Effective management of catastrophic risks – What applies to tailings dams?

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ABSTRACT

Many industries have to manage catastrophic risks. Tailings dam failures are one of the catastrophic risks that the mining industry must manage. Without effective risk management, catastrophic events like the 2014 Mount Polley, 2015 Somarco and 2019 Brumadinho dam disasters will continue to occur. The paper will argue that mining companies need to have an effective process for managing tailings risks and is integratable with other catastrophic mining risk management processes to prevent future mining disasters. But what constitutes an effective catastrophic risk management process?

This paper seeks to answer this question firstly by defining catastrophic risks and what distinguishes them from other operating risks. It will then provide an overview of incidents relating to failure in catastrophic risk management and the lessons we can learn from them both from within the mining industry and from other high hazard industries. These lessons cover topics that include human competency, risk communication, control effectiveness and static versus dynamic risk management. Then referencing these lessons learned as well as other laws, regulations, standards and guidelines, it will describe the elements involved in the effective management of catastrophic risks and how these translate into managing tailings dam risks. Included in this discussion with be the selection, performance verification, management and communication of critical risk controls.

The paper concludes with a discussion on potential future risk management practices associated with adopting leading advances in technology and data analytics. It will cover potential new approaches for controls, control verification, risk analysis, and risk communication. It will provide examples that highlight how adopting new technological approaches has the potential to both improve and undermine risk management endeavours. It will conclude by summarising options for the effective management of tailings and other catastrophic mining risks both now and into the future.