

Alpha Foundation For The Improvement of Mine Safety and Health, Inc.

'Risk Management'

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October 10, 2012



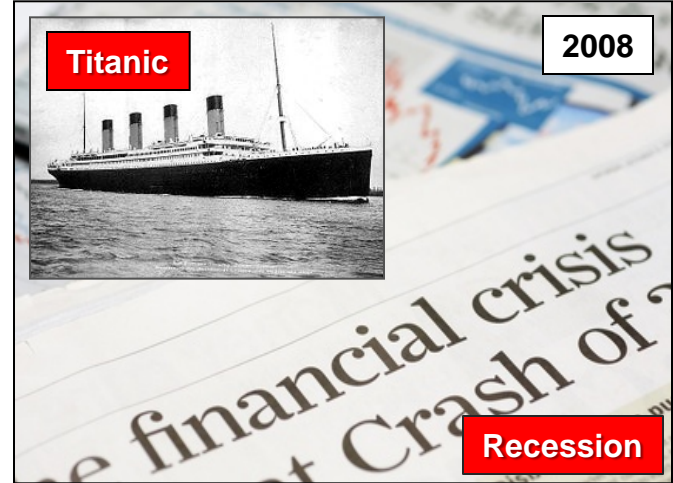
Which Came First: Quake or Collapse?

It's geologists vs. mine owner on cause of Utah disaster

Crandall Canyon



Katrina



Titanic

2008

Recession



Deepwater Horizon

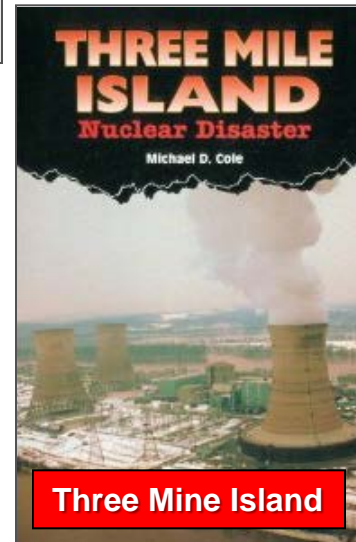


Upper Big Branch

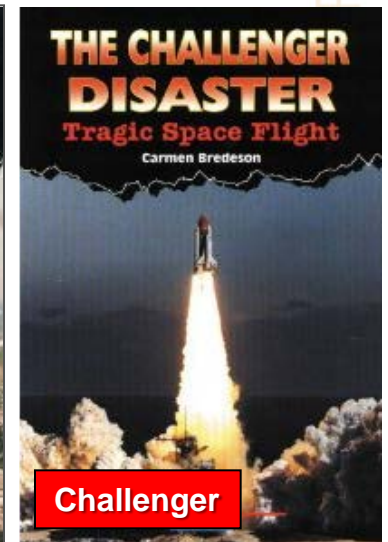
The April 5, 2010, explosion: a failure of basic coal mine safety practices

