

Risk Exposure, Murphy's Law ¹ & Management Reserve ²

Dr. Kenneth F. Smith, PMP

Projects encounter a wide variety of risks during implementation, many of which project managers are well aware beforehand; others completely unforeseen. During the planning phase, prudent project managers mitigate, or otherwise make some provision to deal with the 'known-unknowns.' Nevertheless, in addition to a readily-available contingency budget to deal with such eventualities, the need for an **overall project-wide management reserve fund and schedule 'buffer'** remains to offset the impact from indefinable 'black swans.'

But how large should a management reserve fund be, and how much additional time should be pre-programmed to extend an otherwise-uneventful project completion date? That's the million-dollar question. Instead of 'off the top of the head' ceiling estimates, or adding some pre-established 'rule of thumb' fixed percentage to the baseline schedule and budget, **here is a more systematic approach to answer that question.**

A **matrix procedure** is already well established and outlined in the Project Management Institute's **PMBOK®** as a 'best practice' for determining the 'risk exposure' of individual known risks -- *based on the likelihood of their occurring, and the related impact should they occur.*

A **decision tree technique** -- in terms of their impact on the overall project schedule and budget -- can similarly be applied to multiple *across-the-board* risks; with extra added for your 'intuition' and synergetic effect,³ *aka* a "Murphy Cascade." The two figures below illustrate the decision tree concept and cascade effect:

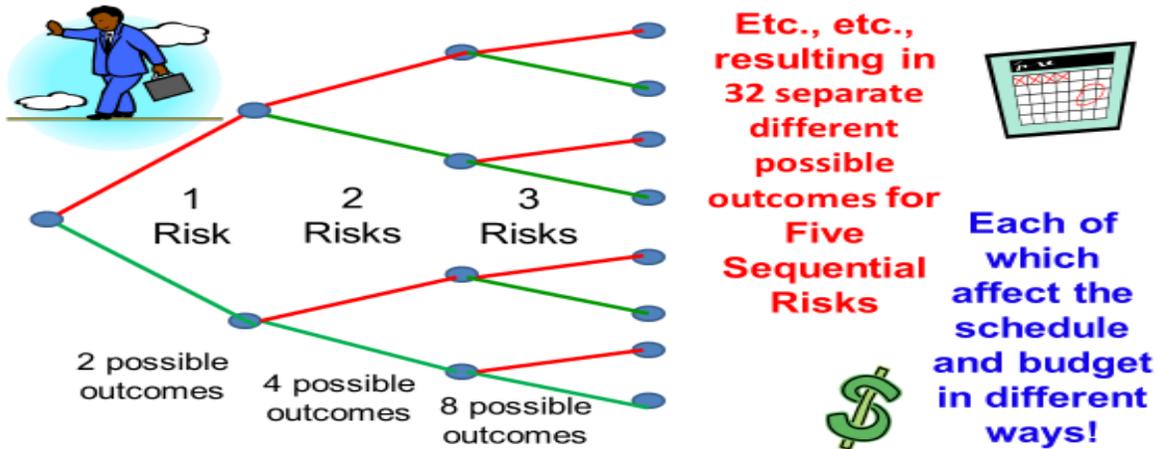
¹ "If anything can go wrong, it will; and usually at the worst time." Murphy

² How to cite this article: Smith, K. (2020). Risk Exposure, Murphy's Law & Management Reserve, *PM World Journal*, Vol. IX, Issue IX, September.

³ "The whole is greater than the sum of the parts." Aristotle

Decision Tree / Risk Breakdown Structure

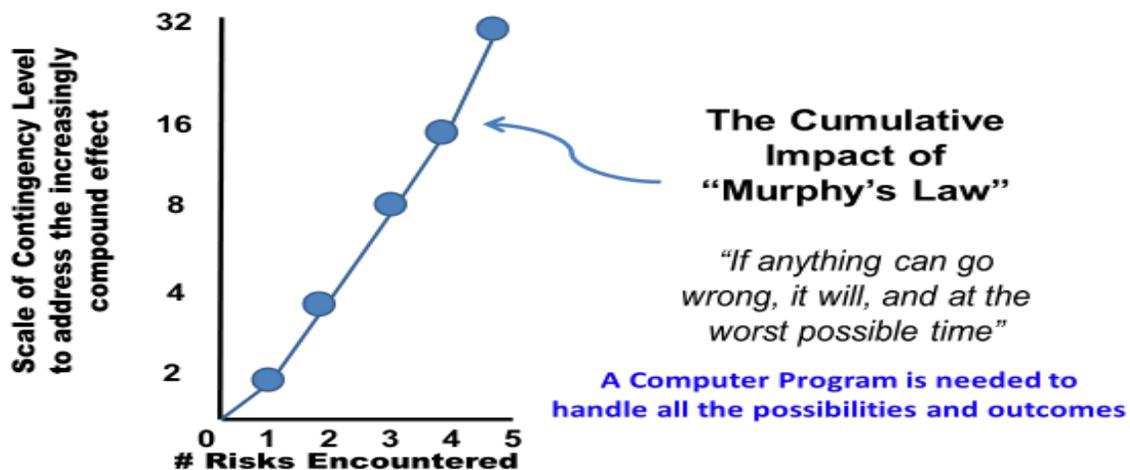
to Analyze the Probability of up to Five Sequential Risk Tiers



