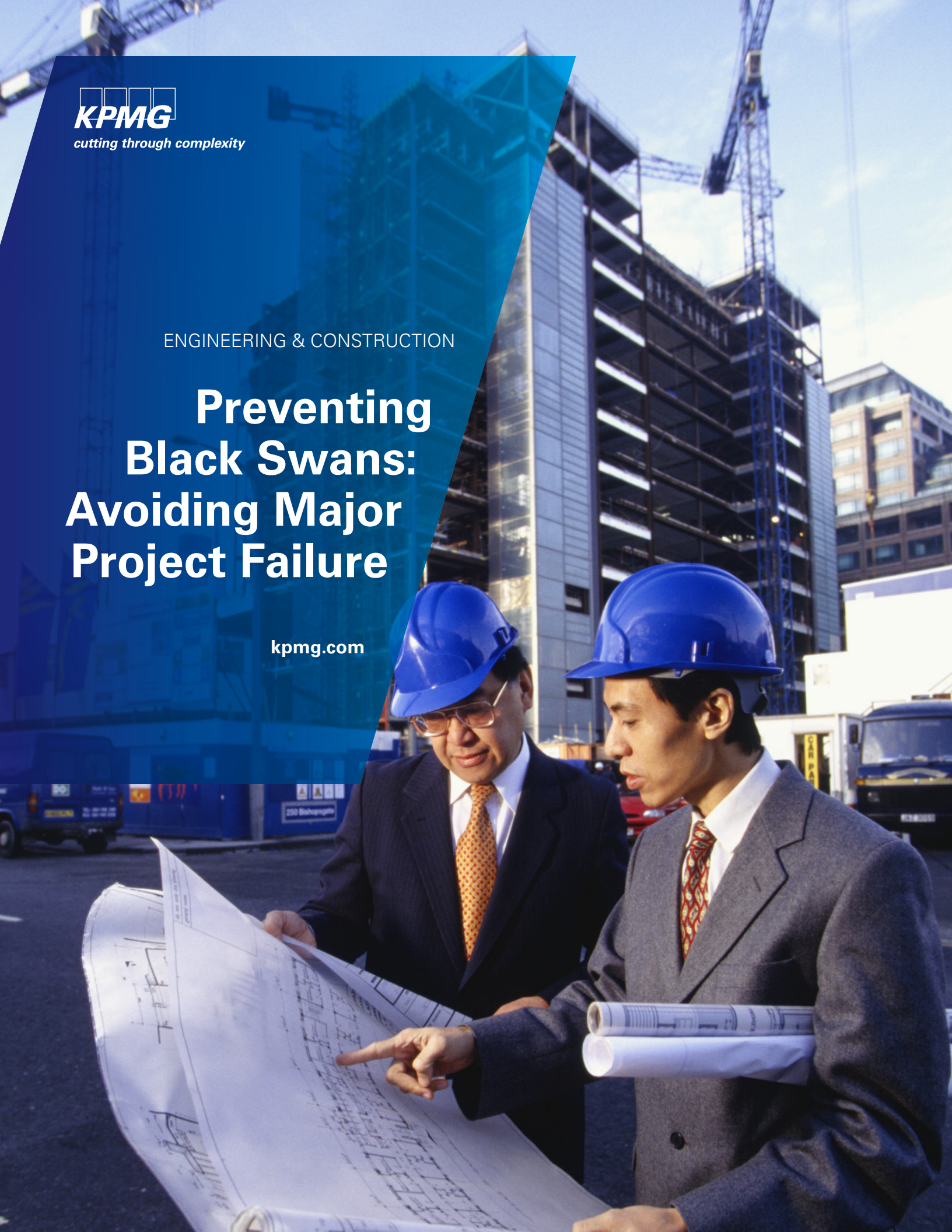

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Preventing Black Swans: Avoiding Major Project Failure

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Introduction

Many individuals involved with or responsible for major capital projects probably feel as if black swan events occur, almost predictably, on nearly every major project. In reality, a black swan event usually is a surprise (at least to the observer). It almost always has a major impact and, after the event's first recorded incident, is rationalized by hindsight.

