

Building Great Project Schedules with S1 // S5

Book 1: Creating, Critiquing, and Risk-Adjusting Your Schedule

Picture this familiar scenario: You're planning a project, and the stakeholders want it done quickly, under budget, and to exacting standards of perfection. This three-legged project stool (time, cost, and quality) can pull you in multiple directions, and it's your job to make it work. Of course, you know that a second-rate schedule will probably prevent on-time delivery, blow the budget, and contribute to shoddy work. To ensure project success, you need a *realistic, achievable* schedule based on sound project intelligence. While critical path methodology (CPM) scheduling tools are very effective at building schedules, they fall short in generating realistic, achievable schedules. This book and its companion, [Optimizing Your Schedule, Gaining Team Buy-in, and Forecasting Costs](#), will guide you in leveraging the S1 // S5 schedule maturity framework process to build realistic, achievable schedules.

Another term for "schedule" is "schedule forecast," but we'll use "schedule" in these books.



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Chapter 1: Understanding Schedule Maturity

WHY IS PLANNING SO IMPORTANT?

Projects transform raw materials (like intellectual property) into an asset that creates value (like a software product). Project management is managing your organization's investment in time, materials, and money. If you spend too much, you run over budget. If you spend too little, you risk delivering an asset that doesn't satisfy project objectives—so it's not really an asset at all. Success lies in your plan's strength, so be sure to include these components in your schedule:

- » The right ingredients: CPM tools offer many building blocks, so it's essential to be selective and enter only the right ingredients—the perfect resources, sequence of work, logic links, and critical paths (the order of activities that determines project duration).
- » The right quantities: Even when you list the right ingredients, your durations and costs need to be accurate.
- » A plan for the antiplan: If your schedule includes contingencies or allocation for risks and uncertainties, the chances of success increase dramatically.

HOW SCHEDULES ARE BUILT TODAY

Generating a schedule typically involves commercial CPM algorithm-based tools with extremely broad functionality.

CPM tools assign dates associated with projects based on the project's scope and sequence of work. These determinations take core building blocks like the work breakdown structure (WBS), activities, and logic links into account, and perhaps some optional building blocks.

A CPM analysis consists of a forward pass and a backward pass. The forward pass moves forward through the project to calculate early start and finish dates (the earliest times the project can start and finish). The backward pass moves backward from the end of the project to determine the latest time an activity can begin without delaying the project. The CPM algorithm also determines a duration entity known as float (see Chapter 2 for more).

It's important to remember that activity durations are your inputs, and schedule dates are the outputs of your CPM analysis. Inexperienced planners often establish dates prematurely, which puts the cart before the horse and defeats the purpose of CPM scheduling. When planning a project, you don't know how long it will take, so you can't start with the answer.

In this book, you'll learn how to:

- create your project basis (schedule)
- critique your schedule
- adjust it to reduce risks

In Book 2: Optimizing Your Schedule, Gaining Team Buy-in, and Forecasting Costs, you'll learn how to:

- optimize and accelerate your project to keep eager stakeholders happy
- gain team buy-in
- forecast costs
- understand the bigger picture

With these new S1 // S5 skills, you will build schedules that lead to successful projects—projects that create value and contribute to your organization's financial success.

But we're getting ahead of ourselves. Let's start at the beginning.

What you should know is the scope of work—the activities and activity durations required to execute the project. That data generate dates and your final answer—the completion date. If you don't like the answer, you can adjust your inputs to come up with an answer everyone can embrace.

CPM TOOL DRAWBACKS

If you use CPM tools exclusively, the schedule can go wrong in these ways:

Neglecting the schedule's structural integrity. CPM tools don't provide all the guidelines or checks and balances to develop a sound schedule. They have logic links, but they don't know you can't, say, build walls before laying the foundation.

Setting unrealistic durations. When considering activity durations, people often plan for the best-case scenario. This applies pressure and sets up potential for failure. You can avoid this by allocating a contingency for unknowns. If the contingency never happens and you over-deliver on the project, all the better.

Ignoring external risks. When planning multimillion-dollar projects involving thousands of person-hours, it's highly unlikely you'll predict the exact completion date. Prospects often take contractors who offer a range of dates based on knowns and potential unknowns more seriously than those who promise a specific completion date.

THE S1 // S5 SCHEDULE MATURITY FRAMEWORK PROCESS

Every time you advance on the S1 // S5 scale (Figure 1-1), you create a more realistic schedule than you get with CPM tools alone:

S1—Project basis: Creating a non-critiqued, non-risk-adjusted schedule with your CPM tool; there's no need to change your process or tools in this stage. This is the basis for a more realistic, achievable schedule.

S2—Critiquing: Running your S1 schedule through checks and balances (metrics) to pinpoint and address shortcomings in structural integrity and create a stronger schedule.

