How an Automated 5-Step Schedule Analytics Process Can Transform Your Construction Project

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It's no secret that construction projects frequently fail to meet desired objectives and timelines. According to McKinsey Global Institute, 77% of megaprojects around the world are 40% or more behind schedule, and large projects typically take 20% longer to finish than scheduled. And a recent study by the consulting and investment banking firm FMI indicates that global construction waste amounts to a financial loss of $1.4 trillion annually. An estimated 60% of this loss is caused by project delays.

For key project stakeholders, the primary way to minimize the risks associated with costly overruns, delays, and disputes is to fully understand the most comprehensive, informative, and useful data set in construction: the project schedule. The following five-step process of schedule analytics, when automated, provides a real-time view into the progress, performance, delays, and future risk of a project so owners and construction management firm decision makers can make the most informed business decisions.

Step 1: Schedule Quality

Although the construction industry generally recognizes the importance of planning and scheduling, the schedule is often overlooked. Schedules tend to be generated at the beginning of a project and have numerous impediments, such as unrealistic timelines; inadequate logic or sequencing; undefined activities; incomplete resource and cost data; and a lack of team input. As the project moves into the execution phase, the schedule typically becomes an afterthought rather than a tool to better manage the project. Delays occur and are accepted without clear accountability or transparency, and overly optimistic recovery efforts are forecasted without regard to historical performance.

DCMA, the Defense Contract Management Agency, has established standards for analyzing the quality of a schedule by highlighting the existence and frequency of certain bad practices that include, but are not limited to, missing logic, high numbers of constraints, activities with high durations and a low level of crew logic. When building a schedule, all

activities should be tied together to make sure it is reactive and can show impacts and delays so problems can be easily identified and accurately diagnosed. Without this control, schedules may be developed with erroneous critical paths, which results in mismanagement. A poor-quality schedule also masks where the actual problems are likely embedded and misrepresents the real short- and long-term effects. Although technology to analyze some of these components does exist, most solutions do not explain to what extent a schedule's deficiencies have reached a level of concern. At that point, people are left to interpret the data — and people are subjective.

Step 2: Critical Path Delay Analysis

Critical path delays are a key contributor to, and driver of, cost overruns — and cost overruns are at the root of all disputes. One reason is that identifying critical path delays, with certainty, is a difficult task. On any given project, multiple delays are likely occurring at once, and understanding them all requires significant time to study the data and develop a complete picture, including wading through the minutiae to derive supportable analytics on what was delaying the project overall versus what was delayed but didn't impact the end date in a specific period. Consultants are often paid top dollar to make sense of this data, because it is a manual, time-consuming, and subjective process which, in turn, often leads to further disputes around assumptions and methods.

Given how dependent delay analysis is on the quality and feasibility of the schedule, such analysis is reliable only when those aspects of the schedule are fully understood. It's critically important to discuss delays as they occur, and to make meaningful decisions related to delays in real time. This is possible with automated schedule analysis. Otherwise, delays occur, the parties involved disagree about what delayed a job and expensive consultants are hired to sort things out.

Step 3: Recovery Analysis

Delays are common in construction. From the baseline schedule often being seen as merely a plan to the reality of the issues that emerge during execution, changes are bound to be introduced to the schedule. Although the intention may be good to get the project back on track, changes are often made to schedule updates without key stakeholders fully analyzing whether they are realistic or feasible. Usually, changes are made by schedulers and project managers with hope, a heightened sense of optimism and, in, some cases, manipulation.

Many costly decisions are made based on adjustments to the project's forecasted end date. That creates problems for many stakeholders who are financially dependent on, or contractually obligated to, important milestone dates listed in the schedule. If milestone dates are incorrect, or infeasible, all parties involved pay the price. Therefore, a control mechanism must be in place that enables users to better evaluate and analyze the reliability and accuracy of recovery decisions. Unfortunately, doing this well manually takes expertise, time, and financial resources. Automated analysis combines speed with the intelligence to recommend a path toward a solution based on the context of the project as well as the feasibility and risk level of each change.

Step 4: Feasibility Analysis

A schedule feasibility analysis determines whether the plan for the project schedule is realistically achievable, given the logic and duration of the activities involved. With so much money at stake, including capital investment and revenue to be generated from the asset, schedule feasibility is imperative.

At the beginning of a project, when the baseline schedule is submitted, feasibility is nearly impossible to address because durations need to be tested. If they are consistently off, future durations are affected. Furthermore, if logic and common sequential activities are missing, trades stack into levels where resource requirements can't be met. Feasibility needs to be studied early and often, and throughout the entire construction life cycle, to effectively mitigate financial risks. By ensuring that schedules are feasible, stakeholders can more confidently plan their business activities to minimize risks and losses, and maximize ROI and business growth on every project.

Step 5: Predictive Analysis

Without a simple way to effectively and accurately predict project and milestone completion dates, or understand the drivers of risk toward achieving them, the construction industry suffers greatly. Running predictive analytics on a project schedule helps inform owners and contractors of the estimated project completion date, enabling all parties to plan better, and minimizes cost exposure due to uncertainty. Predictive analytics also informs stakeholders of the likely path toward the successful achievement of major milestones. By constantly analyzing historical performance and variances, key trends can be identified, which can then be used to more accurately predict future end dates.

Note that predictive analytics refers to the likely critical and near critical path(s) going forward — not the current scheduled critical path. It takes into consideration all that has been learned from performance history to date and runs thousands of scenarios to identify the most likely outcomes and the factors that drove them. This type of analysis is probably the most powerful available in construction. Unfortunately for stakeholders, accurately predicting future outcomes requires studying quality, performance, delay, compression, and feasibility to accurately. Doing so manually is also time consuming and costly, so stakeholders are not keen on investing in it.

Having access to better scheduling analytics process across the project life cycle results in enhanced accountability, heightened performance, increased communication and improved decision making. Automating the process provides a win-win for all stakeholders, minimizing risk and cost and delivering a higher likelihood of meeting expected outcomes.

About the Author

Michael Pink, MBA, is the CEO and founder of SmartPM Technologies, a SaaS software company headquartered in Atlanta, Ga.

SmartPM is a cloud based, full-service schedule analytics and project controls platform designed by industry experts with one mission in mind: to provide stakeholders with a tool to evaluate project performance in real-time, identify critical risk issues, and reduce delays and potential disputes.

For more information, visit https://smartpmtech.com.