When we look back at the troubled and failed projects we have been engaged by clients to help recover or clean up, almost 100% of the issues and failures were attributed to avoidable, and in many cases very predictable, root causes. Yet when asked, most clients would say they were unforeseen failures with few or no warning signs to help avoid disastrous results.

So, if a black swan event is a once- or perhaps twice-in-a-lifetime occurrence, what is happening with infrastructure projects and why do so many project participants and stakeholders attribute the cause of major failures to unforeseen events? The key is whether the potential for failure is predictable or foreseeable by the observer, or in this case, the project team or project stakeholders. Most stakeholders, even the most experienced, are fortunate to work on very few major capital projects ($500m +) over their entire careers.

Why, then, would we expect a project manager or a project team that has managed a small handful of major projects to be highly proficient at it?

Why is it so important to understand the root cause of project failure and differentiate between controllable and uncontrollable events?

The demand for major capital projects has never been greater, driven by an increasing global population, aging infrastructure, increasing urbanization, and continued development of emerging markets.

With this demand also comes the inevitable challenge for owners, contractors, and other stakeholders to successfully deliver these much-needed infrastructure projects. The reality of the situation is that, similar to world markets, capital projects have become increasingly complex and challenging. What worked in the past is no longer good enough today and will definitely not be good enough in the future.

While some organizations are concerned with budget and schedule overruns of 10 or 20 percent, many are much more concerned about projects like Boston's Big Dig that go 50, 60, 90, or more than 100 percent over budget, threatening the viability of the owner organizations or contractors delivering the projects.

The concept of the black swan, around since the 16th century, more recently garnered attention in Nassim Nicholas Taleb's 2004 book, "Fooled By Randomness."[1] Whether or not you have read any of Taleb's books, most of us have heard a lot about black swan events over the past few years, and are trying to make sense of black swan theories and determine how to apply them. While some may disagree, almost all project failures, even catastrophic failures, are really not black swan events but a series of failures that alone may have a negative impact on project outcomes but combined lead to catastrophic failure.

This paper highlights characteristics of major projects that often lead to catastrophic failure for owners and contractors, highlights alternative approaches for screening projects, and discusses red flags and triggers for early identification of troubled projects. If there is a true black swan event, the approaches and practices that help avoid traditional catastrophic failure will also help better prepare stakeholders for that rare occurrence.

Despite the uniqueness and complexity of major capital projects, it is amazing that only a few elements are routinely the cause of project failures. Also surprising is how often experienced project teams ignore the warning signs and move forward into construction despite serious problems in many areas that are keys to project success.

The following tables include some of the root causes of project failure for owners and contractors. Any one of these alone can lead to failure. If a project is characterized by several of these conditions—and in rare cases a majority of them — the near-certain outcome is catastrophic failure.

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[1] Nassim Nicholas Taleb, *Fooled by Randomness: The Hidden Role of Chance in Life and in the Markets* (New York: Random House, 2004).

Causes of Project Failure

Owners
Scoping issues – Project scope does not fully address organizational business requirements
Inexperienced or unqualified project team – Project team lacks appropriate skills and expertise to manage the project
Poor estimating – Project estimates are incomplete or insufficiently detailed for budgeting
Lack of integrated budgeting & planning – Project business requirements are not aligned with budget and execution plan
Incomplete & fluid design – Construction commences based on an incomplete design and project scope is continually in flux
Lack of proactive risk management – Project risks are not fully understood or vetted prior to project approval
Unrealistic schedules – Project delays during planning and approval result in compressed schedule milestones and unrealistic completion targets set by management
Insufficient tools & project management infrastructure – Project tools and infrastructure are not set up to effectively plan, deliver, track, and report performance

Contractors
Poor estimating – Overly optimistic bids, poor or outdated cost data, missed scope items, flawed assumptions regarding regulatory issues, constructability or labor and material price escalation
Resource shortages and inexperienced or unqualified project team – Lack of available craft or staff labor, inexperienced field supervisory personnel, or lack of qualified and experienced project management team members
Unfavorable contract – Construction contract favors the owner in areas such as payment terms, change order pricing, reimbursement of general conditions, overhead and profit/fee, and penalties for nonperformance
Lack of senior management support – The project lacks support from senior management to address project issues and challenges in a timely manner, and manage key communications and negotiations with the owner
Design issues – Project design issues lead to inefficiencies, unrecoverable cost overruns, and schedule delays
Overly aggressive schedule – Overly aggressive schedules lead to inefficiencies in the field and unrecoverable overtime and premium time
Lack of risk management to address unforeseen conditions – Lack of proactive risk management techniques to identify and address project issues and risks
Lack of project coordination and integration – Projects are managed in silos with limited integration among the owner, architect/engineer, contractor and its subcontractors, and other project stakeholders

These lists will not come as a shock to anyone with experience on major capital projects. The important item to note is that while many project stakeholders can tell when something is not going well on their own projects, many do not notify management because they believe the problems or issues are temporary and will eventually be addressed.