UBB

Report to the Governor
Governor's Independent Investigation Panel



Three Mile Island

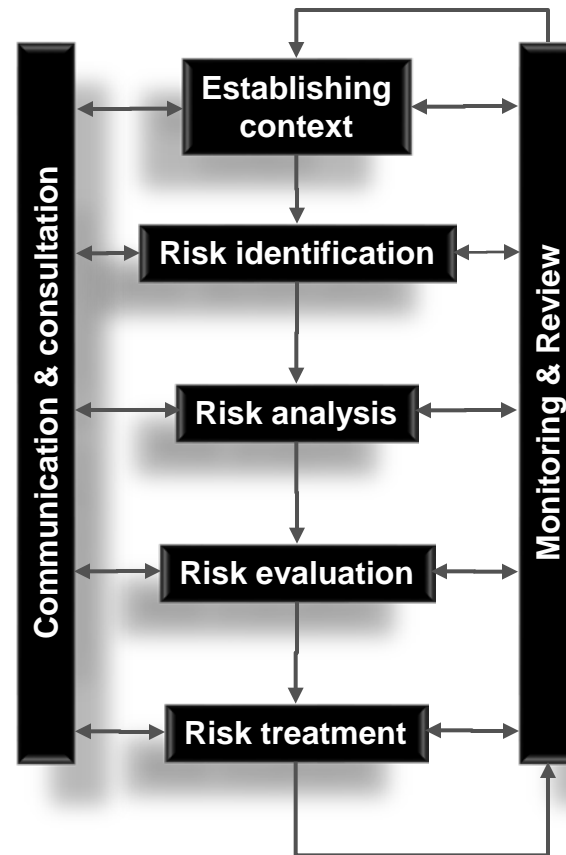
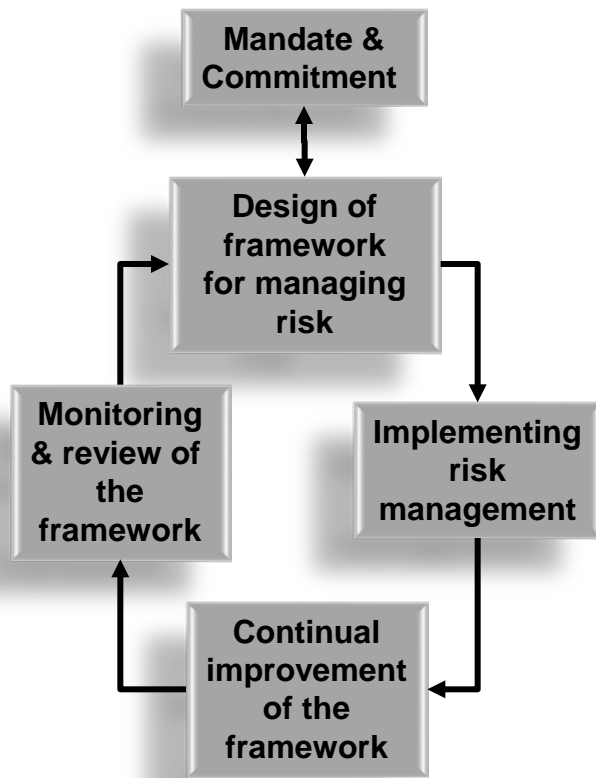


Challenger



BP Texas City

Process of identifying hazards, assessing risk, developing and applying controls to eliminate or minimize risk.



Qualitative Risk Matrix

Frequency of Occurrence	Severity			
	(1) Catastrophic	(2) Critical	(3) Marginal	(4) Negligible
(A) Frequent	1A	2A	3A	4A
(B) Probable	1B	2B	3B	4B
(C) Occasional	1C	2C	3C	4C
(D) Remote	1D	2D	3D	4D
(E) Improbable	1E	2E	3E	4E

Risk Categories:



High



Serious



Medium



Low

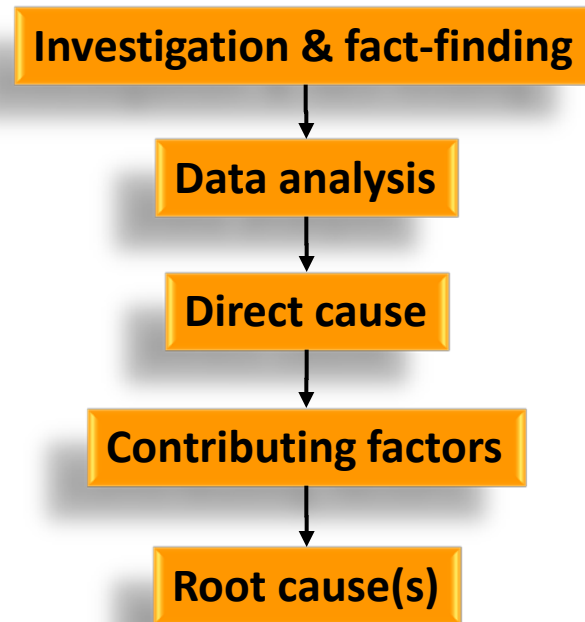
(MIL STD 882)

