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Buckets to Disaster: What to Avoid in Making Critical Decisions

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Abstract

This paper offers an approach to the development of techniques and tools to teach risk-based decision analysis and complex decision analysis to minimize the disastrous outcomes of critical decisions taking in the worlds of plant operations and engineering. Risk Based Decision Management (RBDM) and critical decision analyses are not taught in the curricula of the engineering programs at any major university. Engineers and other technical staff are promoted based on their abilities and the assumption that their experience will guide them to make robust decisions when needed particular in the heat of the moment when time is of the essence. The historical incident record brings this assumption into question. Decisions made by individuals or teams on behalf of companies can lead to disastrous outcomes and significant consequences that have the potential to cause significant losses. This paper proposes a basis for the development of materials to prepare curricula to teach RBDM as part of undergraduate and graduate courses in a very structured and logical manner.

RBDM techniques draw on the sports world in which elite teams have developed programs to teach decision making based on reading and reacting in game situations to enhance the chances of positive outcomes. These high-performing teams learn, through many hours of focused practice, how to apply risk-reward paradigms to take decisions in very dynamic and stressful game situations. We all can learn from the sports techniques and processes and apply them in other fields.

Based on the analyses of several incidents with disastrous outcomes, the common themes that reoccur in decision making are identified as “buckets” which must be avoided to reduce the possibility of negative outcomes from decisions. The definition and rationale behind these buckets provide the basis of an approach to assist decision makers in taking more rational decisions during engineering projects or operations.

Another benefit of analyzing incidents through the eyes of risk (i.e. the decisions implicated in the disastrous consequences) is a better understanding of “what went wrong” and hence an improved ability to more effectively learn from past incidents. Learning from incidents in a global sense has not proven to be effective in the past.