
Project Management Reserve Buffering ¹

Dr. Kenneth F. Smith, PMP

*“It's better to have it and not need it
than to need it and not have it.”*

George Ellis

After carefully planning a project's critical path, how much 'extra' Management Reserve time should you pad the estimated duration for unanticipated delays: 10% 15% 25% just in case, or even more? Is there a 'rule of thumb' for your particular sector?

A synopsis -- gleaned from AI -- identified the following extant practices:

- **20% Solution**
- **25% Minimum Rule**
- **Rule of 30%:** Add 30% to the estimated critical path.
- **50% -- aka -- Goldratt Rule:²** Schedule project activity durations at 50% probability, then add a 50% buffer to the end of the critical path
- **"Cut and Paste"** Cut individual "safe" task durations in half, then add that time to a combined end buffer.
- **Strategic Placement:³** Rather than one large end blob,
 - **Resource Buffers:** Add 'something' to selected key activities throughout
 - **Feeder Buffers:** Add 'something' to non-critical activities that merge with the critical path

¹ How to cite this article: Smith, K.F. (2026). Project Management Reserve Buffering. *PM World Journal*, Vol. XV, Issue VI, June

² See my detailed reaction in Smith, K. F. (2023). On Critical Chain Scheduling & Buffering: A Critique on the Theory of Constraints as Applied to Project Management, advisory article, *PM World Journal*, Vol. XII, Issue I, January. <https://pmworldlibrary.net/wp-content/uploads/2022/12/pmwj125-Jan2023-Smith-on-critical-chain-scheduling-and-buffering.pdf>

³ See a couple of my suggestions in Smith, K. F. (2025). Slipped Schedules, Touch-Time, and Black Elephants! Advisory article, *PM World Journal*, Vol. XIV, Issue II, February. <https://pmworldlibrary.net/wp-content/uploads/2025/02/pmwj149-Feb2025-Smith-slipped-schedules-touch-time-black-elephants.pdf>

Depending how many thumbs -- &/or fingers -- you are willing to contribute to the estimating effort, 'Risk & Remedy' is yet another approach for your consideration, based on individual critical path activity probabilities. I applied and advocated this methodology for many years;⁴ and recently upgraded the related Excel template, as shown in Figure 1 to facilitate number-crunching.

FIGURE 1

| EXTENDED 50-ACTIVITY CRITICAL PATH ANALYSIS | | | | | | | | | | | | | FREEZE |
|--|---------------------------|-----------|-----------|-----------|-------|---|------|------|------|------|---------------------------------|------|---------------|
| RISK & REMEDY with MANAGEMENT RESERVE BUFFER* | | | | | | | | | | | | | |
| PROJECT TITLE: | Ken's Demo | | | | | | | | | | | | |
| | Work Week Duration | | | | | | | | | | Critical Path Activities | | |
| | 4 days | 5 days | 6 days | 7 days | 378 | Scheduled Duration | | | | | | | |
| Start Date: | 14-Jun-26 | 14-Jun-26 | 14-Jun-26 | 14-Jun-26 | 176 | Buffer | | | | | | | |
| Scheduled Completion: | 5-Apr-28 | 25-Nov-27 | 29-Aug-27 | 27-Jun-27 | 553.3 | Recommended | | | | | | | |
| Recommended TARGET: | 6-Feb-29 | 27-Jul-28 | 20-Mar-28 | 19-Dec-27 | 46% | Buffer as % of Original Schedule | | | | | | | |
| NOTE: Round up Recommended # | | | | | | | | | | | | | |
| CP ACTIVITIES | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th | 10th | 11th | 12th | 13th |
| CP ACTIVITY ID | plan | permit | ROW | site prep | cons | OPENING | | | | | | | |
| Duration: DAYS | 20 | 30 | 90 | 35 | 200 | 3 | | | | | | | |
| Probability % | 99% | 90% | 50% | 98% | 95% | 99% | | | | | | | |
| CP Merge Act 1 Probability % | 100% | 100% | 80% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| CP Merge Act 2 Probability % | 100% | 100% | 90% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| CP Merge Act 3 Probability % | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| CP Merge Act 4 Probability % | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| CP Merge Act 5 Probability % | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Duration @ 100%= | 20.2 | 33.3 | 250.0 | 35.7 | 210.5 | 3.0 | | | | | | | |

⁴ Smith, K. F. (2022). Schedule Slippages, Root Causes & Recommended Remedies, *PM World Journal*, Vol. XI, Issue V, May. <https://pmworldlibrary.net/wp-content/uploads/2022/05/pmwj117-May2022-Smith-schedule-slippages-root-causes-remedies.pdf>

In this approach, up to 50 critical path activities are entered with their durations and probability estimates⁵ – based on pre-determined &/or assumed risks -- with provision for up to five additional *merge activities* for each, with their related probabilities.⁶