S3—Risk adjustment: Accounting for risk and uncertainty to establish a risk-adjusted schedule that incorporates a confidence level and a range. While it may be disappointing that your S2 and S3 due diligence will probably yield a later completion date than your S1 schedule, the good news is that it is more *insightful and realistic*.

S4—Optimizing: Investigating acceleration scenarios that may get closer to the S1 date while upholding S2 structural integrity and thoroughly considering S3 risk.

S5—Team buy-in: The project team's review of S2 improvements, S3 risk mitigations, and S4 optimizations. This process forms the basis of subsequent re-cycles of S1 // S5. This continuous-improvement, iterative approach is a huge step toward establishing schedules that are as realistic as possible.

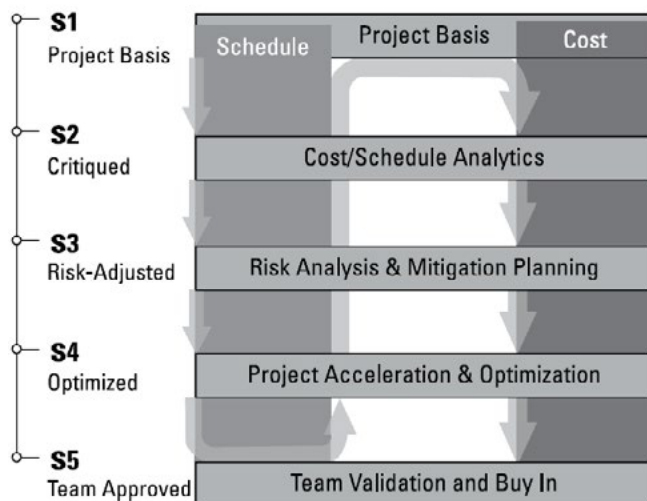


Figure 1-1: The five-stage project maturity framework.

[Optimizing Your Schedule, Gaining Team Buy-in, and Forecasting Costs provides lots more detail on S4 and S5.](#)

The bottom line: S1 // S5 produces a schedule that has been critiqued for structural integrity, accounts for risk and uncertainty, has been optimized, and has project team buy-in.

In this book, we'll walk through S1, S2, and S3 in detail, concentrating on building the project basis, addressing problems in structural integrity, and adjusting for risk.

Chapter 2: S1—The Project Basis

SCHEDULE BUILDING BLOCKS

S1 // S5 begins with the first draft of your schedule generated by your CPM tool. The tool includes these core building blocks:

Project: The overarching entity that encapsulates total scope.

WBS: A breakdown of deliverables into manageable chunks of scope (WBS elements). These elements are deliverables, not the work required to deliver them. The WBS represents value.

Activities: The work required to meet deliverables. Unlike WBS, activities represent expenditure, not value. To establish required activities, you need to define durations, costs, and resources needed to execute work.

Logic links: The sequence of activities. CPM tools typically offer four types of logic links.

Resources: Available labor and materials.

Resource assignments: A rundown of how labor and materials are used in executing work.

CPM tools also include optional building blocks, such as leads, lags, and constraints, but their use can weaken a schedule. (See Chapter 3 for info on using S1 // S5 as a better alternative.)

TYPES OF PROJECT DATES

Based on the duration and sequence of work inputs, your CPM tool will output two primary entity types: dates and float, with start and end dates for the overall project, all individual activities, and payments.

Early dates are an activity's earliest possible start and finish dates while still adhering to logic links and/or resource constraints. **Late dates** are an activity's latest start and finish dates that don't impact the project. Some people create schedules with early dates; others prefer late dates. Both approaches are okay, as long as activity durations are properly forecast. Of course, starting early usually gives the best opportunity for remediation if things don't go to plan.

The difference between an early and a late date is **float**. Essentially, it's wiggle room—an opportunity to absorb risk or accelerate the schedule. In Figure 2-1, Activity A has a ten-day duration, Activity B an eight-day duration, so Activity B has two days of float: It can be completed two days late without impacting the project.

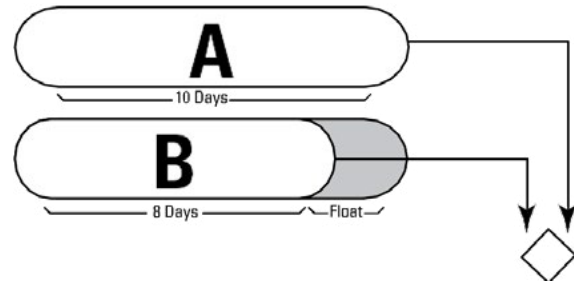


Figure 2-1: Float in a simple two-path network

Baselines provide a project audit trail to track schedule changes. They can be applied to every schedule entity, such as dates, durations, costs, and logic links. At best, baselines are complete snapshots of a schedule at any given time. At worst, they show a previous schedule iteration. You're best off using them as complete snapshots, and baselining early and often.

