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Mastering Time Contingency in Project Scheduling: Best Practices and Practical Insights

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Insight from Bertrand Guerard, the founder of Proprism

Time contingency is the most misunderstood and misused field of project scheduling. Schedules are too often built on the basis of unrealistic assumptions rather than actual risks, and the result is delayed deadlines, cost overruns, and firefighting in reaction to the situation.

77% are behind schedule by 40% or more, and 98% of the projects exceed their original cost estimates, according to McKinsey & Company. The Standish Group's CHAOS Report further indicated that only 29% of the projects are delivered on time and within budget. These facts point to the need to make detailed contingency plans to overcome delays and cost overruns.

Some organizations rely on a **flat percentage allocation** (e.g., 10%) as a contingency buffer, while others use **quantitative risk analysis (QRA)** to take a more data-driven approach. But contingency isn't just about **adding extra time**; it's about **strategic risk management**.

A well-defined contingency strategy involves **structured governance, precise allocation methods, and proactive monitoring** to keep projects on track. According to the **Risk Engineering Society's Contingency Guideline**, contingency should be considered **at multiple levels** throughout a project's lifecycle—from initiation to execution—to mitigate risks effectively and support better decision-making.

This article offers guidelines for the incorporation and management of time contingencies into project

schedules. We shall discuss common methodologies, common pitfalls to be aware of, and professional advice for the use of contingency to ensure the project's success rather than a random buffer.

1. Why most schedules are too optimistic

Most project schedules look ideal on paper but then reality intervenes. Deadlines are not met, budgets are exceeded, and teams scramble to make up lost time. Why does this happen so routinely?

They rely on best-case scenarios rather than realistic risk, resource, and time estimates. Clients and stakeholders insist on overly aggressive deadlines driven by:

- **Market Pressures**: The need to launch a product, open a facility, or complete infrastructure ahead of the competition.
- **Financial Incentives:** Investors and executives often demand compressed timelines to maximize ROI.
- **Risk Blindness:** The assumption that everything will go according to plan, ignoring historical project delays and uncertainties.

However, a good schedule is not just ambitious but also realistic and risk-adjusted. It accounts for uncertainties and includes structured contingencies to absorb inevitable disruptions.

Here is why they fail

- **Overconfidence in estimates**
  Teams tend to believe they can perform faster than past data suggests. Task durations are often underestimated, and potential delays are frequently overlooked.
- **Lack of risk-adjusted planning**
  They are identified but not measured, leading to an absence of a systematic approach for incorporating them into the schedule.
- **Hidden contingency**

Instead of allocating contingency for major milestones, teams build buffers into the activity durations that cannot be tracked or adjusted.

- **No formal contingency management framework.**

Overruns cannot be prevented without a disciplined process for assessing, allocating, and managing schedule contingencies.

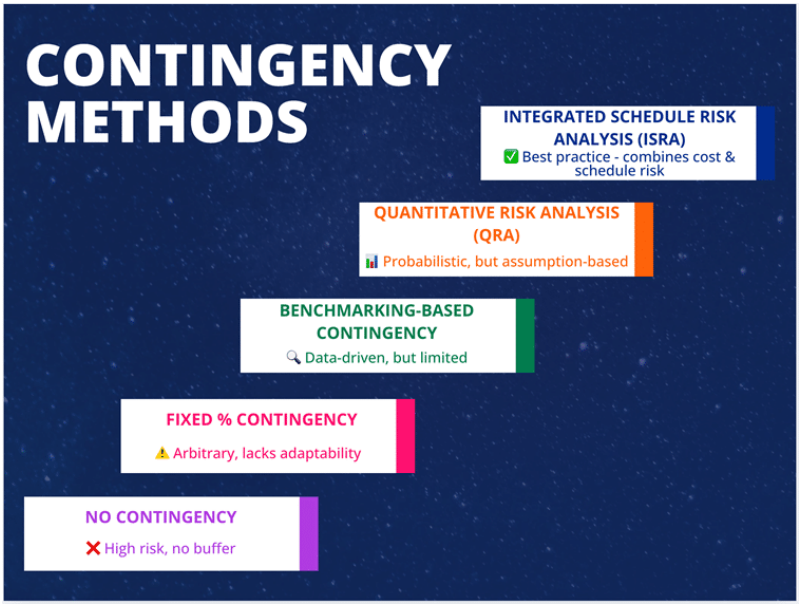
To fix this, project teams must abandon hope-based scheduling and adopt data-driven, risk-aware planning, in which contingency is not an afterthought but an essential part of the scheduling strategy.