While team optimism and confidence are great attributes, we have found that troubled projects almost never recover without dramatic intervention. If management is not aware of project issues until they are catastrophic, it is almost impossible for management to take any action that will rescue the project and avoid failure. This is why it is important for management, the project team, and stakeholders to avoid isolating themselves. They must not rely only on internally generated project information but also on independent information prepared by stakeholders with unbiased information and perspectives.

How do I detect problem projects within a large portfolio?

While it would be nice to have a crystal ball to identify which capital projects will fail or underperform so their issues can be addressed early on, we must instead rely on currently available tools and techniques combined with our ability to analyze and detect issues.

These tools and techniques serve as canaries in the coal mine – the more of them you employ, the better chance you have of detecting and preventing project failure. Which returns us to the main idea in Taleb's book, which is to put in place robust precautions to prevent black swan events, not to attempt to predict them.

Taleb states that a black swan event depends on the observer. For example, what may be a black swan surprise for a turkey is not a black swan surprise to its butcher; hence the objective should be to "avoid being the turkey" by identifying areas of vulnerability in order to avoid surprises. This is why it is important to rely on tools and techniques that provide information independent of the project team or "outside the bubble." Project managers and their teams are eternal optimists, and management and other project stakeholders cannot rely solely on the information they provide or they too risk becoming a turkey.

Effective tools and techniques for getting unfiltered information

Owners	Contractors
Periodic independent project assessments	Management/deal committee review for all project bids or contracts that deviate from target metrics
Project readiness assessments prior to start of construction	Shadow estimates prepared by estimating teams from other business units or regions for all high-risk projects
Utilize advanced schedule analytic techniques for periodic schedule analysis	Include labor escalation provisions for all projects with potential resource shortages
Monthly/quarterly project cost reconciliations prepared by finance or accounting	Active senior management project participation via attendance at weekly project meetings among owner, architect and contractor or other key meetings
Establish a project steering committee at project inception	Actively participate in the design process via design assist or integrated project delivery
Surprise management attendance at weekly project meetings	Include higher contract contingencies and ability to utilize T&M overtime on projects with aggressive schedules
Utilization of earned value cost and scheduled performance indexes	Report and update top 10 project risks on a weekly or biweekly basis, including having subcontractors independently report their top five risks
Independent validation and reporting of budget variance projections	In-flight project assessments conducted by other project teams for all major projects
Tracking contingency draw vs. project completion percentage	Colocate project team with owner team
Report and update top 10 project risks on a weekly or biweekly basis	Review earned value metrics and all potential change orders with senior management on a weekly or biweekly basis

None of these activities are overly complex or challenging. The difficulty is the level of commitment and resources required to effectively maintain these activities over an extended period of time. We have found that many companies are very good at identifying new processes and practices in response to project failures but very few are able to implement and sustain them. If the practices are not sustained, then an organization cannot be surprised when failures reoccur.

Conclusion

Spending valuable resources and energy trying to predict black swan events will only lead to a lot of sleepless nights. However, there are valuable lessons we can draw from many of Taleb's black swan concepts, such as not being a turkey and understanding how much of an impact the viewpoint of the observer has on the perception of events.

By first understanding how and why projects fail, we can better understand how certain events may be misinterpreted as random black swan events as opposed to a series of failures that can be avoided. We have also learned how important it is to incorporate tools and techniques designed to prevent these failures, as well as introducing triggers to alert us early on if these failures are starting to happen.

If the focus is ensuring the flow of independent and transparent information, then no matter how complex or challenging a project, management and project stakeholders will have the opportunity to obtain independent project information and avoid catastrophic project failure.

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