Comparison of Risk Register Quality and Consistency using Causal Network Topology Analysis

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ABSTRACT

For multi-site mining companies, checking the quality and consistency of the data recorded in risk registers is important for confirming how well mine safety management systems have been implemented. However, this task is complicated by the differences in scope of the site, their particular nature, the complexity of the operations and many other factors that can introduce nuances to the characteristics of the risk registers.

We present here an application of a technique called Causal Network Topology Analysis for comparing the quality and consistency of risk registers. By quality we refer to, for example:

- Missing causal relationships between risks

- Location of missing controls

- Focus of risk treatment strategies: prevention vs mitigation controls

By consistency we refer to how _causally interdependent are the risk events_. There are often causal interactions between the lines of a risk register that mean that the likelihood and consequence scores that are applied to each risk event are not independent. We measure this degree of interactions by:

- Proportion of independent scenarios per register

- Efficiency of risk treatment strategy comparison

This approach can indicate quality and consistency differences between registers _irrespective_ of the actual details of the site or operation. This occurs by comparing aspects of the _structure_ of a _causal network_ extracted from how the risk events, causes, controls and consequences causally interact. In this work we compare pairs of registers to demonstrate the approach.