## SmartPM®

# Common Breakdowns in Schedule Management

## THE TOP 5 THAT DERAIL PROJECTS

CPM schedules are the backbone of effective construction project management, mapping out the critical steps to ensure a project's successful execution. However, managing these schedules involves navigating a complex landscape of risks that can significantly impact budgets and timelines. In this e-book, discover the key elements driving construction projects and learn how combining detailed CPM schedule data with proactive project controls along with collaborative team efforts effectively preempts and manage the risks that often lead to setbacks.

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## About the Author

Michael Pink, founder and CEO of SmartPM Technologies Inc., is a seasoned professional in the construction industry, bringing over 20 years of experience in project controls, risk management, and dispute resolution. As a consulting professional, Michael specialized in capturing, organizing, and analyzing complex data sets related to commercial construction projects and converting them into meaningful insights designed to positively influence the bottom line.

Having seen firsthand the immense value that data analytics offers to the industry, Michael founded SmartPM in Atlanta, Georgia, in 2016 - a technology company that delivers advanced analytics in an automated fashion to stakeholders involved in commercial projects.  By leveraging a multitude of trade secrets, artificial intelligence, and machine learning, Pink's approach to SmartPM is rooted in a commitment to practical problem-solving and helping project teams make informed, data-driven decisions.

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## About SmartPM

SmartPM® is an AI-driven Automated Project Controls™ and Schedule Analytics solution built for construction. From handling intricate project portfolios to drilling down into simple, actionable insights, the platform offers automated advanced analytics, comprehensive dashboards, and reporting features to enhance accuracy, predict outcomes, and maintain project timelines. With its cloud-based, unlimited user policy, SmartPM seamlessly integrates into operations of any scale, providing an intuitive user experience while keeping all stakeholders well-informed and minimizing risks.

## About the Data:

The statistical information regarding schedule quality and the subsequent metrics presented in this e-book are based on schedules SmartPM has gathered over the years from clients, partners, and industry relationships, totaling over 45,000. SmartPM has organized this information and subsequently established a grading structure customizable to each project and company for optimal results. This grading framework builds upon the DCMA 14-point metrics, transitioning from a binary pass/fail assessment to a more comprehensive A-range grading system.

For information on the Customizable Schedule Quality Assessment, email info@smartpmtech.com

# Schedule Quality Metrics Explained

## Contents:

# INTRODUCTION

**Navigating the Puzzle: Understanding the Role of CPM Schedules**

Construction projects are like puzzles – each piece, task, and milestone has to fit perfectly to create the desired outcome.

At the heart of this intricate process lies the CPM schedule, which serves as a map guiding teams toward project completion. As valuable as this map might be, its effectiveness is often undermined by various challenges.

**The Current Landscape**

Commercial construction projects are no stranger to overruns, delays, and disputes. However, with a deep dive into schedule data, we not only gain an improved, holistic understanding of projects but also reveal several recurring challenges.

By exposing these challenges, we hope to give you a clear understanding of how to identify and improve upon these risks in future project builds.

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**The State of Construction Scheduling** (As Per the Data)

A rigorous analysis of over 45,000 CPM schedules has shed light on several areas of concern and potential improvement:

- A mere **12%** of schedules are consistent with industry best practices, indicating a broad gap in the application of the best practices essential for effective project management.

- By the project midpoint, fewer than **12%** of schedules match their intended progress goals. This deviation often leads to complications, such as trade stacking and compression.

- **90%** of construction projects do not meet their schedule performance index (SPI) targets.

- Project compression is prevalent in over **60%** of projects.

- An alarming **76%** of projects, when evaluated against their baseline schedules, show signs of delay, highlighting the need for a more proactive approach to scheduling.

**76%**

of all projects show
signs of delay.
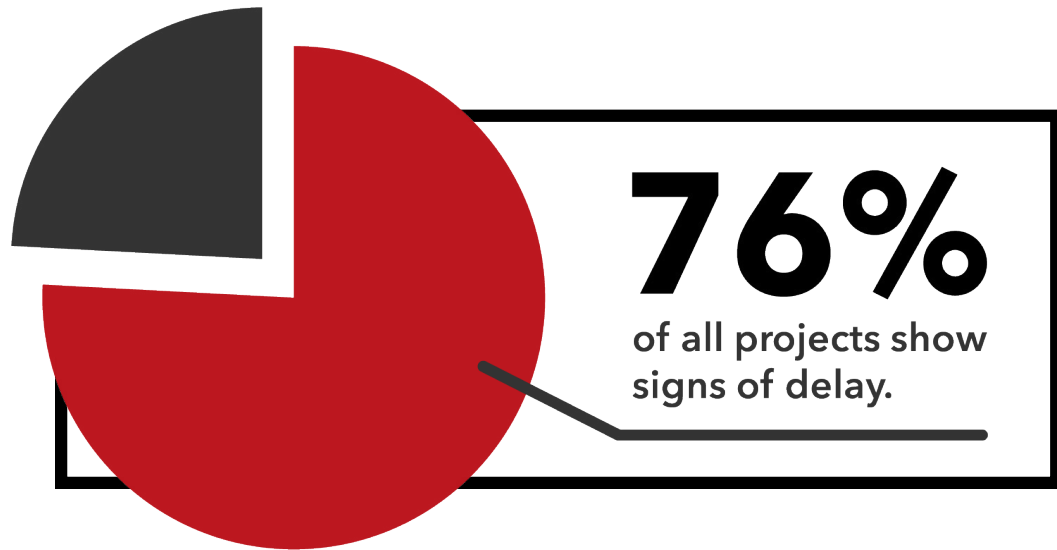
## Unraveling the Central Issue

Beyond the superficial reasons for project delays, a pressing question emerges: How frequently do projects exceed their original baseline? 76%. This is a high number – relaying that even minimal extensions can amplify cost and resource allocations.

While many factors contribute to these delays, the recurring themes hidden in the data uncover significant breakdowns in the initial scheduling process.

To achieve a more cohesive and innovative approach to scheduling, the industry's success relies heavily on actionable, data-driven insights.

By diving into schedule analytics, we offer an opportunity to identify weak spots, enhance best practices, and establish a more streamlined approach to project management. We hope that addressing these insights head-on will lead to more consistent project outcomes and better risk management.

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# BREAKDOWN #1
## Not Utilizing Best Practices, Resulting in Poor Schedule Quality

- 88% of Schedules present medium to high risk of being ineffective.

- Schedule quality typically erodes over time.

- Missing logic, missing "crew" logic, and high durations are the biggest risk issues.

- Poor schedule quality results in erroneous float values and inaccurate critical and near-critical paths.

Poor schedule quality, and inadequate understanding of best practices concerning schedule quality, are the biggest risks in schedule management. With only 12% of schedules built well enough to manage a job, the remaining 88% exhibit a medium to high risk being ineffective.

## The Consequences of Ineffective Scheduling

CPM schedules are more than just a collection of tasks, dates, and durations. When built with integrity, they relay important information regarding a project's trajectory. However, the reality often falls short. Many schedules, despite appearing logically sound, fail to deliver crucial data, particularly regarding accurate float values, which are essential for project management.

- **Total Float:** The amount of time a task can be delayed without delaying the project's end date.

- **Free Float:** The amount of time a task can be delayed without delaying the early start date of any immediately following tasks.

The issue of inaccurate float values leads to a distorted view of both critical and near-critical paths. This problem is widespread, as evidenced by the 90% of projects that fail to meet their intended Schedule Performance Index. The crux of this issue lies in improper management of float, significantly impacting project outcomes.

## Understanding Float and Its Significance Scheduling

Float plays a crucial role in managing project resources and intended timelines. If you're using a CPM schedule the way it was intended – to manage a job and make decisions based on criticality – then float becomes your guide for resource allocation with the goal of maintaining the project's end date:

- **Critical Activities (Zero Float):** These are the tasks where any delay directly threatens the project's completion date. There is no wiggle room.

- **Near-Critical Activities (Minimal Float):** These tasks have a small margin for delay before they, too, begin to influence the project's end date negatively.

- **High-Float Activities:** These tasks offer more flexibility, allowing for more substantial delays without immediately jeopardizing a project's timeline.

## The Domino Effect of Inaccurate Float Values

Decisions anchored around inaccurate float values are essentially shots in the dark. If decision-makers can't rely on float values due to deviations from best practices, the entire project becomes vulnerable to delays and disruptions. In essence, the lack of adherence to best practices doesn't just affect the quality of the schedule but reverberates throughout the entire project life cycle, introducing risk, inefficiencies, and potential cost overruns.