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Exponential Contingency / Management Reserve Needed to address the Cascading Effect of Additional Risks Likely to be Encountered



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I have developed a template to assist in assessing up to five (5) such risks at a time and their resultant impact is depicted below:

| DECISION TREE ANALYSIS [5 Tier Scenario] | | | | | | | | | | | | | | | | | | | | | |
|--|--|---|------------------|--------------------|------------------|---------------------|------------------|-------------|------------------|----------------|------------------|--|---------|---|---------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|------|-------|
| Project ID | | FOR ESTIMATING A SCHEDULE BUFFER & MANAGEMENT RESERVE BUDGET | | | | | | | | | | © 2020 2012. Dr. Kenneth F. Smith, PMP | | | | | | | | | |
| | | An "A Priori Analysis" of Possible Outcomes for [Up to Five] Mutually Independent Risks | | | | | | | | | | | | | | | | | | | |
| | | Enter Project ID, then Risks and data in the Yellow Cells Below | | | | | | | | | | "Murphy" i.e. ANY MORE | | | | | | | | | |
| | | RISK 1 | | RISK 2 | | RISK 3 | | RISK 4 | | RISK 5 | | PROBABLE IMPACT FOR MANAGEMENT RESERVE | | Estimate of TIME & or COST YOU WANT TO ADD to the "As is" Value in the RED Column | Added Cumulative Cascade Effect | SUGGESTED RESERVE SCHEDULE & BUDGET | SUGGESTED REVISED SCHEDULE & BUDGET | SUGGESTED RESERVE SCHEDULE & BUDGET | SUGGESTED REVISED SCHEDULE & BUDGET | | |
| | | Probability | Impact | Probability | Impact | Probability | Impact | Probability | Impact | Probability | Impact | AS IS | RESERVE | | | days | days | days | days | | |
| | | Poor Design | Causing Estimate | Unavailable SKILLS | Causing Estimate | Equipment Breakdown | Causing Estimate | Bad Weather | Causing Estimate | Civil Disorder | Causing Estimate | 28 | AS IS | days | days | days | days | days | days | | |
| | | Time Unit = | days | days | days | days | days | days | days | days | days | @ | days | days | days | days | days | days | days | | |
| | | Input Drivers: | 76 | 80% | 8 | 30% | 2 | 30% | 10 | 70% | 4 | 30% | 4 | 14% | 4 | 1 | 3 | 8 | 84 | 31 | 112 |
| | | | | | | | | | | | | | | | | | | | | | |
| | | PLANNED BUDGET | | | | | | | | | | | | | | | | | | | |
| | | Money Unit | \$m | \$m | \$m | \$m | \$m | \$m | \$m | \$m | \$m | \$54 | \$m | \$m | \$m | \$m | \$m | \$m | \$m | \$m | |
| | | Input Drivers: | \$350 | 80% | \$1 | 30% | \$60 | 30% | \$1 | 70% | \$1 | 30% | 1 | 17% | \$9 | \$2 | \$3 | \$14 | \$364 | \$57 | \$418 |

To analyze the impact of more than five risks and obtain more comprehensive suggestions, simply insert the Suggested Revised Schedule & Budget data into the Planned Schedule & Budget, and edit the risks and related estimates.

The additional suggested funding should be held in the Management Reserve for application wherever needed, while the additional time should be built into the implementation plan -- added as a final buffer activity on the project's critical path.

This is just one of over 100 templates I have designed to assist in planning, managing and evaluating projects, available in conjunction with my book, Project Management PRAXIS.

About the Author



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Dr. Kenneth F. Smith is a freelance project management consultant. Formerly a US Defense Department management systems specialist; subsequently a Senior Foreign Service Officer, US Agency for International Development (USAID) project manager, evaluator, trainer & advisor; and consultant to ADB, the World Bank, and USAID. He earned his DPA (Doctor of Public Administration) from the George Mason University (GMU) in Virginia and his MS from Massachusetts Institute of Technology (MIT Systems Analysis Fellow, Center for Advanced Engineering Study). A long-time member of the Project Management Institute (PMI) and IPMA-USA, Dr. Smith is a Certified Project Management Professional (PMP®) and a member of the PMI®-Honolulu and PMI®-Philippines Chapters.

Ken's book -- **Project Management PRAXIS** (available from Amazon) -- includes many other innovative project management tools & techniques; and describes a "**Toolkit**" of related templates available directly from him at kensmith@aol.com.