Actual dates indicate when an activity actually started and finished. By tracking actual dates against **planned dates**, you can gauge performance. But keep in mind that an activity with a later actual finish date than its planned finish date doesn't necessarily suggest poor execution—it may have started late because a preceding activity was delayed. So instead of using dates to track activity performance, compare actual and planned durations.

Target dates and **constraint dates** are often badly misused in CPM schedules. Target dates should be for reference only, as they have no bearing on schedule dates. On the other hand, constraint dates impact CPM analysis calculations by overriding free-flowing logic. Let's say you plan to lay the foundation on Monday, build the walls on Tuesday, and add the roof on Wednesday. A constraint date stating that roof construction will start on Tuesday goes against free-flowing logic, because it can't begin until Wednesday, after the walls have been built.



While constraint dates are valid for some situations, such as contractually forced delivery dates, use them with extreme caution. If your project must be completed by a particular date, never plug that target into your CPM schedule as a constraint date. Instead, compare target dates to calculated scheduled dates. For example, if the CPM schedule shows project completion by November 30, but stakeholders want it October 30, compare the October 30 target with the scheduled November 30 date, then determine whether to replan, investigate acceleration, or reset stakeholder expectations.

DOVETAILING PLANNING AND PERFORMANCE TRACKING

Break down your project into as many manageable activities as needed—enough to give sufficient insight to help you 1) report the schedule during planning and 2) track execution performance. If you're building a garden shed, breaking it down to 100,000 activities obscures the big picture when planning. But on a complex refinery turn-around project, 100,000 activities won't provide sufficient granularity, making it difficult to report the schedule and track performance.

Beyond being tracked against plan, performance should also be measured using industry benchmarking to discover how your project ranks against projects of similar nature and size.

THE NEVER-ENDING HIERARCHY

Regardless of project hierarchy—projects, programs, portfolios, business units—your project is part of a never-ending hierarchy. CPM tools create hierarchies through indenting.

Build a corporate project structure that suits your needs for slicing and dicing project scope. Segmenting projects into separate entities in a hierarchy enables fast and easy cross-project analysis, enterprise resource scheduling, and corporate cash flow modeling—all effective portfolio management strategies.

WORKING FORWARD OR BACKWARD

Not all projects have a defined start date leading to a calculated finish date. Some have a defined finish date leading to a calculated start date. For example, toy factories need to determine when toy development should begin to ensure delivery to retail stores by early November. CPM tools are valuable for both types.

Working backward is not the same as “as late as possible” (ALAP) planning, which assumes that float will be consumed before an activity starts. Activities can carry float in a working-backward plan

Chapter 3: S2—Critiquing and Improving the Schedule

Completing your CPM schedule is your first—and a very important—step in building a realistic, achievable schedule. Your task in S2 is to critique and improve the S1 schedule's structural integrity using S1 // S5 techniques not available in CPM tools.

In recent years, countless enterprises have adopted metrics for critiquing schedules. Tools such as DCMA's 14-Point Schedule Assessment and Deltek's metric-based planning philosophy have advanced CPM scheduling to the next level. They make your schedule structurally sound by supplementing your expertise and knowledge, and they give you time to use your brain for bigger things.

Deltek Acumen >

Deltek Acumen Fuse has hundreds of metrics for critiquing project schedules. Consider weighting the relative importance of your metrics and combining them into an overarching score. For more detail, please check the reference library at www.deltek.com/en/products/project-and-portfolio-management/acumen.

THE BEST METRICS

Most successes happen by making complex things simple, and metrics are no exception. These core metrics are invaluable when establishing a sound project basis.

Logic Density

It's impossible to overestimate the importance of logic to a sound schedule. In theory, all but the first and last activities should be associated with at least one predecessor and one successor logic link. Logic density, an incredibly useful metric, calculates the average number of logic links per activity, and should fall between two and four. If your average is less than two, some logic is probably missing. If it's more than four, your logic is probably overly complex and/or has redundant links.

Supplying missing logic ensures accurate logic paths and differentiation between noncritical paths (those with float) and critical paths (those with no float).

It's equally important to eliminate redundant logic links—that is, links superseded by more detailed, driving logic. Removing redundant links simplifies your schedule and lessens the overhead of maintaining risk models.

Figure 3-1 illustrates a redundant link flowing directly from Activity A to Activity C, since logic already flows from A to B to C.

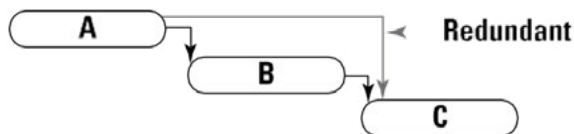


Figure 3-1: Redundant logic

Number of Parallel Critical Paths

There's nothing inherently good or bad about critical activities. It's useful to analyze the number of parallel critical (or near-critical) paths in your schedule. If it has several, you have more risky work fronts than with just one critical path, even a very dominant one. Having to solve a single big problem is better than multiple simultaneous medium-sized problems.