# The Erosion of Schedule Quality Over Time

## The Deteriorating State of Schedules

While an initial 88% of schedules are already characterized by a medium to high risk of being ineffective at their baseline, it's concerning to note that this statistic tends to worsen over the lifespan of a project. This means the effectiveness of schedules diminishes as projects progress, introducing further risk.

# The Hidden Risks of Missing Logic

When diving into key schedule quality metrics – based on the DCMA-14 point check coupled with additional unique indicators – certain issues introduce significant risk into schedules. Predominantly, these are missing logic, the absence of "crew" logic, and overly long durations.

### The Biggest Risk Issues for Schedule Quality

- Missing Logic

- Absence of "Crew Logic"

- High Durations

Failure to ensure each activity has both a successor and a predecessor results in excessive float. This oversight may falsely suggest an activity (or a sequence of activities) has an extended period for completion, which might be up to the end date of the entire project. However, in many cases, these tasks are clearly part of the workflow. They must be completed; however, since they are missing logic, the critical path and associated float values become unreliable.

## Crew Logic and its Absence

Assessing average float values across numerous projects reveals a startling observation: 80% of schedules have excessive float, a phenomenon traced back to missing crew logic.



**80%** of schedules have excessive float due to missing crew logic.
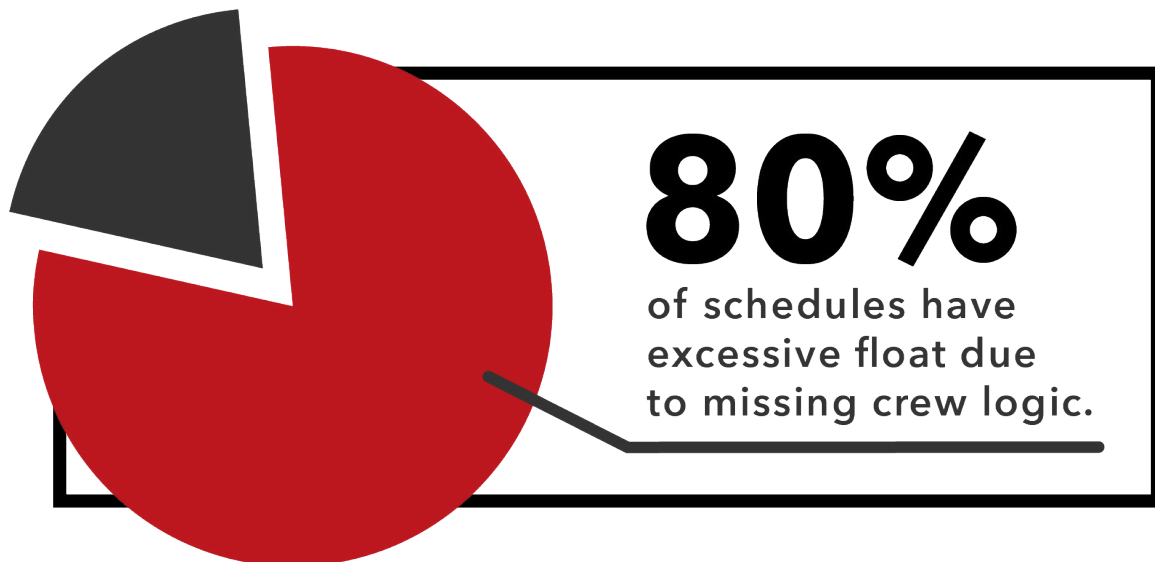
To illustrate, consider the construction of a 10-story building. Without crew logic, trades move haphazardly from one floor to another with no clear sequence. The resulting confusion can lead to trades overlapping and stacking automatically, complicating workflows and throwing off the critical path. This is especially true in larger structures where missing crew logic can cascade into logistical nightmares, with trades clashing and schedules becoming unresponsive.



When a building has missing crew logic, the critical path runs up the structure or enclosure and across the top floor, enabling project teams to think that only the structure and top floor are critical. However, as various trades get involved through the structure and do not have crew logic, activities get pushed off, true float values get modified, and the critical path does not change. When this happens, you cannot know which trade has the most impact on managing towards an end date.

## The Perils of High Durations

Long activity durations introduce a unique set of problems. They tend to monopolize the critical path due to their inherent length. Such extended durations can challenge accurate status updates, given the absence of a clear framework to gauge progress.



Figure 1: 3-month long activity on the Critical Path

An activity spanning three months, as seen in Figure 1, is hard to monitor without precise controls in place. This lack of granularity in the schedule can obscure true progress and create challenges on-site.

## The Cumulative Impact of Schedule Shortcomings

These identified risks and gaps in schedule creation and maintenance culminate in two major pitfalls: erroneous float values and inaccurate representations of critical and near-critical paths. The core strength of a CPM program lies in its capacity to prioritize resources efficiently. However, without consistent schedule quality, this advantage is thrown away, leading projects astray and potentially inflating costs.

# The Impact of Missing Logic and Finish Constraints on Project Scheduling

A well-structured schedule aids in resource allocation, task prioritization, and achieving project milestones. However, the presence of missing logic and finish constraints can disrupt this flow. Let's explore this topic by examining the provided P6 schedule from a project.

## Example: Missing Logic & Finish Constraints
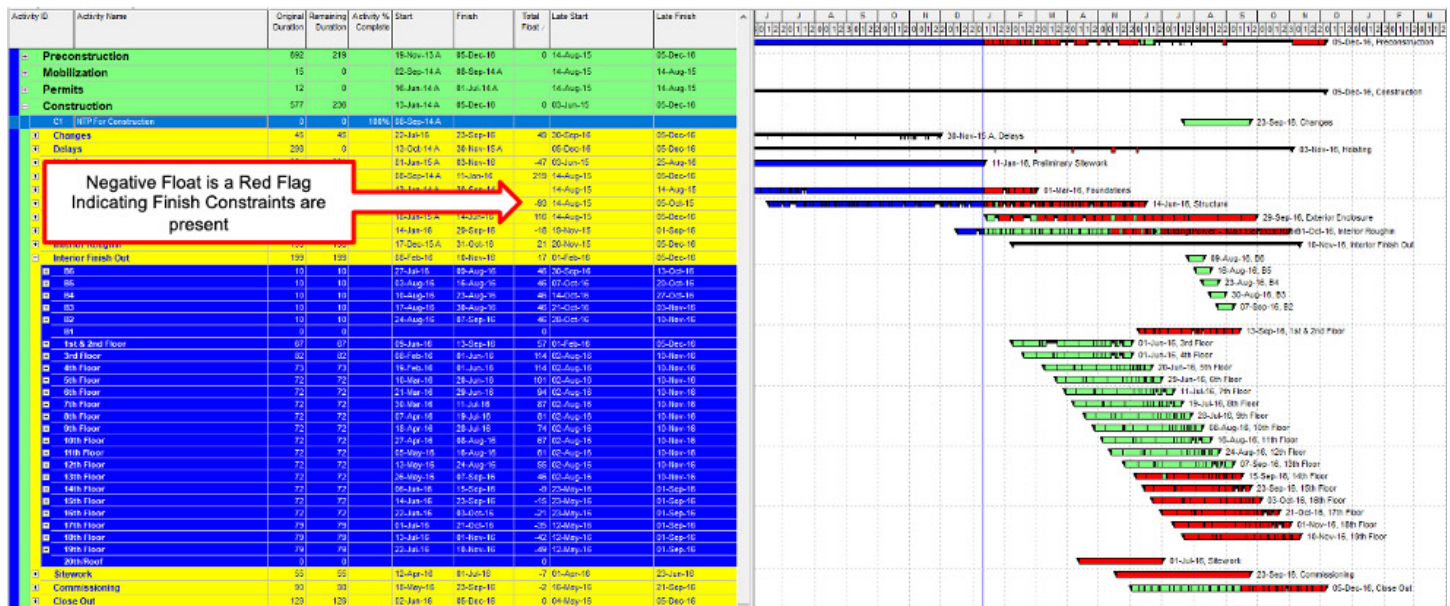


Figure 2: Finish Constraints and Negative Float

## Decoding the Schedule

### 1. Red Flag - Negative Float:

Figure 2 prominently shows activities with negative float, highlighted in red. This negative float indicates the presence of finish constraints.
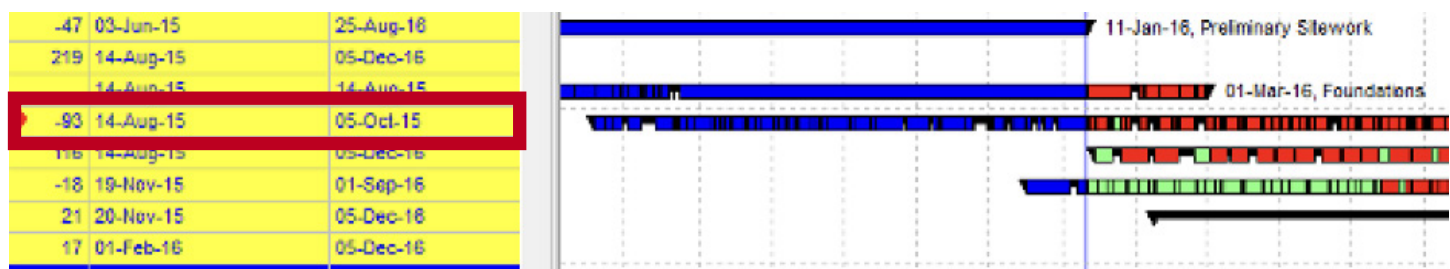


