and a PhD in construction management.

InEight builds construction project management software that enables you to overcome your greatest project challenges. Our solutions span the entire project life cycle from design to estimate and from field execution to turnover and asset management. They provide the real-time information and insights you need to minimize risks, improve operational efficiency, control project costs, make educated decisions, and collaborate easily with all project stakeholders.

InEight solutions make it easy to build project confidence.

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