Constraints

Constraints, date overrides such as "Must Finish On," take precedence over naturally occurring calculated dates. For that reason, scheduling theory recommends avoiding

hard or two-way constraints. Use one-way constraints only if you can absolutely defend their use and can't use any other building block.

Negative Float

Negative float (aka a "schedule bust") results from an artificially accelerated or constrained schedule, and indicates that current completion dates aren't possible. Quite simply, you need to make changes.

Insufficient Detail

If an activity consumes more than 10 percent of total project duration, you probably should provide more detail in the scope of work. You don't want to back a capex project if you don't know scope to within plus or minus 10 percent.

Number of Lags

A lag is a positive duration on a logic link, often representing non-working time between activities, like waiting for paint to dry. Lags aren't necessarily a poor planning technique, but they tend to hide detail and can't be measured like normal activities. For that reason, convert lags to actual activities with durations.

Number of Leads

A lead is a negative duration, often used to adjust the start or end date of a successor activity. They should be avoided, because they can result in a successor starting before its predecessor.

Merge Hotspots

When more than two incoming logic links merge at the start of an activity, the resulting hotspot indicates the activity will be delayed, because incoming links must be completed on time to start on time.

SCORING AGAINST METRICS

Scoring is a great way of seeing how well you're doing. Deltek's Acumen Fuse Schedule Index is a single score (0 to 100) based on weighted results from some of the metrics described here. Establishing the perfect metrics is an ongoing process, but it's valuable to have a single score when comparing your schedule's quality to itself over time, other projects in your organization, and similar projects outside of your organization.

This year, the average Fuse Schedule Index has increased by nearly 20 percent. Figure 3-2 shows Fuse Schedule Index improvement across thousands of projects, indicating that projects are adopting metric analysis and generating more realistic schedules.

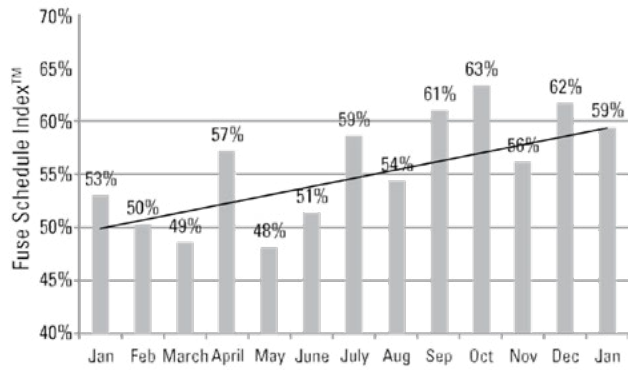


Figure 3-2: Improvement of the average Fuse Schedule Index over 12 months

2D SCHEDULE ANALYSIS

Applying WBSs and code fields enables slicing, but segments data in only one dimension. Figure 3-3 shows a Deltek Acumen Fuse’s 2D slice-and-dice analysis. It’s particularly useful to overlay schedule metrics against the two dimensions of time and contractors, so you can see when schedule quality issues arise and which contractor’s scope of work is most problematic. This analysis doesn’t just count issues—it pinpoints them, which is the first step in resolving them.

WHAT NOW?

You’ve run your schedule against metrics and pinpointed and resolved its shortcomings, but now the finish date is later. But really, it’s only more realistic. With this much stronger schedule, you can move to S3—firming up durations and accounting for potential risks.