Figure 3: Highlighted section showcasing Negative Float values due to Finish Constraints

### 2. Overwhelming Critical Areas:

At first glance, the sheer number of tasks that appear to be critical can be intimidating. Numerous areas, ranging from preconstruction to close out, are displayed as critical (Figure 4).
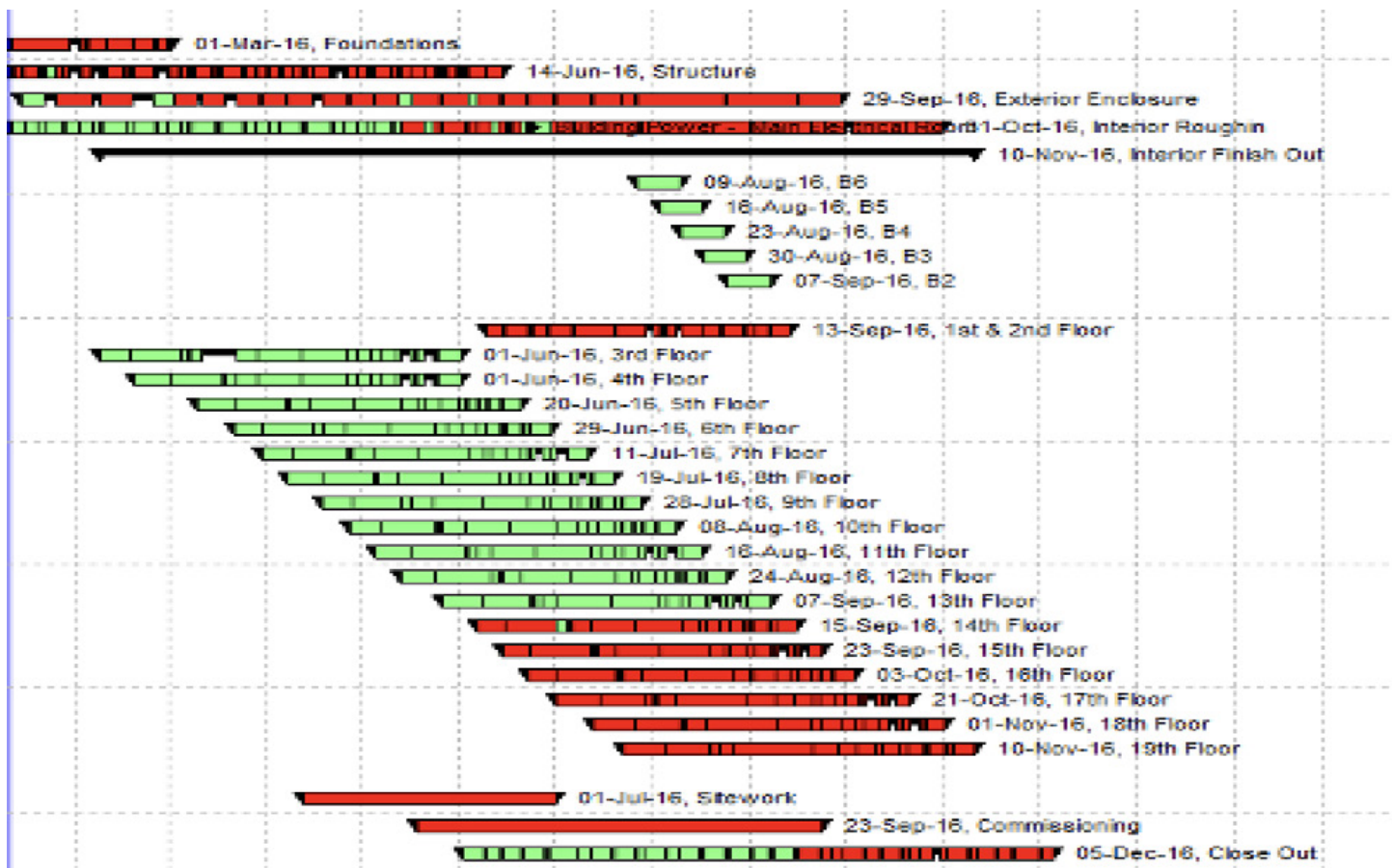
Figure 4: Several Critical Paths highlighted in the schedule.

### 3. Masking the Longest Path

The crucial downside of finish constraints are their potential to obscure the genuine critical path. By artificially setting end dates, multiple paths appear critical in Figure 4, overshadowing the project's actual longest path.

### 4. True Critical Path vs. Perceived Path

As per the schedule, areas such as preconstruction, foundation, structure, and enclosure are genuinely critical. However, other segments like rough-ins, first floor, top floors, and more also appear critical due to the distortion created by finish constraints.

## The Underlying Risks

The inherent risk with such a schedule is the mis-allocation of resources, resulting from the negative float and misleading critical paths. Without a clear critical path, several other risk areas are introduced as well.

**1. Resource Management:** A project manager could unknowingly allocate resources to tasks that aren't immediately critical, resulting in inefficiencies and potential delays.

**2. False Alarms:** With so many tasks appearing critical, there's a risk of "crying wolf" too often, leading to teams not responding urgently when a genuine issue arises.

3. **Hidden Delays:** Not recognizing the true critical path means potential delays might remain unnoticed until it's too late to address them effectively.

4. **Budget Overruns:** Inefficient resource allocation can increase costs, as tasks might take longer than planned due to the lack of required resources.

A project schedule, though a robust tool, is only as effective as its accuracy. Missing logic, finish constraints, and other scheduling nuances can significantly skew perceptions and lead to inefficiencies. By understanding and identifying these elements, project managers can make more informed decisions, ensuring smoother project progression.
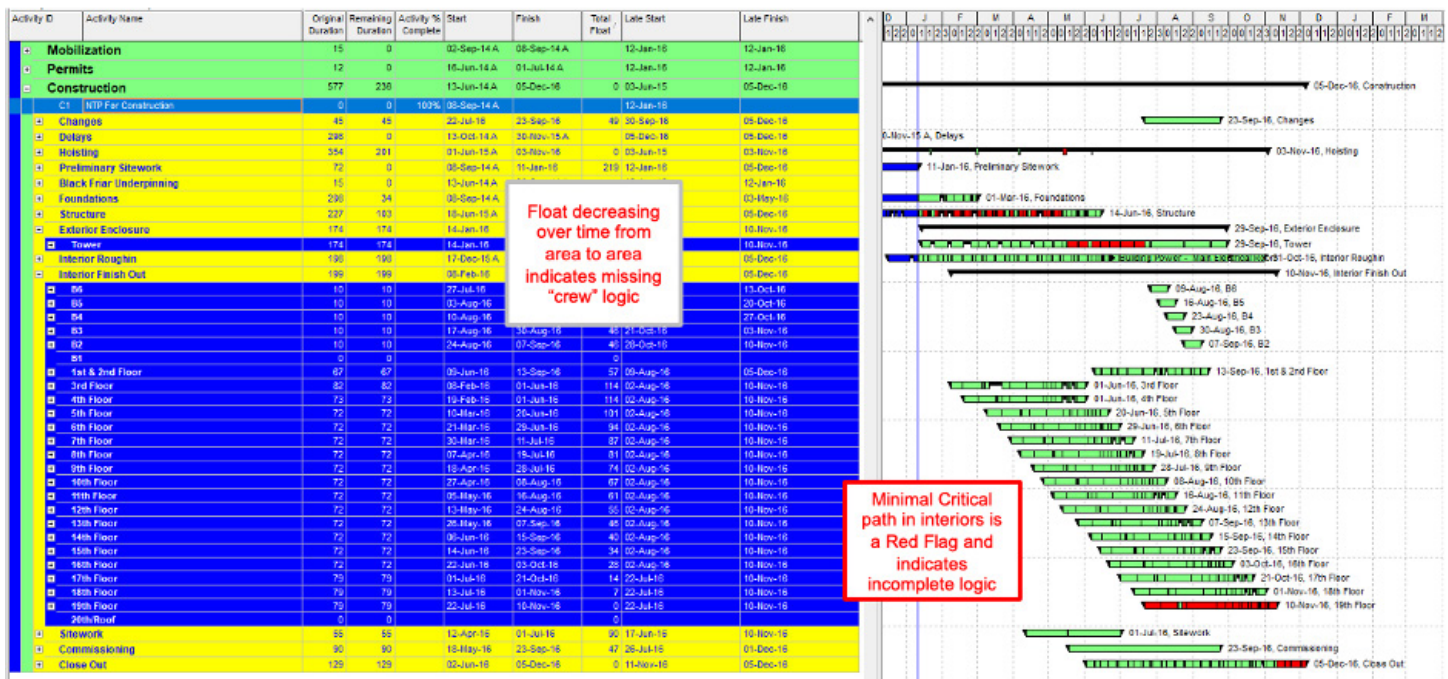
## Example: Removed Finish Constraint