Multiplying related merger probabilities produces a diminished critical path duration probability.⁷ The residual probabilities are then then computed to derive a buffer for a 100% duration. Planners can then select specific activity estimates to refine or retain, to modify the overall Management Reserve buffer. The difference between the planned and computed 100% probability duration is then displayed as buffer amount & percentage with 4, 5, 6, & 7 day work-week schedule options.⁸

If this buffer seems too large -- *as either an absolute duration or a percentage* -- remember Bent Flyvbjerg's black swan and admonition that '*fat tails*' are the consequence of mega-projects;⁹ as well as Winston Churchill's oft-cited '*chain of destiny*' observation: "*It is a mistake to try to look too far ahead. The chain of destiny can only be grasped one link at a time.*" To alleviate your concern, adopt a 'Rolling Wave' approach -- *i.e. schedule your project in smaller increments* -- instead of trying to plan the entire project duration at the outset, with a massive reserve buffer. This process should also be applied and estimates updated **during project implementation**; as once the project gets underway, changes often occur, and former *non-critical activities may subsequently become critical.*

Conclusion, Calculator, Caution & Common Sense

This approach only addresses the critical path and its related merge activities. Much more sophisticated tools & techniques -- such as Monte Carlo -- exist for project planning, scheduling and monitoring management, so this management reserve buffer calculator is merely another simple tool for your consideration. Nevertheless, it can elevate your estimating beyond simply thumbing '*ceiling*' percentages for the critical paths of your projects.

The template is designed for a critical path of up to 50 Activities.
Here's the link; Hold the Control key, and click on the logo to download it.

⁵ To estimate activity probabilities, use my ADEPT template [See: Smith, K.F. (2026). Better than PERT? You'd Better Believe! It's More ADEPT. *PM World Journal*, Vol. XV, Issue V, May] or traditional PERT formula. <https://pmworldlibrary.net/wp-content/uploads/2026/05/pmwj164-May2026-Smith-better-than-PERT.pdf>

⁶ NOTE: *The merger default is 100% -- i.e. No Merger Activity -- to facilitate computation.*

⁷ Assuming Merger activities delay in a 'wait & hurry up' mode, which reduces the likelihood all merger activities will be completed as scheduled; thereby precluding subsequent activities proceeding as planned

⁸ **NOTE:** Excel does not have an adjustable calendar for weekends & holidays, so caution should be used applying these estimates to a specific project.

⁹ Flyvbjerg, B and Gardner; D. 'How Big Things Get Done: The Surprising Factors that Determine the Fate of Every Project from Home Renovations to Space Exploration, and Everything in Between.' Penguin Random House 2023



PROJECT
MANAGEMENT RESEI

Go for it!

No matter how hard we try to understand the components, tools and techniques of project management and apply them with logic, systematic approaches and quantitative formulations; remember implementation of projects is in a messy VUCA¹⁰ environment, ***and we can still go wrong, systematically!***

About the Author



Dr. Kenneth Smith

Honolulu, Hawaii
& Manila, The Philippines



Initially a US Civil Service Management Intern, then a management analyst & systems specialist with the US Defense Department, Ken subsequently had a career as a senior foreign service officer -- management & evaluation specialist, project manager, and in-house facilitator/trainer -- with the US Agency for International Development (USAID). Ken assisted host country governments in many countries to plan, monitor and evaluate projects in various technical sectors; working ‘hands-on’ with their officers as well as other USAID personnel, contractors and NGOs. Intermittently, he was also a team leader &/or team member to conduct project, program & and country-level portfolio analyses and evaluations.

Concurrently, Ken had an active dual career as Air Force ready-reservist in Asia (Japan, Korea, Vietnam, Indonesia, Philippines) as well as the Washington D.C. area; was Chairman of a Congressional Services Academy Advisory Board (SAAB); and had additional duties as an Air Force Academy Liaison Officer. He retired as a ‘bird’ colonel.

After retirement from USAID, Ken was a project management consultant for ADB, the World Bank, UNDP and USAID.

¹⁰ Volatility, Uncertainty, Complexity, and Ambiguity,

He earned his DPA (Doctor of Public Administration) from the George Mason University (GMU) in Virginia, his MS from Massachusetts Institute of Technology (MIT Systems Analysis Fellow, Center for Advanced Engineering Study), and BA & MA degrees in Government & International Relations from the University of Connecticut (UCONN). A long-time member of the Project Management Institute (PMI) and IPMA-USA, Ken is a Certified Project Management Professional (PMP®) and a member of the PMI®-Honolulu and Philippines Chapters.

Ken has two KENBOOKS: 1. Project Management PRAXIS which includes many innovative project management tools & techniques; and describes a “Toolkit” of related templates, and 2. MUSINGS on Project Management -- a compilation of contemporary concerns in project planning, monitoring & evaluation, with some tools & techniques suggested for their solution. Either or both books are available from Amazon, and their related templates are available directly from him at kenfsmith@aol.com on proof of purchase.

To view other works by Ken Smith, visit his author showcase in the PM World Library at <https://pmworldlibrary.net/authors/dr-kenneth-smith/>