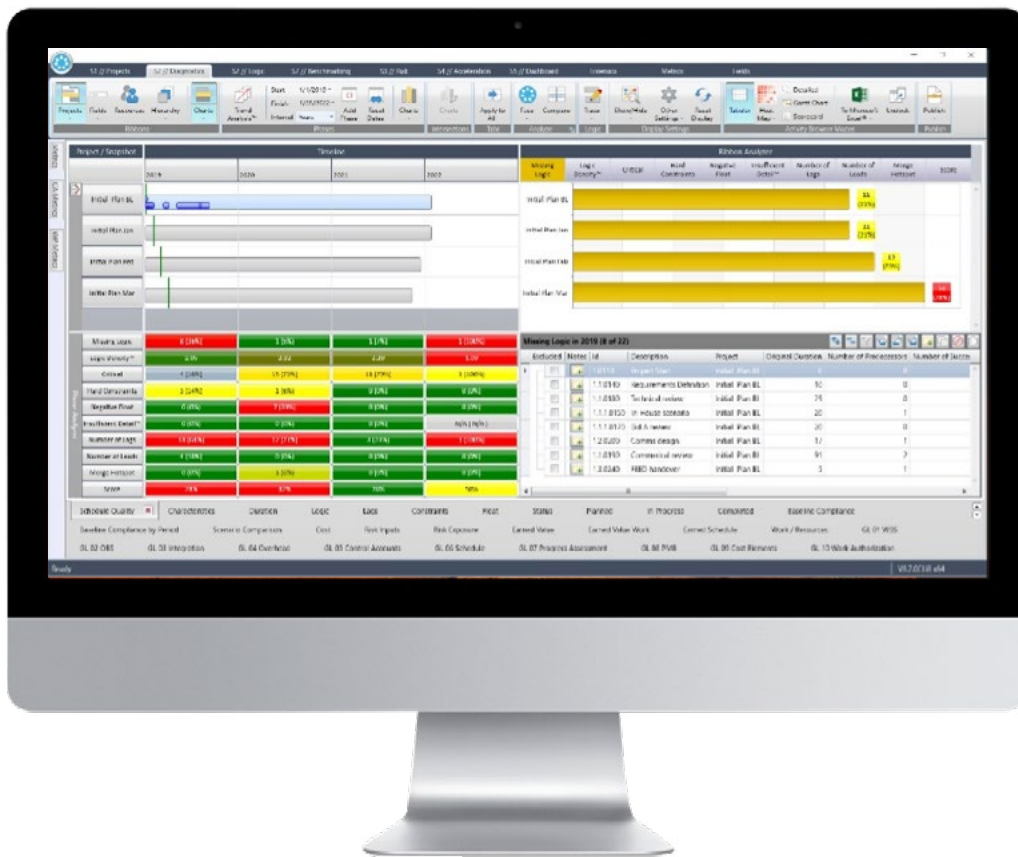


Figure 3-3: S2 analysis performed in Deltek Acumen Fuse

Chapter 4: S3—Risk Analysis

S3 is all about managing risks to insert certainty and confidence into your schedule. Schedules often fall short in differentiating between scope of work (activities) and unknown factors surrounding this work (scope uncertainty). S1 CPM schedules don't account for external risk events, which typically have negative (but sometimes positive) impact on execution.

QUALITATIVE RISK ASSESSMENT

A qualitative risk assessment is conducted through a risk register, often a spreadsheet. Figure 4-1 shows a risk register where risks are sorted from high (most risky) to low (least risky). Scores are based on the intersection of each risk's probability and impact, using a risk matrix or probability impact grid (PIG). It's paramount that your risk register scores represent team consensus, or agreed-upon risk events.

Check out the advice on getting team consensus throughout the S1 // S5 process in Chapter 2 of [Optimizing Your Schedule, Gaining Team Buy-in, and Forecasting Costs.](#)

Risk Included	ID	Type	Name	Current Probability	Schedule	Cost	Score
<input checked="" type="checkbox"/>	R9	🚩	Risk of delay due to fab yard constraints	Very High	Very High	High	25
<input checked="" type="checkbox"/>	R37	🚩	Risk of major dredging equipment failure	Very High	Very High	High	20
<input checked="" type="checkbox"/>	R3	🚩	Risk of insufficient in-country skilled labor	Very High	Low	Very High	20
<input checked="" type="checkbox"/>	R1	🚩	Risk of delay post transportation due to incomplete work	Very High	Very High	Very High	20
<input checked="" type="checkbox"/>	R42	🚩	Risk of inability to hire craft to maintain labor curve due to catering, camp fa...	Very High	High	Very High	20
<input checked="" type="checkbox"/>	R34	🚩	Risk of actual required resources exceeding planned/forecasted resource av...	Very High	High	Medium	20
<input checked="" type="checkbox"/>	R36	🚩	Risks of theft of materials (especially long lead such as 9% Nickel steel) and/o...	High	Very High	High	20
<input checked="" type="checkbox"/>	R41	🚩	Risk of delay in approvals of visas	High	Low	Very High	20
<input checked="" type="checkbox"/>	R38	🚩	Risk of change in law impacting construction	High	Very High	Very High	20
<input checked="" type="checkbox"/>	R5	🚩	Risk of pirates during FPSO sail from fab yard to site	High	High	Medium	16
<input checked="" type="checkbox"/>	R2	🚩	Risk of customs delays	High	High	High	16
<input checked="" type="checkbox"/>	R44	🚩	Risk of Governmental agency directing EPC to stop work due to alleged enviro...	Very High	Medium	Low	15
<input checked="" type="checkbox"/>	R11	🚩	Risk of lack of labor availability of skilled craft in-country	Medium	Medium	High	12
<input checked="" type="checkbox"/>	R35	🚩	Risk of major mechanical equipment failure during commissioning and start...	Medium	High	Low	12
<input checked="" type="checkbox"/>	R4	🚩	Risk of insufficient SURF contractor resources	Low	High	Very High	10
<input checked="" type="checkbox"/>	R10	🚩	Risk of delay due to heavy lift vessel not being available on time	Low	Very High	High	10
<input checked="" type="checkbox"/>	R45	🚩	Risk of delays in releasing equipment or modules out of customs	Low	Very High	High	10
<input checked="" type="checkbox"/>	R6	🚩	Risk of poor quality materials being delivered in country	Medium	Medium	Low	9
<input checked="" type="checkbox"/>	R8	🚩	Risk of damage to key equipment during transportation/offloading/installati...	Low	Low	Medium	8
<input checked="" type="checkbox"/>	R40	🚩	Risk of review of safety report results in changes to facility design	Low	Medium	Medium	6

Figure 4-1: A risk register

COMMITTING TO YOUR WHY

Figure 4-2 shows a PIG where a risk event with very high probability and very low impact receives a score of 25. The risk register in Figure 4-1 suggests focusing on the top risk—delay due to fabrication yard constraints. At first it makes sense that this risk tops the list, but there's more to consider.