Figure 5: Removed Finish Constraints

## 1. Critical Path Alteration

As seen in Figure 5, once the finish constraint is removed, the critical path navigates upwards through the structure, exterior enclosure, and culminates at the top floor. Notably, if there is a delay on the top floor itself, the entire project's timeline could be at risk.

## 2. Float Discrepancies

Float or slack is the amount of time an activity can be delayed without delaying the project. A significant amount of float in the lower floors suggests that there's a lot of flexibility in when these activities can be completed without affecting the overall project timeline.

As provided:

- 3rd & 4th Floors: 114 days

- 5th Floor: 101 days

- 6th Floor: 94 days

- … and so on till the 19th and 20th floor/roof with zero float

Such disparities in float values indicate that there's an uneven distribution of activities across the floors. This poses risks, especially when considering crew and resource allocation.

## 3. Missing Logic and Crew Logic

This is particularly concerning. In the real world, resources are finite. The current schedule assumes there's a possibility to stack activities, i.e., execute them simultaneously. In reality, getting multiple crews, especially for similar tasks, is challenging. Even if three crews are needed per the schedule, resource constraints could still lead to delays.

## 4. The Risk from Automatic Compression

Modern CPM scheduling software can automatically compress the schedule to find the optimal path.  But, without the appropriate logical relationships, this can lead to an unachievable plan.

## 5. Inaccurate Representation of the Critical Path

In a construction project, especially a building such as this one, the critical path should ideally move through areas with the highest concentration of trades and activities. Currently, this is not reflected in the schedule.

So, while this schedule has removed the finish constraint, it still highlights the inherent risk of not thoroughly considering project logic and potential resource constraints. Let's see what happens when crew logic is added in.
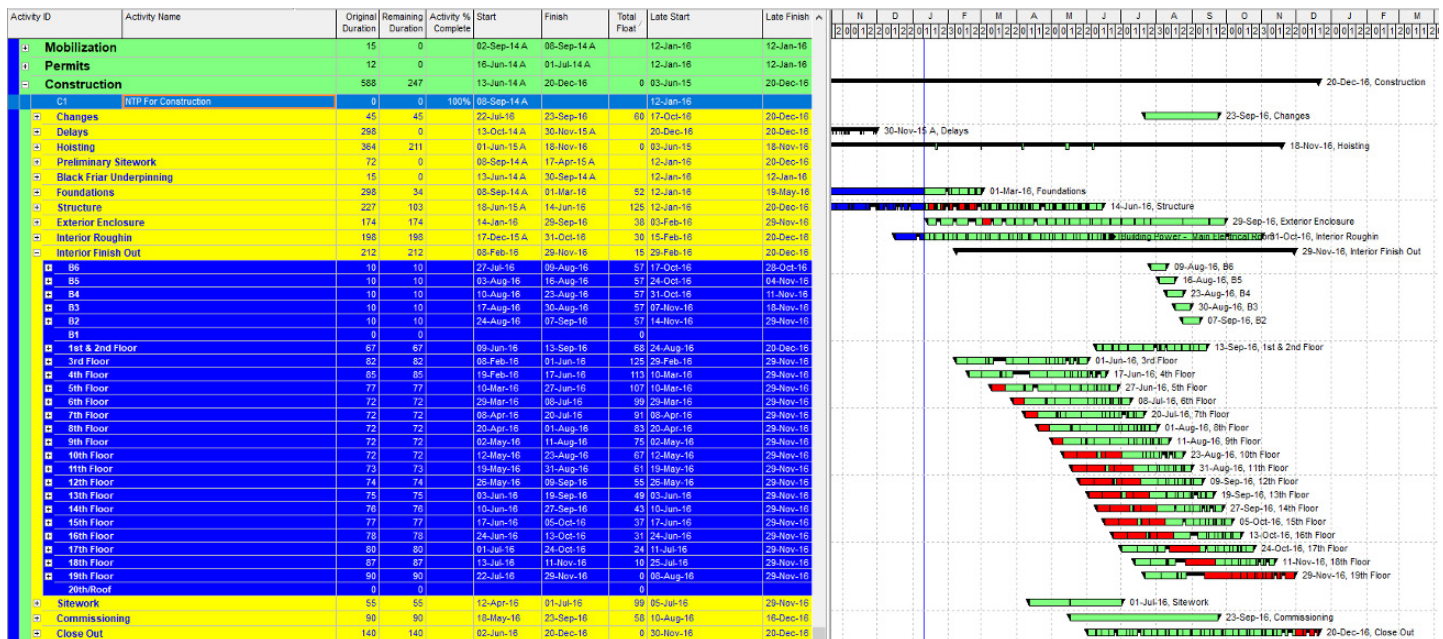
# Example: The Addition of Crew Logic



Figure 6: The addition of Crew Logic

The addition of crew logic in Figure 6 highlights the intricate dynamics and interdependencies involved in large-scale construction projects. Much like the image shows, a well-structured schedule is not merely a list of tasks. When Crew Logic is added, it zooms into the heart of the project: the critical path. This is where the resources, both in terms of finances and labor force, are heavily invested from one day to the next.

Ascending the building showcases how critical trades are interlocked with one another. As you move upwards, you can observe the reliance of one trade on the other, painting a comprehensive picture of the project's progression. By weaving in Crew Logic, the schedule gains an innate resistance to compression, preventing the timeline from being unduly shortened.

This enhanced viewpoint is invaluable as it pinpoints which trades are critical at different project milestones. Should any delays occur, the schedule, protected with Crew Logic, communicates the need to mobilize additional resources to maintain alignment with the projected end date.

Fundamentally, low-quality schedules introduce unwarranted risk to projects. Deviating from best practices can result in a distorted critical path, which, in turn, impacts decision-making. The integration of hard logic with crew logic anchors decisions in reality, ensuring the project's objectives are not only met, but exceeded.

# BREAKDOWN #1: RECOMMENDATIONS
## How to Analyze Schedule Quality Risk

### 1. Establish Schedule Quality Protocols for Your Enterprise and Initiatives

Every organization, regardless of its scale, should solidify its stance on the quality of schedules. These standards ensure uniformity, predictability, and a higher chance of project success.

### 2. DCMA Alone Doesn't Suffice

While the DCMA's 14-point check is an excellent baseline, it's merely the tip of the iceberg. Projects vary based on numerous factors – from budget and scale to geography and nature. Every firm should go deeper, understanding the nuances of each risk, especially considering their frequency and impact on different types of projects.

### 3. Educating All Stakeholders on Schedule Best Practices and Associated Risks

Awareness is the first step. Once the potential pitfalls and their implications are identified, the next step is establishing internal benchmarks. This process isn't just about setting standards; it's about cultivating a culture where everyone, from top-tier executives to project managers, understands and appreciates the significance of these standards.

Why do certain metrics pose risks? How do they influence the project manager or superintendent? If the project's team views the scheduling process as a mere formality, its true potential remains untapped. Therefore, education is paramount. The goal is to instill a deeper comprehension of why certain aspects, like missing logic or extended durations, can jeopardize a project. Proper training can foster trust in the process, leading to more consistent results.

This oversight does not fall solely on schedulers or site teams; even the executive tier needs a clear understanding of these challenges. Their decisions shape the project, so having a holistic view of its status, potential risks, and ongoing delays is critical. Without a firm grasp of scheduling best practices, it's impossible to uphold and enforce these standards, leading to a disjointed internal process.