Risk Management

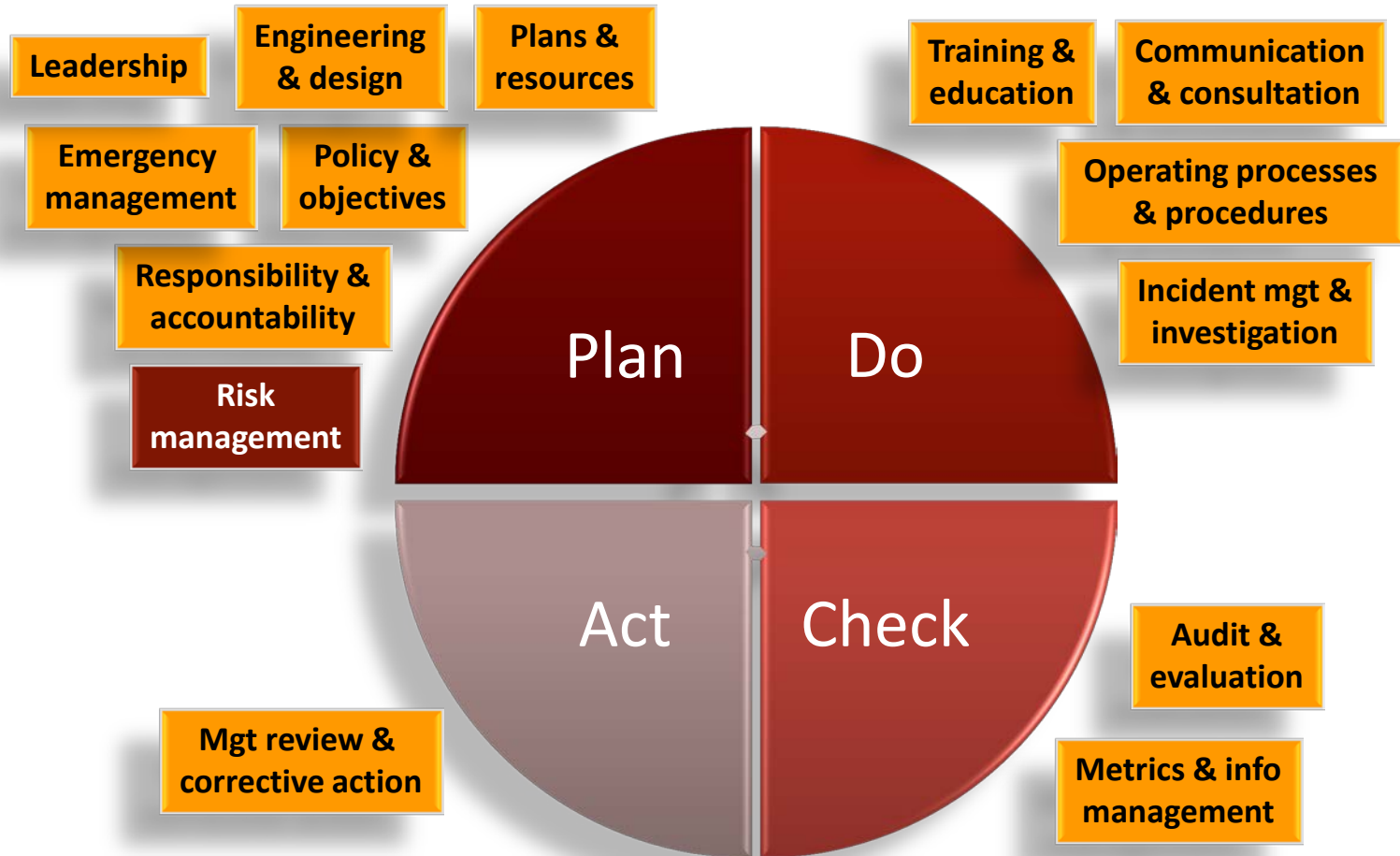


Special Risk Management: Root Cause Analysis