Let's say the risk has a potential negative impact of 30 days. But if the delay occurs during an activity with a 60-day float, this risk could stand, because the 60-day float will easily absorb a 30-day impact.

The lesson is that qualitative risk assessments don't give true insight into risk impact. That's why more and more project-led organizations are adopting quantitative risk assessment to create risk-adjusted P schedules.

Probability / Scoring Template						
Name	Min Value	Very Low	Low	Medium	High	Very High
Very High	>75 %	5	10	15	20	25
High	>50 %	4	8	12	16	20
Medium	>25 %	3	6	9	12	15
Low	>10 %	2	4	6	8	10
Very Low	<=10 %	1	2	3	4	5

Figure 4-2: A risk matrix (PIG) defines scoring thresholds used in a risk register

QUANTITATIVE RISK ASSESSMENT AND THE RISK-ADJUSTED S3 P SCHEDULE

It's acceptable (and unavoidable) to have risk as long as you account for it. A P schedule (P stands for percentile, an indication of confidence), unlike S1 and S2 schedules, is as realistic as possible, accounting for risk, duration uncertainty, and potential opportunities.

A P schedule has a single set of dates and a deterministic finish date. You can generate multiple P schedules, covering anywhere from P0 to P100. A P0 schedule indicates 100 percent confidence that the project will be on time and on budget, and a P100 schedule indicates 0 percent confidence that the project will be on time and on budget, based on what you know today.

However, don't hold your project execution team to a P schedule. Most P schedules show a longer duration and later completion date as buffers against possible problems, so if the project team works to the P schedule, the project will probably be completed on the later finish date. You want the team to meet the S2 schedule, but if not, you have the P schedule as a buffer.

Capturing Uncertainty and Risk Events

You need three main things when building a P schedule:

1. Your S2 schedule.
2. Ranges of uncertainty for activity durations.
3. Your list of risk events (threats and opportunities), and how they map into the schedule. Which activities could they have an impact on?

You already have #1, so let's concentrate on #2 and #3.

Capturing duration uncertainty: Capturing duration uncertainty entails establishing three durations for each activity—the best case, the most likely case, and the worst case.

Capturing domain experts' knowledge and translating it into three-point estimates for use in a risk analysis model can be a bottleneck. The Uncertainty Factor method can help, since project teams find this approach easier than having statistical discussions about thousands of project activities.

Each category in an Uncertainty Factor template represents a range of uncertainty based on minimum, most likely, and maximum percentages. Figure 4-3 shows a schedule grouped at the WBS level, enabling you to quickly load your schedule with top-down uncertainty rankings. If necessary, you can make exceptions to group rankings for certain activities or subgroups. Apply the rankings to activity durations and they translate into absolute duration ranges. The result: a detailed, fully ranked schedule.

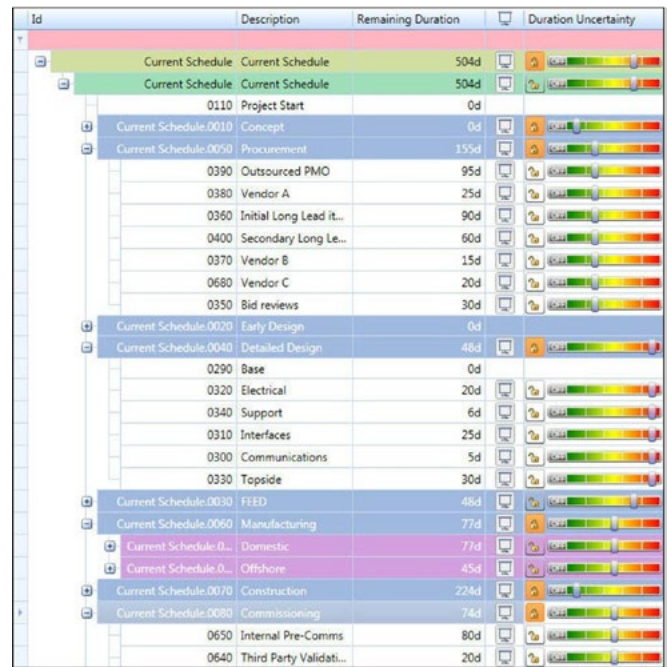


Figure 4-3: Top-down rankings for activity groups at the WBS level

Calibrate Your Scoring Mechanism

Before capturing risk events, ensure that probability and impact type categories align with project size and complexity. For a three-year project, impact categories of less than five days won't capture the real impact. If you define a large range of impact types relative to project size, you'll artificially put most risk events in lower-end brackets, skewing risk distribution. A good rule of thumb for calibrating a risk matrix is to make 20 percent of project duration your largest category—for a 30-month project, the largest category should be six months. Then use a downward-moving scale, with the smallest category rounding to team-friendly values. Here's an example for a 30-month project:

