

Working Group 4

Improving Risk Models

WG Leaders:

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Attendance Breakdown

Approximate total attendance	44 persons
Federal Regulators	2 persons
State Regulators	2 persons
International Regulators	1 persons
Pipeline Industry/Service Providers	24 persons
Standard Developing Organizations	1 persons
Researchers	9 persons
Academics	3 persons
Other	1 persons

Guiding Principles

- Model improvements/usage should improve both efficiency and effectiveness of overall risk management while maintaining operational reality
- Improvements should be incremental and continuous
- Use physically relevant inputs/outputs

Main Points of Improvement

- How to address low probability of occurrence/catastrophic failures
- Bridge to Enterprise Risk Management, Safety Management Systems and Regulations
 - Include organizational factors
 - Make model output relevant to decisions and return on investment
 - Risk informed/Decision support tool

Main Points of Improvement

- Consider probabilistic risk models
 - Coherent - sum of all probabilities equal to 1
 - Include variability
 - Move from averages to distributions
 - Recognize extreme values without extreme conservatism
 - Modular, scalable, flexible
 - Address data gaps/unknowns to include uncertainties
 - Value of information
 - Simplify big data, don't over collect - when is data good enough?
 - Variable dependence – interactive threats
 - Verifiable/validatable
 - Forward looking fault/event tree analysis
 - Incorporate SME input where possible

Main Points of Improvement

- In moving to probabilistic models, how to address targets
 - Risk not equal to exactly zero
 - Risk informed
 - Risk communication
 - Mandated Maximum Risk Tolerance
 - Benchmarking
 - As Low As Reasonably Practicable
 - Anchoring

Minor-Points of Improvement

- Address un-Intended consequences
 - Mitigation creating new risk
- Expose hidden or masked threats
- How to measure improvement
- Learn from near misses and including why events did not escalate
- Use models to drive R&D needs
- Predicting new threats from changes in operational realities
 - 100 yr weather events
 - New production sources

WG 4 Gaps

- 1. Risk Management Workshop(s)**
- 2. Paper study on a Critical Review of Candidate Models**
- 3. Paper study on Review of Approaches for Preventing Catastrophic Events**
- 4. Paper study on Risk Tolerance**

Associated Details

(Gap #1)

General Knowledge: Risk Management Workshop

PHMSA/NAPSR should hold a public workshop that brings perspectives from the pipeline industry, other industries, regulators, modelers, standard developing orgs and other stakeholders.

Key questions/actions:

- Where we've been, where we are and where we need to go
- Consider paper study contractor presentation of related scope and seek further input.

Advice to hold the event in CY 2015

Associated Details

(Gap #2)

General Knowledge: Paper study on a Critical Review of Candidate Models

The study should consider:

- Candidate models from inside/outside the pipeline industry
- Ability to predict previous events from candidate models
- Suitability to pipelines and its business, operational and regulatory realities
- Decision theory to optimize risk
- Commentary on other facilities and LNG

Recommended as 6-8 months to complete and roughly \$200K-\$300K

Associated Details

(Gap #3)

General Knowledge: Paper study on Review of Approaches for Preventing Catastrophic Events

The study should include the following attributes:

- How other industry approaches could be adapted to the pipeline industry
- Consider how to facilitate unique data mining
- Suggestions for a Knowledge Management Framework so that lessons learned are propagated back in to the community of knowledge

Recommended as 4-6 months to complete and roughly \$100K-\$200K

Associated Details

(Gap #4)

General Knowledge: Paper study on Risk Tolerance

The study should consider:

- Conflicts between non-zero risk and the goal of zero failures
- Survey across other industries/geographies to understand how risk tolerance is determined/quantified

Recommended as 4-6 months to complete and roughly \$100K-\$200K