2. The right way to allocate time contingency

Many organizations struggle with determining the right amount of time contingency in their schedules. Some rely on rules of thumb, while others apply data-driven methodologies to quantify risk exposure. But which approach is the most effective?

A KPMG study identified the most widely used methods for determining project contingency:

- **Fixed percentage (e.g., 10%)**
  A simple but often arbitrary method that does not account for project-specific risks.
- **Quantitative risk analysis (QRA)**
  Uses probabilistic methods, such as Monte Carlo Simulation, to assess schedule uncertainties.
- **Benchmarking (Internal & External)**
  To set contingency levels, leverage past project data within the organization or from industry benchmarks.
- **No contingency allocation**
  A high-risk approach where schedule overruns are absorbed reactively, leading to project delays and cost escalations.
- **Integrated schedule risk analysis (ISRA)**
  A holistic approach that combines cost and schedule risk into a single model for a risk-adjusted contingency plan.



Rather than relying on fixed buffers or outdated practices, the most effective approach is a risk-driven method that:

 Explicitly identifies and quantifies risks based on actual project data.
 Adjusts contingency dynamically as risks evolve throughout the project lifecycle.
 Ensures transparency by allocating contingency where it is truly needed, rather than embedding it in task durations.

Organizations can strike the appropriate balance by moving toward structured risk-based planning with the aim of making schedules feasible and resilient against actual-world uncertainties.

3. Monte-Carlo simulation and its limitations

One of the most widely used schedule risk analysis tools is the Monte Carlo Simulation (MCS). It provides a probabilistic approach for the project timelines based upon the probability of the delay and the probability with which it occurs. However, while a very valuable tool, MCS also possesses weaknesses.

Despite its prevalence, MCS has faced criticisms regarding the following shortcomings:

- **Over-reliance on assumptions**
  MCS models typically use assumption-based input distributions rather than actual project data. If the assumptions are flawed, the results will not be correct. A study by the Project Management Institute found that 50% of risk models do not forecast actual project delays because the risk data used is incomplete or of poor quality.
- **Lack of real-world constraints**
  Traditional MCS models fail to consider resource constraints, dependencies, and execution limitations, rendering the results inapplicable to real-world situations.

- **Garbage in, garbage out**
  Poor assessment of risk inputs leads to unreliable simulation results. These results are undermined by low-quality risk registers and uncalibrated probability distributions, which can foster excessive confidence in flawed conclusions.

To enhance the reliability of schedule risk analysis, experts recommend complementing MCS with empirical-based methods, such as:

 Regression modeling: Uses historical project data to predict schedule deviations accurately.
 First-principles risk analysis (FPRA): Focuses on bottom-up risk assessments rooted in engineering and operational realities.
 Parametric analysis: Applies statistical correlations and known industry benchmarks to refine risk assessment.

Research from the Association for the Advancement of Cost Engineering (AACE) shows that hybrid risk models (combining statistical and empirical methods) are up to 30% more accurate than Monte Carlo Simulation alone.

While Monte Carlo Simulation remains valuable, it should never be used in isolation. By integrating data-driven methodologies, project teams can achieve a more realistic, risk-adjusted scheduling and contingency planning approach.

4. Strategic placement of time contingency

Time contingency is adequate only when strategically placed and not embedded within the task durations. When contingency is embedded, the teams lose control, transparency, and the ability to make dynamic adjustments as the risks evolve. Contingency must instead be strategically reserved at the most critical points where the maximum protection against schedule slippage can be provided.

1. Critical path milestones
Positioning contingency at critical path milestones protects against the risk that potential slippages within high-risk activities could compromise the entire project. It serves to counter risks likely to cascade through dependent activities and cause major disruptions.

2. Before mechanical completion or beneficial occupancy
The final phases of a project are typically plagued with last-minute issues from quality testing through regulatory clearances. Contingency planning before mechanical completion or beneficial occupancy safeguards against unexpected commissioning and handover delay.

3. Between the major phases of a project
Transitions between phases within a project, for example, design through construction or commissioning through operations, generate uncertainties. Contingency needs to be introduced at handover stages to absorb variances and allow smooth progression without cascading delay.

4. At interfaces with major contracts
Transitions between major contracts are sources of uncertainty. Contingency needs to be brought into these handover phases to absorb variances and ensure smooth passage without cascading delay.

Strategic contingency transforms it from a behind-the-scenes buffer into a pro-active risk mitigation tool. Project teams can make schedules more robust, minimize disruptions, and generally make the overall process more predictable by placing time contingency where needed.