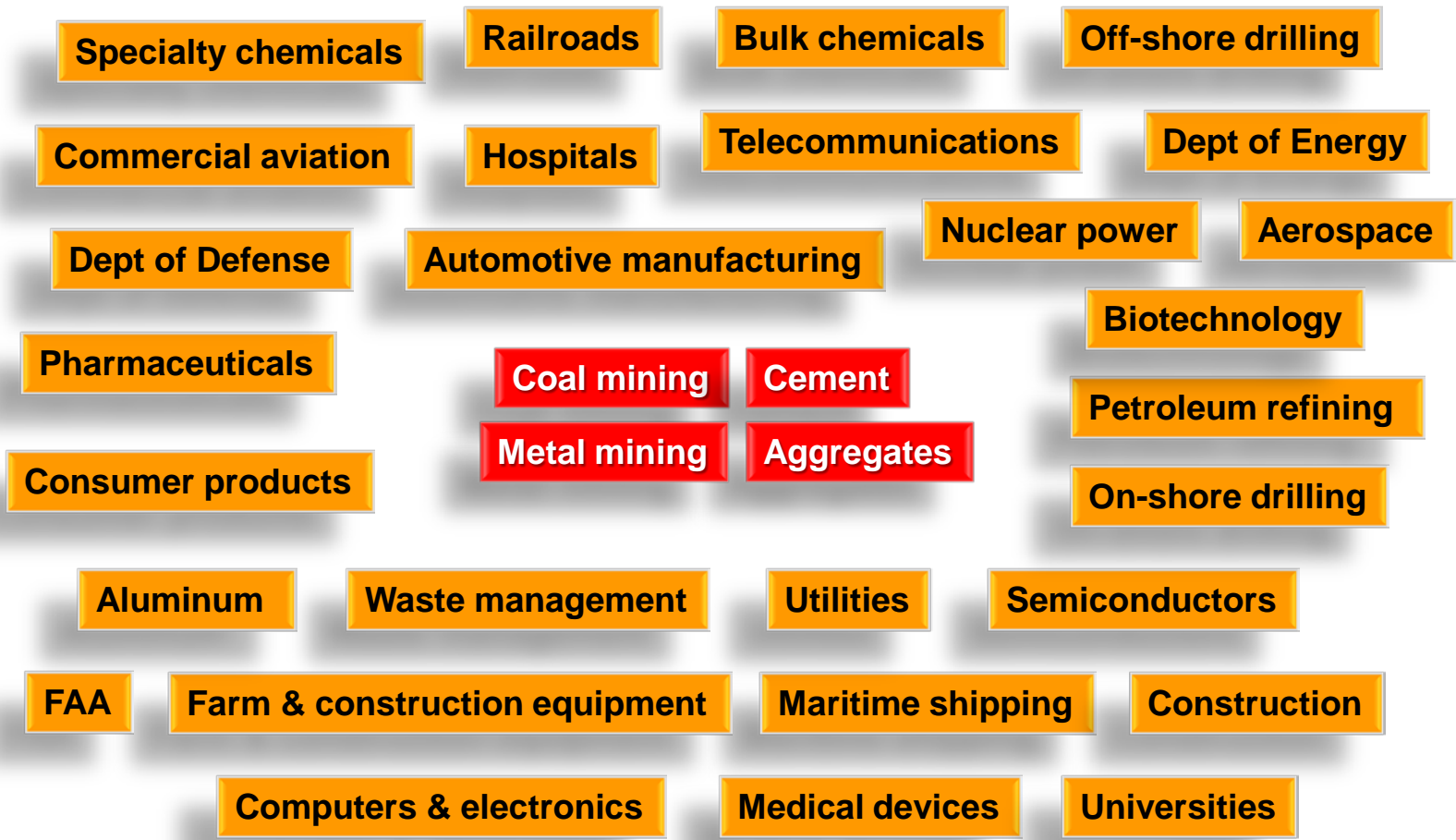
- A tool designed to help identify not only what and how an event occurred, but also why it happened.