### 4. Real-Time Monitoring and Rectification of Schedule Quality Discrepancies

Setting benchmarks and training personnel is half the battle. The true challenge lies in consistent adherence to these standards. The dynamic nature of construction means that deviations from the plan are a given. Whether it's resource constraints, unexpected change orders, weather disruptions, or any other myriad challenges, everything must be reflected within the schedule.

A robust system, built on established standards, ensures that every stakeholder is well equipped to identify and address these challenges in real-time. Take schedule quality deterioration over time, for example. With the right processes in place, such issues can be detected and rectified promptly, ensuring the project remains on track.

# BREAKDOWN #2
Making Schedule Changes that are not reviewed, discussed, and bought into

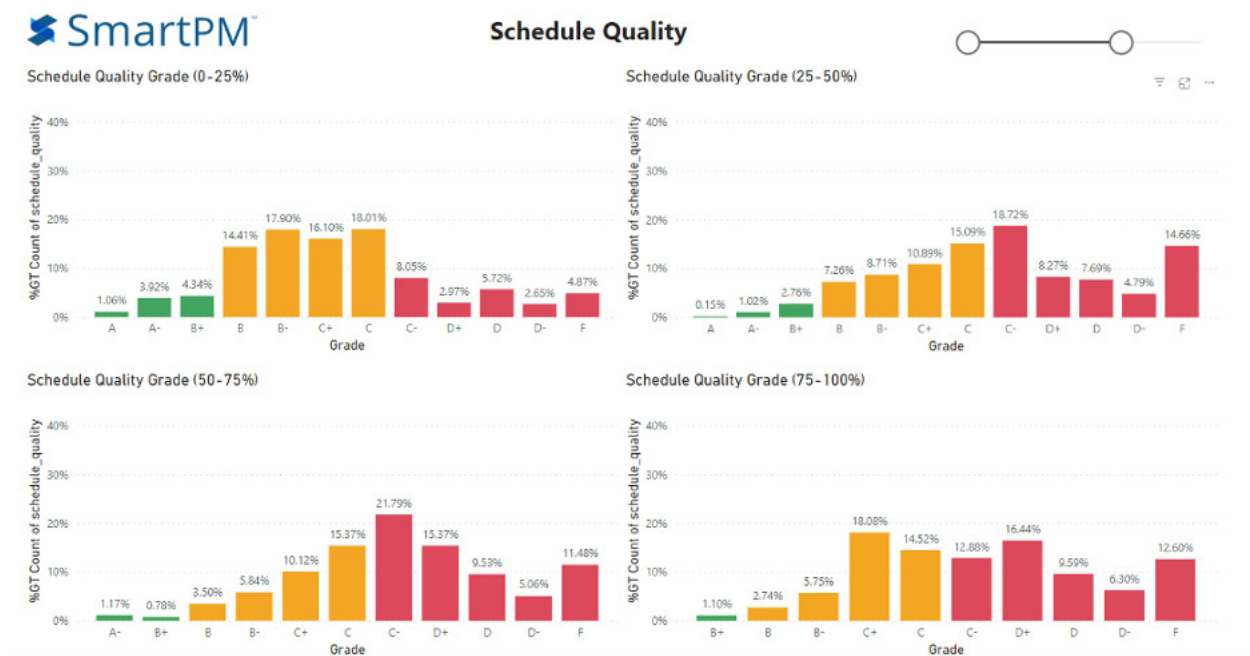### 1. The Decline of Schedule Quality Over Time:



Figure 7: The decline of Schedule Quality throughout the project life-cycle.

Figure 7 shows a distribution of schedule grades over different completion percentages. A clear pattern emerges where schedules of higher quality (B+ or higher) reduce in frequency as the project progresses while lower quality schedules (C- or lower) increase.

## Implications

- The decline in quality grades with increased project progress signifies a trend of deteriorating schedule management.

- A grade of B+ and above represents schedules following best practices. As projects progress, the decreasing prevalence of these high grades means adherence to best practices diminishes.

- On the other hand, a rise in schedules graded C- or lower points towards a growing risk in schedule management. This indicates changes are happening to the schedule without considering quality, leading to erroneous critical paths.

## 2. The Impact of Compression on Scheduling



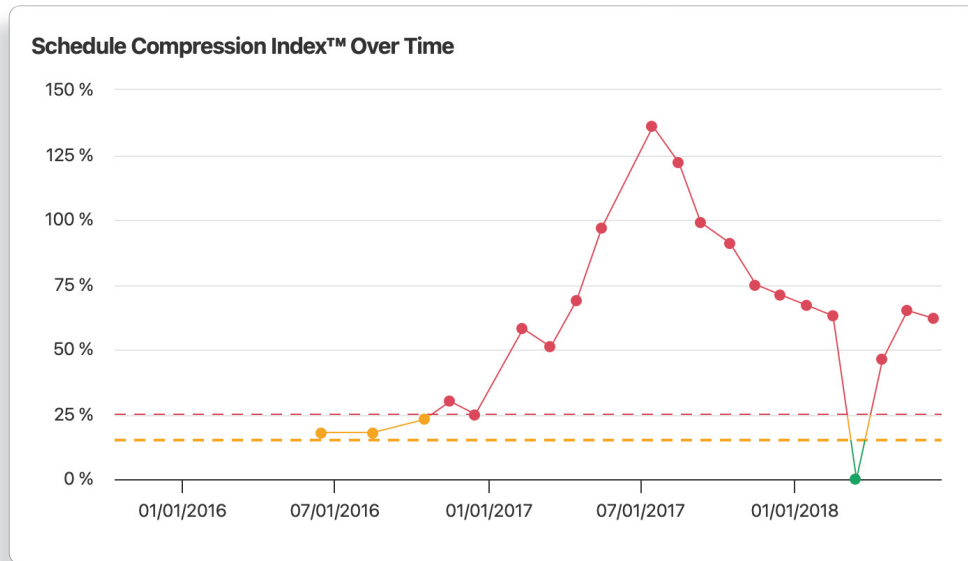**Schedule Compression Index™ Over Time**

Figure 8: Schedule Compression Index™ Over Time

Figure 8 displays a fluctuation in compression indexes throughout the project life-cycle. A sharp peak is observed around mid-2017, followed by a significant drop and stabilization.

## Implications

- Compression is indicative of changes made to the schedule, especially when unforeseen delays occur, representing the utilization of float and the shortening of critical paths.

- The dramatic rise and subsequent drop in the compression index suggests that there were extensive changes made to the schedule, possibly in response to unforeseen challenges or setbacks.

- A compression index above 125% implies an impractical workload towards the end of the project. With such a high compression rate, the resources and adjustments needed to stay on track are not feasible.

- Any compression over 25% is problematic. It denotes an attempt to achieve 25% more work in the remaining project duration. If this remains unaddressed, the project team might find themselves working extra hours or weekends to meet target completion dates.

## The Practical Implications of Compression

Compression not only provides insights into schedule changes but also indicates the feasibility of the project's end date. It quantifies extra workload and helps teams gauge whether set project end dates can be achieved without excessive strain on resources or labor force.

While changes to the schedule are sometimes unavoidable, they must be approached cautiously, ensuring quality is not compromised. Schedules that aren't reviewed and agreed upon can lead to compression, indicating a discrepancy between the work left and the time remaining. Monitoring both schedule quality and compression helps predict potential overruns, delays, and the feasibility of project completion dates.

