A Review of Risk Management for Tailings Dams and Forward Paths

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ABSTRACT

Design and risk management of tailings dams have been under more scrutiny with recent notable failures. This paper investigates the history of risk management for tailings dams, learnings of recent exercises, and other industries and areas of society.

A comparison of the societal FN curves between various industries such as nuclear, oil and gas, process, and transport is made, and the reasons for such selections. These are considered in the context of current and likely future societal expectations in light of recent events. The aim is to achieve a better approach and understanding of social permission to operate.

It appears that designers and operators in many industries along with mining may not recognise the fuller spectrum of probabilities and consequences, along with not completely understanding the impending failure potential. The systemic human factors associated with those situations are examined.

There is a trend of serious under provisioning for prevention and for remediation of large societal events in the nuclear, oil and gas, large buildings, and more recently in tailings dams related events. An examination is made of why this may be the case, and of possible ways forward in risk management to achieve more acceptable levels.

Some useful safety critical approaches are considered such as functional safety and Human Factors in rail, aviation, and nuclear industries. The SFARP approach is considered along with the safety case approach used in other areas. An examination is made of how these could be adapted for application in tailings dams. New and emerging techniques such as the use of big data, and artificial intelligence are also considered for better understanding of operational risk potential.