	Very Low Impact	< 1 week
	Low Impact	< 1 month
	Medium Impact	< 3 months
	High Impact	< 6 months
	Very High Impact	> 6 months

A 5x5 risk matrix like the above is common, but some organizations prefer a 4x4 matrix, which forces risk workshop participants to choose a low or high score rather than the middle value.

When determining uncertainty ranges, don't account for the impact of potential risk events, which are already in the risk register. To prevent this, ask yourself, "Under normal working conditions, can we complete the work in the time shown?"

Separate Impact Types

A high schedule impact may not be a high cost impact, so when capturing risk impacts, score schedule impact separately from cost or other impacts.

TRACK CURRENT AND MITIGATED STATES:

There's real value in capturing today's score and a future score the team believes it can achieve by mitigating the risk. By doing so, you can generate two risk models that show the effectiveness of mitigation plans. When you incorporate additional overhead in your model, you'll have an even clearer ROI view of your mitigation. These techniques give you a great way to defend additional investment for your mitigation strategy—a true ROI analysis to reduce risk exposure.

ACCENTUATE THE POSITIVE:

A risk event can present threats and opportunities. It may seem counterintuitive, but give sufficient emphasis to the team brainstorming risks in the form of opportunities.

RISK ANALYSIS:

Merge the captured risk events into your schedule via risk mapping—linking risk events to activities. To make this process less painful, enlist help from team members who are extremely knowledgeable about the schedule—the risk team's lead planner and discipline leads.

To pinpoint risk hotspots and bottlenecks and fix them at the source, link risk events to the earliest appropriate activities, then let the schedule's logic reflect the knock-on effect. For example, when linking a Customs delay, map it to "delivery of materials," not construction activities, letting the knock-on effect cascade through construction.

A risk analysis is typically a simulation. The most common approach, Monte Carlo, may seem intimidating, but is actually simple. You'll execute a number of iterations, each a standard CPM analysis. The clever bit is that each iteration's activity durations vary depending on their uncertainty ranges. You'll also trigger risk events in each iteration. If you run 1,000 iterations, you'll have 1,000 scenarios from which to determine the most likely outcomes.

RISK REPORTING:

To bring your new insights into focus, create two schedule risk reports: the what and the why.

The What Report (Risk Histogram)

This report gives insight into risk exposure metrics and your P50 completion date, which indicates a confidence level that the completion date has a 50 percent chance of being met.

Metric 1: S2 completion date confidence level:

Figure 4-5 shows a project with a 5 percent confidence level. That sounds risky, but confidence level can be misleading, driven more by complexity of converging logic than by risk and uncertainty. Risk range is a much more reliable metric (see below).

Skeptical? For a simple schedule with two parallel activities (each with a 20-day deterministic duration), apply a plus-or-minus five-day uncertainty spread to both activities and run a simple Monte Carlo simulation. You might expect a 50 percent confidence level, but the chance of both activities finishing on time is actually 25 percent (50 percent times 50 percent). When you extrapolate this across tens of activities with multiple paths, confidence level quickly diminishes to single digits.

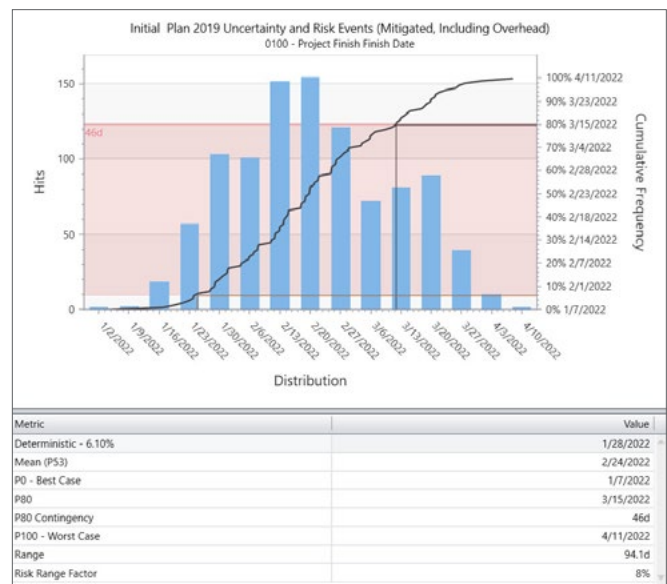


Figure 4-5: Risk histogram (the what report)

Metric 2: P date: Based on your desired confidence level (say 75 percent) you can determine the corresponding P date.

