

## Top Three Impacts on Your Project's Critical-Path Method Scheduling

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Anyone connected to the construction industry understands the importance of critical-path method scheduling. CPM schedules help identify the activities required to complete a project, as well as help determine critical activities that absolutely can't be delayed.

As a contractor, it is vital to trust your critical path; if it's developed properly, you'll know exactly what needs to be done to achieve the scheduled completion date. When you don't, your project is at odds with itself. To trust your critical path, you need to trust your data – which starts with ensuring every CPM construction schedule you create, analyze, review, or deliver is of a high-enough quality that performance can be successfully analyzed.

While quality metrics or indicators vary from project to project, it's important to remember that they are just that – indicators. Each project, with its unique characteristics and approaches, requires a customized strategy. However, there are a few key metrics that should always be examined to maintain a reliable schedule, providing a flexible framework beyond the baseline.

### UNDERSTANDING YOUR CPM CONSTRUCTION SCHEDULE

One of the most important features of a CPM construction schedule is float. This represents the flexibility in your project timeline. There are two distinct types of float:

» **Total Float:** This is the amount of time an activity can be delayed without impacting the overall project completion date.



» **Free Float:** This identifies how long an activity can be delayed without affecting the start of subsequent tasks.

When float values are zero, it means there is no room for delay without affecting the project's end date. The activities with zero float form what is called the critical path – the sequence of tasks that directly determine the project's completion. These activities are non-negotiable; any delay here directly impacts project delivery.

CPM construction schedules are designed to manage the complexity of large-scale projects with multiple stakeholders and dependencies. However, the integrity of your schedule – and your ability to meet project deadlines – relies on the accuracy of float values. If these values are unreliable, so is

your critical path. Building schedules without best practices leads to confusion, making it difficult to distinguish between activities that are truly critical to the project's end date and those that are more ancillary. This confusion can lead to delays, cost overruns, and mismanagement of resources.

To ensure that your schedules are both accurate and reliable, it's essential to understand the primary risks that can compromise their quality. By addressing these risks head-on, you can make data-driven decisions that keep your projects on track. Read on to explore the top three risk drivers of CPM construction schedule quality so you can make informed decisions:

### **1. Avoid Missing Logic**

There should be no missing logic in any schedule, no matter what kind of project it is; every activity must have a predecessor and a successor. Unfortunately, this is also quite often an area of error. There are only two exceptions to this rule: The first activity in the project should have no predecessor, and the last activity can't have a successor. Aside from those two exceptions, every activity should have one task before it and one after it; otherwise, the schedule is generally incomplete. The type of logic used can vary, but the important thing is to keep that logic present throughout your schedule to avoid the risk of open-ended activities.

An activity without a predecessor or successor is referred to as an open-ended activity. This term indicates that someone overlooked the necessary logic. Such activities pose a significant risk to your project's schedule – and to its successful and timely completion. Open-ended activities are a risk issue because they will open up float even if the activity is a finish milestone. Typically, the more float opens, the more compression happens. When this happens, you cannot trust your critical path.

### **2. Minimize Long-Duration Activities**

According to the DCMA, no activity in your CPM construction schedule should exceed two months in duration. While there are specific activities, like procurement, that may naturally extend beyond two months, the underlying principle remains important. This best practice aims to ensure that your schedule includes an appropriate level of detail. In essence, activities should be broken down into manageable, bite-sized pieces. As

a rule of thumb, a week's duration is ideal, but try not to exceed a month. If necessary, keep activities under two months.


If you think about construction activities, specifically ones that have a long duration, it would be hard to gauge progress objectively. This is a risk because activities can be falsely labeled as critical or non-critical without an accurate progress calculation – once again, masking your true critical path.

### **3. Be Mindful of the Overuse of Constraints**

The main problem with constraints is exactly what you might expect: They can mask the real critical path in your CPM construction schedule. By setting artificial start and end dates, constraints force multiple paths to seem critical when, in reality, they are not. For example, if a finish-no-later-than constraint is applied, it might artificially make a non-critical activity appear critical, skewing the actual critical path. This can lead project teams to focus on the wrong activities, leading to inefficient resource allocation, and potentially delaying the project.

On the other hand, hard constraints, like must-finish-on or must-start-on, can create an illusion that the project is on track, even if there are underlying delays. This happens because the constraints override the natural logic-driven sequencing of tasks. This false sense of security can cause project teams to overlook emerging risks or delays, as the constraints prevent them from seeing the true impact of issues on the overall schedule.

When issues like missing logic, long durations, and/or excessive constraints make their way into your project, it becomes harder to accurately track progress and predict future risk. The presence of these issues can make it unclear whether tasks are progressing on time due to effective management or simply because of schedule mismanagement.

It should be noted that these three areas are not the only ones that need to be managed effectively to keep a project on track. However, they are at the top of the list, because they have the most potential to make or break a schedule. A healthy respect for their impact – both positive and negative – can make a world of difference. 



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### About the Author

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Michael Pink is the CEO and founder of [SmartPM Technologies](#), a SaaS software company headquartered in Atlanta. SmartPM is a cloud based, full-service schedule analytics and project controls platform designed by industry experts to evaluate project performance in real-time, identify critical risk issues, and reduce delays and potential disputes.

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### About the Article

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