

## Dar Al Riyadh Insight #95

### Modeling of Event Risk in Large Complex Projects

***Dar Al Riyadh Insights reflect the knowledge and experience of our Board, executives and staff in leading and providing PMC, design and construction management services. Dar Al Riyadh believes in the importance of broadly sharing knowledge with our clients and staff to improve project outcomes for the benefit of the Kingdom of Saudi Arabia.***

Six elements involved in event contingency are examined in this series of Insights:

1. Various financial components of a project's price
2. Event contingency as distinguished from cost contingency
3. Preferred method of addressing event contingency from a provider's perspective
4. Potential event risks warranting consideration (event risk checklist)
5. Events typically excluded from event contingency
6. Modeling of event risk in large complex projects

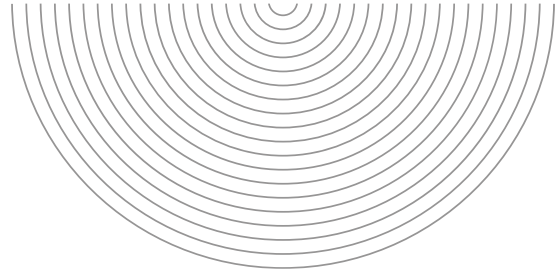
This Insight addresses number 6.

#### **Modeling of Event Risk in Large Complex Projects**

Event risk may have both cost and schedule impacts and each needs to be modeled. Event risk mitigation strategies need to consider both cost and schedule. Schedule mitigation is aided by adequate float within the schedule and the adequacy and robustness of contingency execution plans and management. In instances where schedule related liquidated damages are present, adequacy of float takes on even greater importance.

Modeling of event risk, especially on large complex projects, must consider several important factors:

- Coupling of event risks whether by common assumptions, risk drivers, or constraints. For example, a global financial crisis would severely impact several elements of both cost and event risk. A similar coupling has been associated with COVID-19.
- Correlation among tasks, such that delay or cost growth on one results in delay or cost growth on other tasks. This results in a greater impact from event risks than is typically modeled (typically modeled with zero correlation among event risks, whereas evidence suggests 30 percent correlation may be a better assessment.)
- Assumed distribution in any Monte Carlo analysis. Evidence suggests that large complex systems behave with a "fat tail" behavior. Distribution selection should be carefully considered.
- Low probability, high impact events must be considered and reflected in the event risk assessment.
- Optimism bias must be challenged, especially when defining low and high-end contingency estimates for each of the various event risks.



### Summary

Event risks are real and have a significant impact on overall project cost performance. Optimism bias must be challenged and special attention paid to low probability, high impact events and their modeling. While one begins with an assessment of unmitigated event risks, it is important to understand the strategies available to limit the effects of these risks. These include:

- Avoid – walk away from the project!
- Transfer
- Manage

This last strategy should be employed even when avoidance and transfer are believed to have occurred. All too often these first two strategies have proven to be less complete than believed.