Metric 3: Contingency: Adding contingency is actually a reaction to risk—a way to absorb risk. It does not reduce exposure. Contingency, which is reported in the context of a confidence level, such as P75, is the difference between your S2 deterministic date and your P date. In Figure 4-5, the P75 contingency is 35 days—meaning you’re 75 percent certain you’ll finish no more than 35 days after January 24, which is February 28.

Metric 4: Risk range: The difference between the best-case scenario (P0) and the worst-case scenario (P100), risk range (in Figure 4-5 it’s 81 days) provides context around the extent of risk exposure.

Metric 5: Risk range factor: Take risk range a step further by comparing range to the remaining project duration: A risk range of three months relative to 30 months remaining duration equates to a 10 percent risk range factor. This gives insight into future risk exposure.

Metric 6: The risk tornado (the why report): schedule contribution factor: The risk tornado reports the cause(s) of risk exposure and events or activities that contribute to exposure. Historically, project managers have focused on the criticality metric—the number of times an activity occurs on the critical path. The idea is that frequently occurring activities drive more risk.

However, criticality doesn’t indicate the size or degree of impact on the critical path or project finish date. A high-criticality activity with only a two-day impact isn’t as big a red flag as an activity that occurs less often, but whose failure has a six-month impact.

A better metric is the schedule contribution factor, which reports an activity’s contribution to risk in terms of duration. It also separates contribution from uncertainty and risk events. This clarifies whether the key risk driver is the activity’s scope/certainty or a risk event impacting the activity.

Figure 4-6 shows the schedule contribution factor of activities that are risk hotspots and whether the cause is uncertainty or specific discrete risk events. This report helps determine which risk events to mitigate.

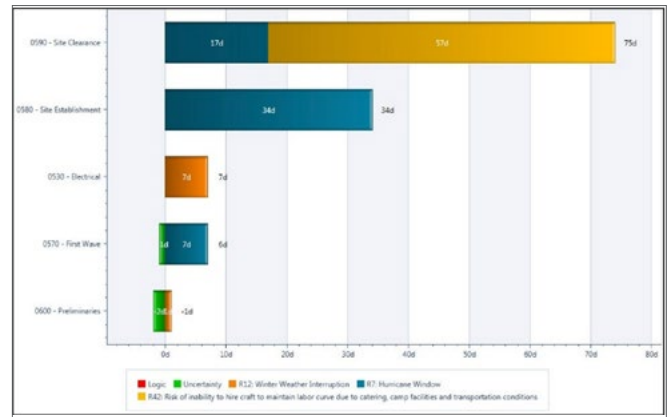


Figure 4-6: The risk tornado (the why report)

THE LAST RISK MODEL STEP

To complete your risk model, run a second scenario using your mitigated risk scores, and compare it against your base model to determine risk reduction ROI. Figure 4-7 compares unmitigated and mitigated risk scenarios for the same project. Mitigation saved 26 days.

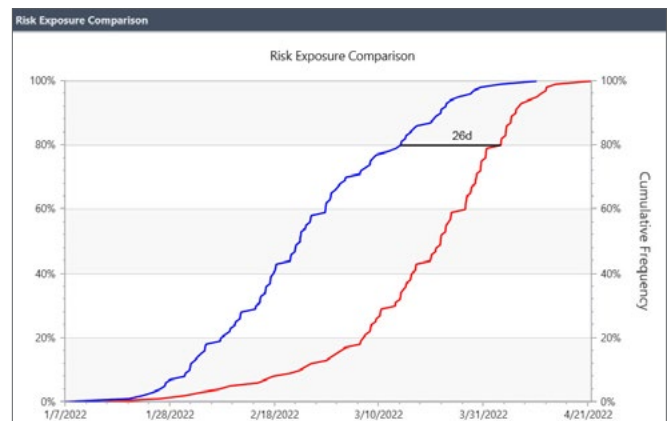


Figure 4-7: Project risk with and without mitigation



Chapter 5: Your Progress So Far

At this point, you and your schedule have come a long way. You've gone well beyond the capabilities of standard CPM tools by building a schedule that leverages the power of the S1 // S5 schedule maturity framework process. You've critiqued your CPM-generated schedule and adjusted it to reduce risk—in other words, you now have a realistic, achievable schedule.

Our focus in this book has been the philosophy behind S1 // S5 and how it can help you address the all-important issue of managing risk.

Learn how S1 // S5 helps you elevate your schedule to best-in-show status by optimizing your project to keep eager stakeholders happy, gaining team buy-in, and forecasting costs.



Read Book 2: [Optimizing Your Schedule, Gaining Team Buy-in, and Forecasting Costs](#)

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