5. Continuous monitoring and adaptation

A contingency plan is only as good as its ongoing management. Allocating time for contingency is just the first step; ensuring its effectiveness requires continuous monitoring, evaluation, and adjustment throughout the project lifecycle.

- **Sanity check discussions**

Project teams need sanity-check discussions after schedule creation and Quantitative Risk Analysis (QRA) workshops. They ensure contingency reserves are appropriate relative to the realities of the project and the stakeholders' expectations.

  - **Scenario testing**

A well-structured contingency plan must be able to withstand pressure. Scenario testing determines how realistic and achievable contingency levels are through simulating probable disruptions and assessing their impact upon timelines.

    - **Integrated cost-schedule risk analysis**

Time and cost contingency must not be addressed independently. A combined cost-schedule risk analysis ensures schedule buffers are aligned with financial reserves so there are no mismatches between risk mitigation plans and the availability of funds.

- **Management of change (MOC) process**

All contingency usage should be tracked, documented, and approved for the purpose of transparency and accountability by a proper Management of Change (MOC) process. It prevents the unnecessary draw-down against contingency reserves and makes them available for actual risks.

  - **Portfolio-level contingency assessment**

Contingency planning is not sufficient at the project level; risks must also be handled at the program and the portfolio level. Contingency assessment across different levels assists organizations in managing risk exposure across projects such that high-impact risks are adequately mitigated.

By treating time contingency as a dynamic resource rather than a fixed buffer, project teams can adapt to changing conditions while maintaining control over schedule integrity. Ongoing monitoring and strategic adaptation transform contingency from a passive safeguard into an active project success driver.

6. Lessons from Real-World Applications

Successful projects rely on well-structured schedules and implement proven best practices that enhance schedule reliability and contingency management. Organizations can increase predictability and improve project outcomes by combining strategic planning, risk analysis, and continuous adaptation.

- **Early investment into schedule maturity**

Successful projects ensure contingency management by aligning their schedule with Standard Operating Procedures (SOPs), contracting approaches, and construction standards from the outset. A sound, well-documented schedule is the proper platform for risk-based contingency planning.

- **Hybrid risk analysis techniques**

The most reliable scheduling approaches combine professional judgement with statistical methods. A hybrid risk assessment process provides contingency based upon past data and the existing circumstances of the current project with a balanced approach towards managing uncertainty based upon evidence.

- **Agility in risk management**

Risk profiles evolve through the life of a project. Successful teams regularly review and refresh contingency plans as the circumstances evolve, with buffers remaining current and realistic. This flexibility ensures projects are able to absorb shocks without the requirement for unnecessary delay.

- **Application of contingency across project levels**

Effective organizations do not handle contingency in isolation; rather, they implement it across different levels:

- Project-Level Contingency: To manage uncertainties within the context of a single project.
  - Program-Level Contingency: Managing dependencies between different projects.
    - Portfolio-Level Contingency: To enhance overall resilience across a full investment portfolio.

Projects with schedule maturity, disciplined risk assessment, and dynamic contingency planning perform better than projects with ad-hoc buffers or reactively planned ones. By adopting these principles, organizations are able to maximize predictability, optimize resources, and achieve long-term project success.

Time contingency is not just a question of adding buffers; it's a question of incorporating resiliency into the schedule. A well-executed contingency plan provides the flexibility for projects regardless of the unexpected.

Effective schedules are well planned, closely tracked, and continuously fine-tuned. Through the use of a structured risk-based approach, organizations are able to:

 Prevent costly overruns by proactively managing uncertainty.
 Improve decision-making by basing contingency on accurate data and evolving risks.
 Ensure projects are delivered on time with the intended impact and value.

A reactive approach to contingency leads to inefficiencies, while a **strategic and transparent** approach strengthens project execution.

About the Author

With more than **20 years of experience** in sectors such as the pharmaceutical, petrochemical, energy and construction industries at international level, **Bertrand Guerard, the founder of Proprism, puts in place the necessary tools for project management, and provides advice and support to project managers.**

His strategic expertise extends from project planning and control to budget and schedule risk analysis to ensure the success of projects.

His motivation to do things differently and empower his clients with agile expertise has led Bertrand to develop his activities on **large-scale national and international projects** (from €15M to €750M).

Bertrand holds an engineering degree from Polytech'Lille and an Executive MBA from Solvay Brussels School. Bertrand works with young talent in his role as **visiting professor of project management** at the Université Paris-Saclay as part of his dedication to share experiences, develop knowledge and be a mentor.