## Analyzing the Persistence of Critical Changes

An essential facet of construction project management is maintaining and enhancing quality throughout the project. One key determinant of this quality is how activities, especially critical ones, are managed and adjusted throughout the project life-cycle.
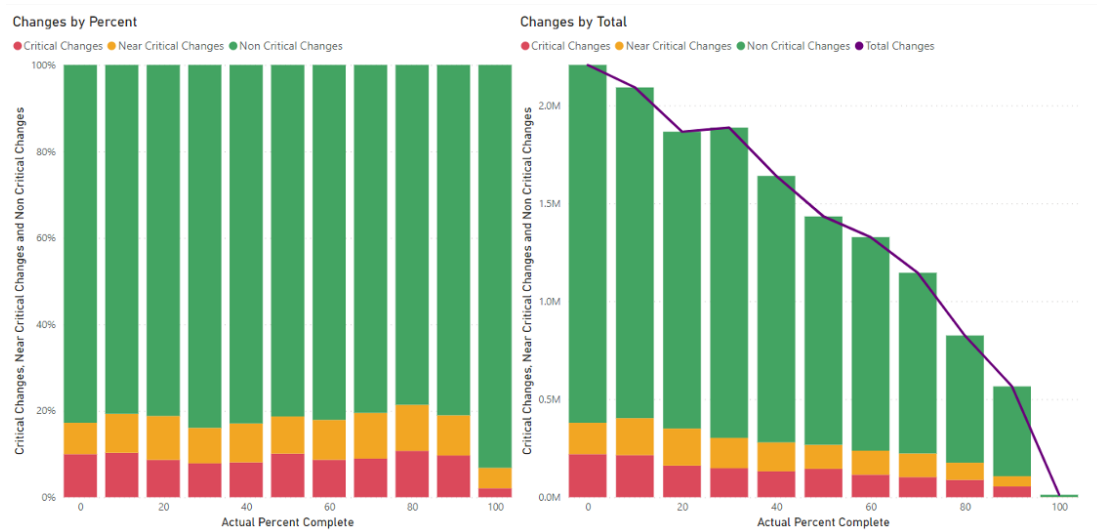


Figure 9: Schedule Change Criticality by Percent vs. Total Number of Changes

As seen in Figure 9, a steady 20% of changes across every project update pertain to critical and near-critical activities. This consistency carries significant implications:

- **Adjustments to the Critical Path:** The consistent critical changes imply that the critical path is frequently modified. Such modifications can be due to shifting priorities, unexpected challenges, or resource changes.

- **Shifting Durations:** The durations of certain activities are likely being reduced. This can be an attempt to expedite the timeline and keep the project on track.

- **Logic Modifications:** The logical sequence or dependencies between tasks might be undergoing modifications. This can affect the project flow and potentially introduce risks if not managed properly.

- **Trade Stacking:** The overlapping of trades or tasks, usually as a countermeasure for delays, seems evident. While this can sometimes provide short-term solutions, it can lead to quality compromises in the long run.

## Deciphering the Rationale Behind Critical Changes

Most adjustments to the schedule are reactive measures to counteract delays. This consistent reaction suggests two critical insights:

> **1. Inadequate Delay Management:** The repetitive nature of these changes underscores a challenge in effectively preempting and managing delays. This is a red flag, particularly as it relates to maintaining schedule quality.

> **2. Predominant Use of Crashing:** The frequent response to these delays is to 'crash' the schedule, i.e., to shorten project duration by any means possible, even if it requires additional resources.

## 1IN5
### Schedule Changes are Critical or Near-critical

With 1 in 5 changes being critical or near-critical, it's evident that project delays are a recurring theme. While it's logical to steer the project back on course using the critical and near-critical paths, it's concerning that there seems to be a minimal focus on preserving schedule quality.

Moreover, the persistence of these changes indicates the following:

- The critical path is being modified.

- Durations are shortening.

- Logic is being removed.

- Trades are being stacked to overcome delay.

## However, most changes are done to overcome delay, indicating two things:

> **1.** Delays are not being effectively managed (which relates to quality).

> **2.** The typical response to delay is crashing the schedule.

With 20% of changes being critical or near-critical throughout the project life cycle, delays are inevitable and the typical response is to course correct through the critical and near-critical paths, which is reasonable. However, this story indicates there needs to be more emphasis on schedule quality, especially concerning changes altering the critical path.

And, while course correction is essential, there are some underlying correlations to schedule changes that might go unnoticed until it's too late.

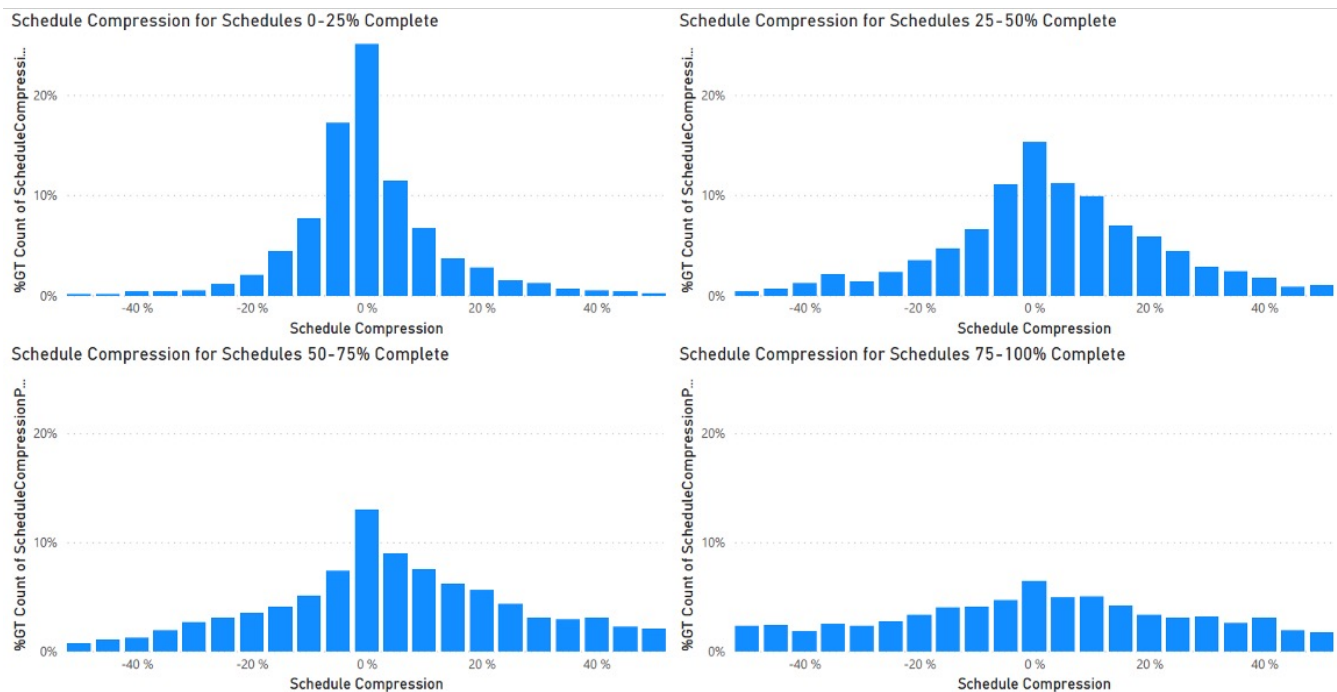# The Correlation Between Schedule Changes and Compression



Figure 10: Schedule Compression Indexes throughout the project life-cycle

Figure 10 presents a detailed representation of schedule compression during the lifespan of a project, divided into phases of completion: 0-25%, 25-50%, 50-75%, and 75-100%.

**Initially (0-25% completion)**, compression levels are relatively mild. There's a noticeable peak around 0% compression, indicating that at the start, most schedules remain close to their original timeline.

However, as the projects progress to the **second phase (25-50% completion)**, there is a more balanced spread of compression. The **third phase (50-75% completion)** also illustrates this. Compression becomes more dominant, which is typical for many projects. The initial stages allow for adjustments, but as deadlines loom, the pressure to stay on track causes continual compression.

Finally, after 75% of the job is complete, compression is relaxed. This is a common story, as relayed in Figure 8.
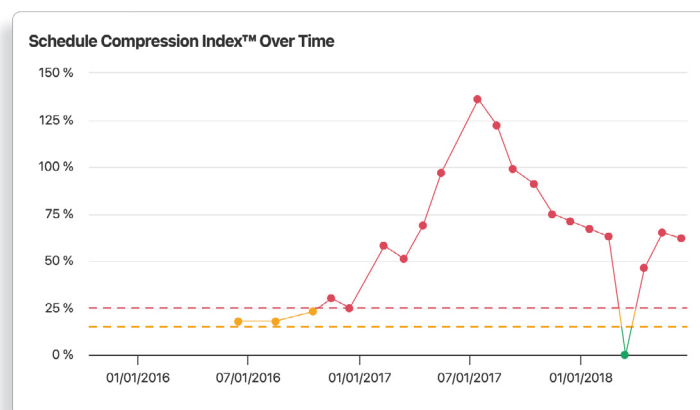


Figure 8: Schedule Compression Index™ Over Time

As the project progresses, compression continually soars, ultimately peaking in mid-July 2017. At this point, the schedule is eased up, and decompression starts to happen.

## The Impact of Maximum Compression

When compression is at its highest, problems arise. Every delay, be it material delivery or workforce-related, begins to stack up. The schedule tightens, and suddenly, there's a realization that the project won't finish on time. This phase is where most claims originate. Stakeholders start pointing fingers at what went wrong around this period, questioning critical activities, and examining the Time Impact Analyses (TIA) that may have pushed the end date.