Risk-Based Safety & Health Management System

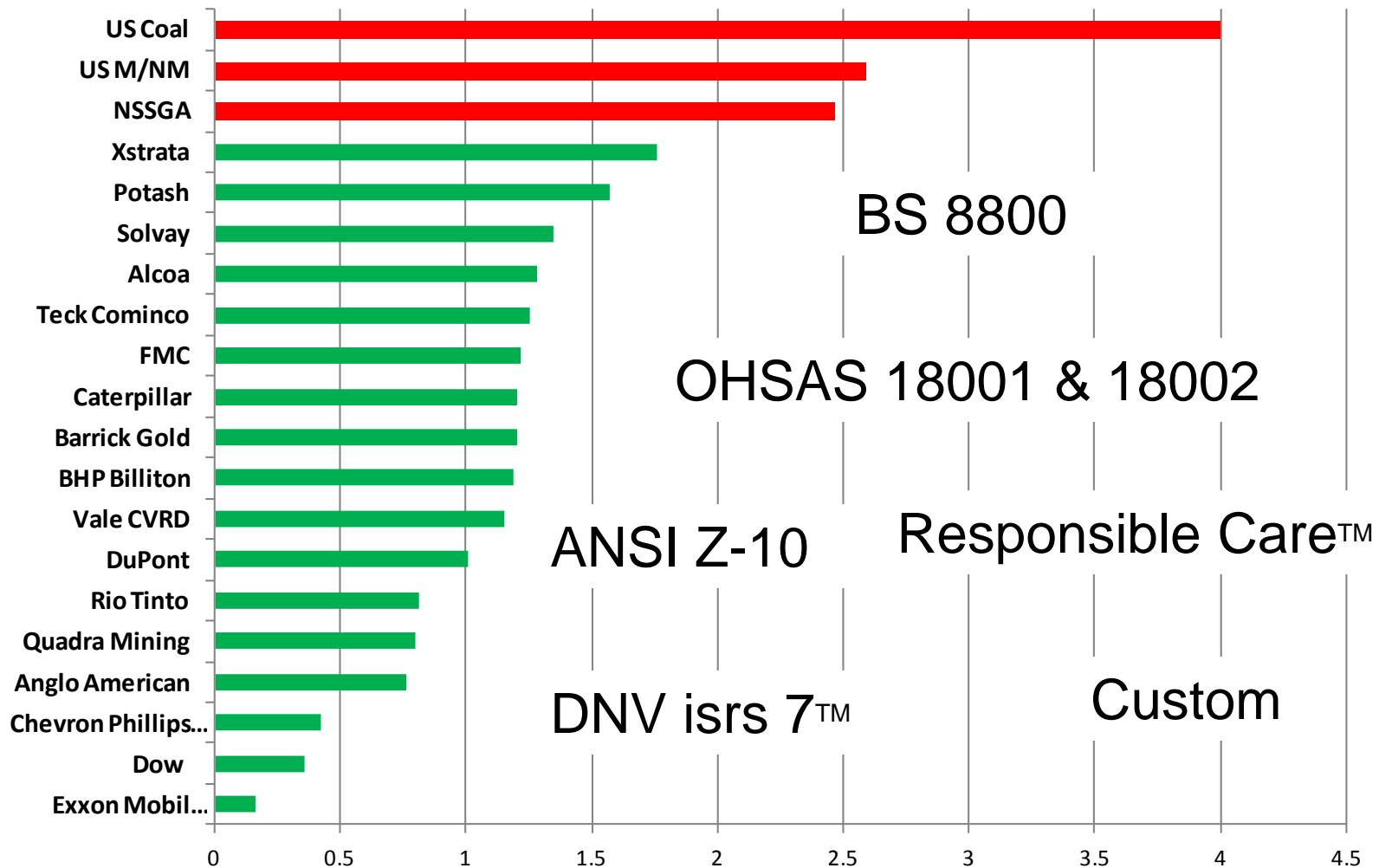


Risk-Based Safety & Health Management Systems



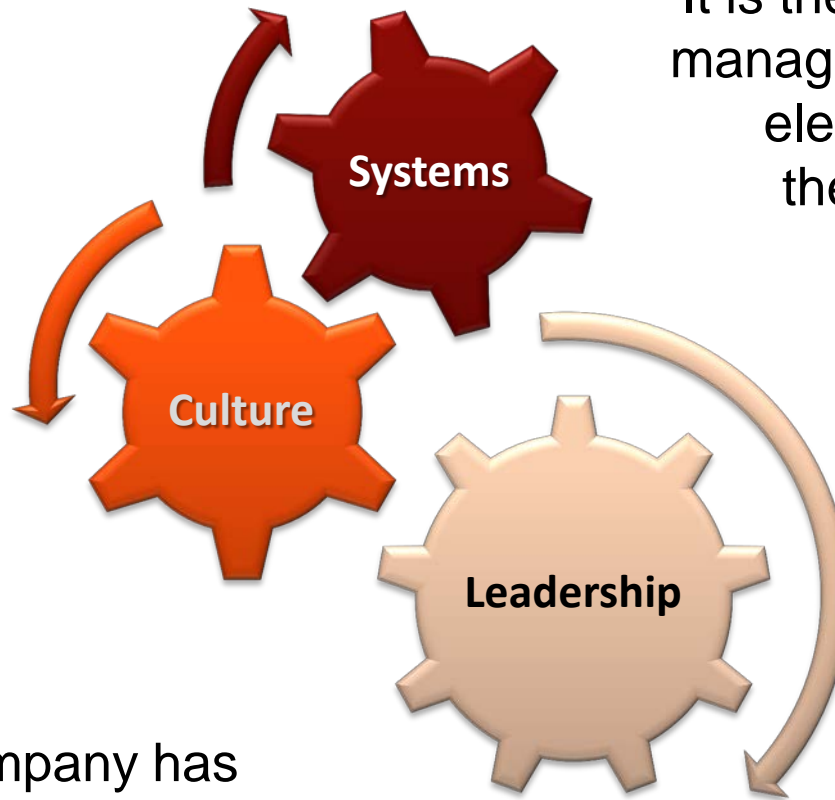
TRIFR Comparison for 'High Risk' Companies (2009)

2009 Corporate Website Data



TOGETHER WE REACH

Framework for Mining Safety & Health Excellence



It is the integration & active management of these three elements that minimizes the potential for mining morbidity & mortality.

Each mining company has different requirements relative to the need to improve each element.

Operational Risk Management Literature

- Application of existing risk assessment techniques to:
 - Slope stability, coal spontaneous combustion, haul truck operations, escape ways, mine hoisting, tunneling, blasting, etc.
- Development of new risk assessment techniques.
- Optimization of different risk management (RM) approaches.
- Characterization of RM-based management systems.
- Longitudinal performance associated with mandatory RM-based management systems (international).

Operational Risk Management Research Needs

- Characterization of RM practices across mining companies with long-term good and poor safety performance.
- Characterization of cultural and leadership characteristics of companies using RM practices with long-term good and poor safety performance, i.e., precursors to effective RM policy.
- Assessment of intervention effectiveness of RM processes in mining companies with long-term good and poor safety performance, i.e., relative effectiveness of RM programs.
- Assessment of the efficacy of consensus standard RM-based management systems versus company-specific RM-based management systems, i.e., how important is customization?

Operational Risk Management Research Needs

- Intervention effectiveness of different management systems facilitation variable (leadership, responsibility, accountability, etc.) in reduction of safety outcomes.
- Assessment of the acceptance of different RM processes in very small ($N \leq 10$), small ($N \leq 50$), and larger ($N > 50$) mining companies, i.e., will small mines use non-mandatory RM?
- Assessment of the efficacy of RM processes in very small ($N \leq 10$), small ($N \leq 50$), and larger ($N > 50$) mining companies.
- Characterization and patterns of individual and group heuristics in accuracy of risk estimation (probability & consequence), i.e., what informs mining risk judgment?

Operational Risk Management Research Needs

- Assessment of the relative effectiveness of different risk assessment techniques in the accuracy of risk estimation and perceived ease of use by individuals and groups.
- Assessment of miner participation in risk assessment (e.g., estimation and control development) and its impact on risk attitude, perception and behavior.