Once these claims start, they quickly escalate. Lawyers, consultants, and other third parties get involved, ramping up the project's costs.

## Each Delay-Related Cost represents a significant financial impact on your ROI

- Extended General Conditions

- Prolongation of Revenue Generation of Asset

- Acceleration/Inefficiency Costs

- Interest Carry on Bank Loans

- Dispute Resolution / Claims Management Fees (Lawyers/Consultants)

- Liquidated Damages

- Mismanagement of Project Handover/Turnover

- Impacts to Relationships

## The Data Dilemma

Here's a significant issue: the data quality. According to a recent study by FMI corporation:

> **"Bad data – data that is inaccurate, incomplete, inaccessible, or untimely, and can't be used to derive actionable insights – may have cost the global construction industry $1.85 trillion."**

This staggering loss underscores the critical importance of reliable scheduling data in the construction industry. In many cases, scheduling data is incomplete or not detailed enough. With such a lack of clarity, disputes drag on, often leading to prolonged litigation.

The Compression Graph, in its simplicity, lays out the challenges the construction industry faces daily. The takeaway? There's an urgent need to improve data management practices and streamline processes to prevent these issues from coming up repeatedly.

# BREAKDOWN #2 RECOMMENDATIONS
## Overseeing Schedule Updates and Changes

**1. Implement Rigorous Monitoring:** Establish a structured process for overseeing schedule changes to ensure all modifications are thoroughly reviewed and aligned with project goals.

**2. Focus on Critical Paths:** Prioritize and monitor critical and near-critical path changes. Minimizing alterations in these areas can prevent potential delays and overruns.

**3. Assess the Impact:** Before executing any changes, evaluate their effects regarding schedule compression and feasibility. This step helps make informed decisions, ensuring the changes won't negatively impact the project's timeline or deliverables.

**4. Stakeholder Alignment:** Secure agreement from relevant stakeholders before implementing changes. This not only ensures everyone is on the same page, but also promotes accountability.

**5. Avoid Overburdening Trades:** It's crucial to strike a balance when managing trades. Overloading them with tasks in a condensed time frame can label them as "inefficient" when, in reality, they're grappling with the strain of increased demands without corresponding compensation. This can lead to increased costs, reduced productivity, and decreased willingness to engage in future projects.

**6. Strategic Implementation:** Once changes are agreed upon, ensure they align with the overarching project strategy. This keeps the project on track and ensures changes support the project's objectives.

**7. Continuous Review:** Monitor project progress diligently post-changes.  If target dates are consistently missed, consider re-baselining the schedule to reflect the project's status accurately.

**8. Trustworthiness of Changes:** Beware of changes made to counteract past delays. A re-evaluation is necessary if these adjustments reach a point where the schedule's reliability is questioned.

**9. Managing Compression:** Regularly check the state of schedule compression. Understand the resources required – how many more hands on deck are needed? It's vital for compression not to escalate to a point where it jeopardizes the end date.

By adhering to these recommendations, construction projects can better manage schedule updates and changes, ensuring smoother operations and minimizing disputes or delays.

# BREAKDOWN #3
## Changing Actual Dates and Percent Completes Post Original Entry

SmartPM's analysis of scheduled start dates, finish dates, and percent completes indicated some intriguing findings:

- Roughly 55% of schedule updates had modifications to the actual dates.

- About 32% of schedule updates displayed a reduction in percent completes.

## Potential Cause of Discrepancies

Such tendencies indicate a lack of control in the process of updating schedules. These discrepancies could arise from off-site update procedures or a lack of mechanisms for accuracy.

## Implications on Project Evaluation

Undeniably, recurrent changes make it hard to gauge progress and performance. Additionally, ascertaining accurate float values and identifying the critical path becomes challenging.

Consider a scenario where a task, initially reported as 60% complete and not on the critical path, was, in reality, only 30% done and should be on the critical path. Such misreporting promotes mismanagement and delays.

## Risks and Challenges

If there is a recurring pattern of tweaking dates and percent completes, it often leads to contractors requesting additional funds. However, the ambiguity surrounding which tasks genuinely lie on the critical path renders requests debatable, which can potentially culminate in a dispute. This, in turn, strains inter-party relationships, creating additional pressures for on-site teams.

The cascading effects don't stop here. Trade partners who bear financial losses due to these changes often remain uncompensated. However, there are many things you can do to help capture accurate start dates and percent completes, ultimately helping you avoid these issues.

# BREAKDOWN #3 RECOMMENDATIONS
## Capture Accurate Start Dates and Percent Completes

1. **Implement Monitoring Controls:** Establish a system to accurately track start dates, finish dates, and activity progress.

2. **Weekly Site Walks and Updates:** Consistently update schedules every week. The updating process should involve walking the site and noting the required information.

3. **Accountability and Schedule Quality:** Stress the importance of minimizing risks by making it part of a measurable standard for schedule quality.

## Benefits of Weekly Updates

**More Accuracy:** Frequent updating leads to more accuracy, as a weekly recall reduces reliance on memory as opposed to a monthly one.

**Clearer Insights:** Regular schedule updates offer clearer insights into the data. When you update weekly, the most you can fall behind is a week. But, with monthly updates, there's a risk of falling behind by an entire month. Therefore, if things go off track, you'd need a much more aggressive plan to catch up.

## PRO TIP: Quality Grading as an Incentive

Introducing schedule changes into the grading system for schedule quality can be an educational tool. People naturally aim for higher scores.

For instance, if teams notice a consistent drop in scores due to frequent changes in actual dates and completion percentages, they're more likely to adjust their approach.

Additionally, teams will often want to understand why and how to improve when they don't meet the standard.
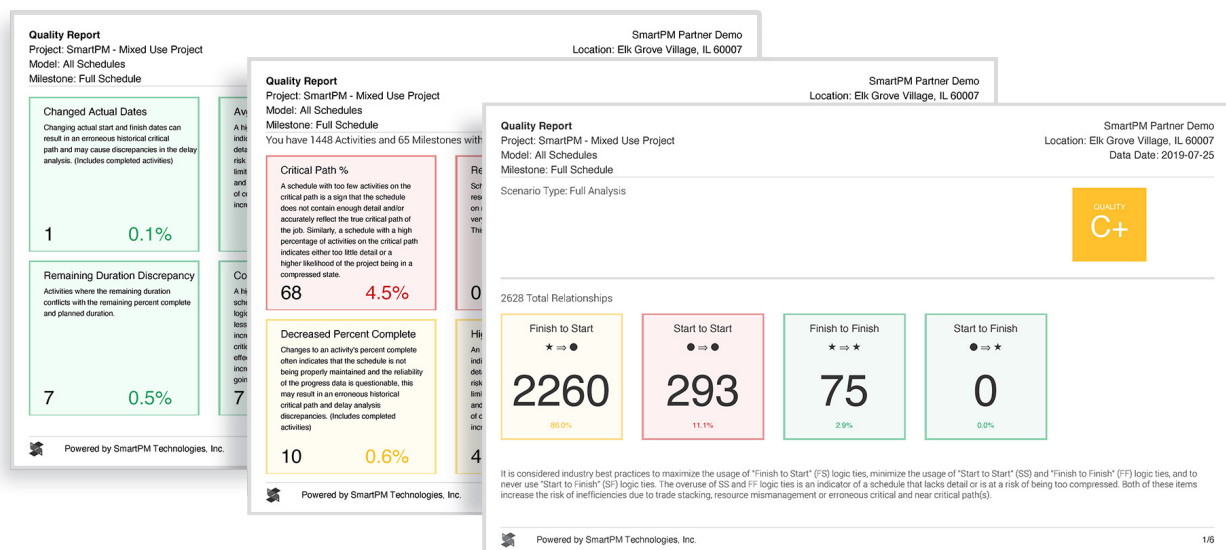
# BREAKDOWN #4
## Lack of Communication/Understanding of Schedule Data Across All Levels

### Limitations of CPM Schedule Data

Critical Path Method (CPM) schedule data alone doesn't give a complete understanding of a project. One must invest time and have the necessary expertise to grasp its full implications.

For most people, deciphering a Gantt chart from one update to another is a challenging endeavor. Yet, understanding this data is paramount. To effectively work towards a shared objective, everyone should comprehend schedule data at the macro level. This ensures that decisions are made based on a thorough risk assessment.

Simplifying this data for everyone's understanding is a requirement, or these common industry challenges will continue. If top-tier executives are unaware of whether best practices are being implemented or can't gauge project performance accurately, they are navigating aimlessly.

### The Limitation of In-House Solutions

Many in-house tools primarily focus on comparing schedule data from one update to the next, not considering the entire project timeline.

A popular trend is importing schedule data into platforms like PowerBI. Though these tools are powerful, using them in this manner typically allows for a comparison between only two data sets at a time. To see a full project's trajectory, questions must be answered, such as:

- What was the initial plan?
- What occurred at every update?
- Is the project on track?
- How tight is the project's timeline?
- What are the predicted end dates for various milestones based on past performance?

For such in-depth analysis, you'd need a dedicated scheduling engine to spot trends or recurring issues across every update, providing a clearer picture of your overall risk profile.

### Resource Scarcity in Construction Companies

Analyzing the commercial construction landscape in the U.S., it's evident there is a shortage of such specialized tasks. 96% of construction companies need more resources for thorough schedule data analysis, metric preparation, and efficient communication of these insights. While consultants are available, they come with their own costs.

Diving deeper, only about 4% of companies, predominantly within the ENR Top 200 contractors, have dedicated project controls and in-house scheduling analysts. The rest, especially those beyond the Top 200, often go without. This gap significantly contributes to project overruns, delays, and the ensuing disputes.

# BREAKDOWN #4 RECOMMENDATIONS
## Improving Communication and Understanding of Schedule Data

### 1. Standardize Key Metrics

- **Define Metrics:** Determine and set standards on essential metrics related to the schedule. Key metrics can include quality, performance, progress, changes, critical changes, feasibility, compression, subcontractors, milestones, and more.

- **Elevate Understanding:** Elevate these metrics to a comprehensible level for all stakeholders. Understand the associated risk levels and how they need to be presented.

### 2. Data Presentation and Simplification

- **Customization:** Once metrics are calculated, decide on the crucial information to convey and the best methods of presentation.

- **Use Business Intelligence Systems:** Simplify complex data using a business intelligence system or software. Such platforms are specially designed to communicate information effectively, ensuring that even complex data sets are understandable.

### 3. Education and Training

- **Executives:** Train executives to grasp this data adequately. They play a pivotal role in decision-making, and an in-depth understanding on their part can create better outcomes.

- **Site Teams:** Empower site teams with knowledge. With the ability to comprehend what's happening from a scheduling perspective, performance can be enhanced and potential pitfalls can be preempted..

### 4. Effective Reporting

- **Avoid Overwhelming Data:** A 40-page spreadsheet might be comprehensive, but it can be daunting. Make sure your reports are clear, consistent, and concise.

- **Promote Understanding:** Ensure everyone, from site workers to executives, understands the data. Doing so fosters better decision-making and deters potential issues arising from misinterpretation or lack of information.

In essence, until schedule data is presented in a way that resonates with all stakeholders, it won't fully be effective. Simplified, clear, and well-understood data minimizes stress, prevents undue optimism, and drives projects toward successful completion.

# BREAKDOWN #5
## Lack of Executive Mandate and Support

Change is never easy, particularly in industries as multifaceted as construction. Nobody wants to hear bad news or if their project is being mismanaged. Yet, when equipped with credible data that sheds light on potential roadblocks, common challenges can be proactively mitigated.

### When Data Speaks, We Listen

When data speaks, people listen, especially when done visually. Data doesn't just tell a story; it makes a compelling case. When leadership, particularly at the executive level, grasps the essence of scheduling data and aligns with the analytical process, project controls can seamlessly integrate into operations. However, the precondition to this is presenting data in an accessible, digestible manner.

### Leadership's Role in Institutionalizing Best Practices

Beyond mere understanding, executives wield the influence to institutionalize best practices in scheduling, thereby setting a benchmark. Frequently, project teams are hesitant to address potential pitfalls until data evidence them.
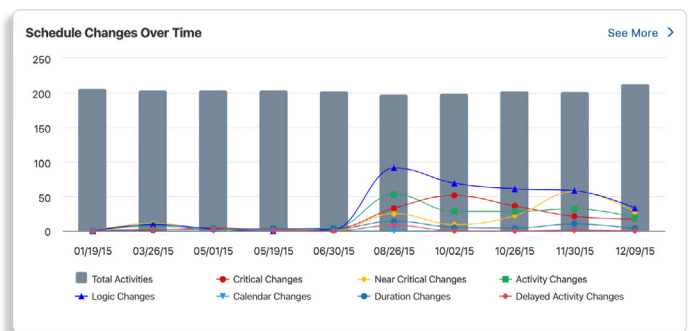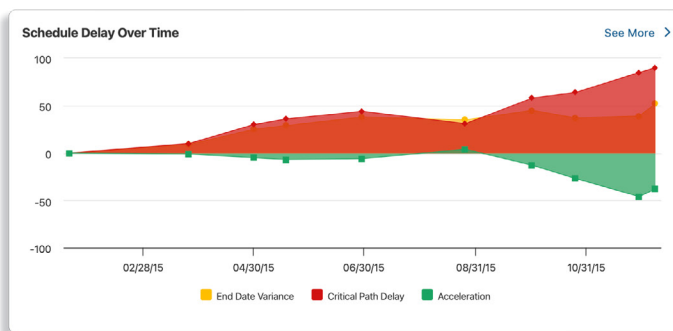


Once executives appreciate schedule data's role in unearthing business challenges, gauging risks, and fortifying decision-making processes, there will be a cascading effect, ensuring buy-in from all project stakeholders.

### Diverse Competencies in Data Management

SmartPM's data indicates that most companies have differing levels of capabilities when it comes to managing and analyzing schedule data.

However, the evidence is indisputable: projects yield better outcomes when executive mandates are both formulated and strictly adhered to, and when pivotal metrics are transparently showcased. This clear correlation between organizational involvement and project success prompts the consideration of practical strategies to enhance this critical aspect.

# BREAKDOWN #5 RECOMMENDATIONS
## Enhancing Executive Mandate and Support

### The Value of Schedule Data

- Educate Executives on the various metrics that can be gleaned from schedule data.

- Determine what key metrics are most useful for managing risk on your types of projects.

### Investing in Project Controls

- Invest in project controls and/or leverage technology to bridge the gap.

- Prioritize training for Project Managers (PMs) and Superintendents (Supers) to effectively utilize schedule data analytics for risk identification and control.

### Visibility and Transparency in Data Sharing

- Ensure data is accessible to all internal stakeholders, fostering open discussion and enabling informed decisions.

- Promote a culture of accountability across all levels, from the C-Suite to the Site Teams.

### Real-World Impact of Efficient Data Utilization

Some companies, previously lagging three to four months behind on projects, now complete tasks on time due to an in-depth understanding of their critical paths.

> **"SmartPM takes away the ambiguity from the scheduling process. It presents you with definitive data that graphically represents the intuitive understanding of how a project is progressing"**
>
> -Brandon Schroer, VP of Scheduling, DesCor Builders

Trustable schedules, visual compression numbers, and clarity on these delay issues empower executives to intervene promptly, endorsing best practices and allocating necessary resources. This proactive approach ensures projects stay on track, both time and budget-wise.

## Conclusion:

Schedule data stands out as the most invaluable dataset in construction. At its core, project controls revolve around harnessing this data, scrutinizing it, and using it to influence favorable outcomes. This e-book dove into the top five pitfalls in schedule management that can swiftly send a project off track:

> 1. **Neglecting Best Practices:** Schedule management thrives on the application of industry-approved best practices. Failure to adopt them results in foundational gaps that erode project progression over time.
>
> 2. **Unregulated Changes:** Unvetted changes – those not reviewed, discussed, or agreed upon – have a downhill effect. They can disrupt the momentum of the project and lead to unforeseen complications.
>
> 3. **Changing Actual Dates and Percent Completes Post Original Entry:** The practice of retroactively altering dates and percent completions without a robust control mechanism distorts project data and can compromise its integrity.
>
> 4. **Lack of Executive Mandate:** A mandate from the top is instrumental. Without executive support, projects can lack direction, resources, and the reinforcement of best practices.
>
> 5. **Understanding and Utilizing Schedule Data:** With most projects relying heavily on timeline adherence, not capitalizing on schedule data's potential insights is a missed opportunity. Schedule data, when understood and utilized effectively, can enhance project trajectory, ensuring timely completion and budget adherence.

Fixing these issues might seem daunting. Certainly, there is no need to tackle all five issues simultaneously. However, companies can reap the rewards by addressing even one of these challenges, effectively mitigating risk and leading to profitable outcomes.

If you need help interpreting your schedule data or want to enhance your project control mechanisms, learn more by clicking below or email us at info@smartpmtech.com.

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## GAIN CONTROL OF YOUR PROJECTS TODAY

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