

BUILDING ORGANISATIONAL CAPACITY

CHAPTER XV

INSURABILITY OF TAILINGS RELATED RISK

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1. INTRODUCTION

Mining is and has always been a perilous business, and tailings facilities are integral to mining operations. The tragic consequences of the failures of tailings facilities in Brazil and elsewhere in recent years cost many lives and severely impacted on the livelihoods of large numbers of people. These events also triggered major financial losses for the mining companies that operated these facilities and prompted regulators, civil society organisations, rating agencies and investors around the world to turn their attention to tailings dam safety (Johnson 2019). An industry-wide safety review of tailings dams in Brazil has led to the closure of numerous large mines in the country, while a group of almost a hundred large investors have called on over 700 mining companies to disclose information on their tailings facilities (see Barrie *et al.*, this volume).

Clearly, there needs to be a strong focus on minimising the possibility of such tragic events occurring again. Much can be done to advance this goal, as the necessary technologies, skills and protocols have been around for some time. However, while hoping for the best, we must always be prepared for the worst. Despite the best laid plans, and even if the Global Industry Standard on Tailings Management ('the Standard') is enthusiastically embraced by all involved parties, the fact remains that one will never have full control over forces of nature such as extreme weather events or earthquakes. Insurers are also aware that the majority of incidents giving rise to an insurance claim are attributable to human error, rather than to extraneous factors such as so-called 'acts of God'.

Insurers can help improve industry risk management and at least financially support their clients after tragic events, but this can only be done if there is transparency in the assessment of risks, and if covers are based on risk-adequate prices and conditions. For both the mining industry and insurers, the principles of safety and responsibility must be

adhered to, not only in workplaces but also regarding possible consequences for the general public. Adequate insurance has to be part of any effective solution to mitigate the effects of a sudden and accidental catastrophic event. Insurers can also play an important role in preventing future failures by creating incentives for companies to improve their management practices, for example by making access to insurance dependent on companies committing to comply with certain standards.

Unfortunately, the reality at present is that both the prevention and mitigation of tailings facility failure events come at a price that many mining operations cannot currently afford. Insurance solutions need to be accessible and affordable to mining companies and other interested parties wherever possible. An effective solution will also require the energetic and active engagement of global bodies such as the United Nations (UN), the World Bank as well as the governments of individual countries (as discussed later in this chapter). In this context, the development of the Standard provides a unique opportunity to address insurance availability concerns and drive improved tailings facility management practices in the mining sector (Battello 2019).

The remainder of this chapter is organised as follows. Sections 2 and 3 provide an overview of the 'state-of-play' regarding the insurance of tailings facilities and highlight limitations of existing approaches. Section 4 deals with how the management of tailings-related risks currently works and how this can be improved – a key concern of insurers. Section 5 explores the potential to expand insurance solution options, focusing particularly on the use of insurance 'pools' to spread financial risk. Section 6 briefly addresses the broader question of how to maximise the impact of the new Standard. A short glossary is also provided at the end of the chapter for readers unfamiliar with insurance industry terms.

2. THE RELATIONSHIP BETWEEN MINING AND INSURANCE

The attractiveness of a mining venture to a mining company is often determined by whether or not the company can transfer risk to the insurance industry. It is extremely difficult to raise capital or a loan for an uninsured mine. Investors and banks want to know that their respective activities are protected: no insurance generally means no loan and no capital. Mine operators therefore have to do whatever they can to make a risk quantifiable because the insurance industry, understandably, is only willing to assume risk that is assessable. This task will be made easier if a mine can show that it adheres to certain standards and is fulfilling its obligation to do whatever is necessary to avoid an incident from occurring. Mines need to help the insurance industry help them.

The insurance industry has to set the bar high, even where standards exist. This is especially so in the case of tailings facilities, given that the risks involved are sizable and extremely challenging to assess. Many tailings dams are thirty or more years old, making it almost impossible to accurately establish their current condition, much less how they will continue to perform over time. This is a major reason why tailings dams are generally not insured.

The possible effects of climate change on tailings facilities are adding to the challenges faced by the industry and creating an additional level of uncertainty for insurers. Unlike water retention dams, tailings dams are continuously constructed by 'raises' during the life of a mine (Dugdale and Isleib 2019). Given the potential for the frequency and intensity of rainfall to increase in certain regions, this can increase the aggregate risk of dam failure – as tailings may liquify or break down over time when exposed to heavier rainfall if not managed appropriately.

Even where standards are in place, they are far from providing an absolute guarantee. As insurance expert Manuela Battello explains:

There was no shortage of best available practices and best available technology before the catastrophic events in Brazil. Yet, tailings facility failures occurred there and elsewhere anyway, even on mines managed by the largest and reputedly most sophisticated of mining companies. It is little wonder that insurers are reluctant to underwrite tailings facility exposures. Few mining companies, on the other hand, can afford to bear the full cost of a catastrophic tailings facility event (Battello 2019).

Despite the obvious demand from the mining sector for insurance coverage, given that a 'no insurance' scenario is not viable, the trend in the insurance sector is to move away from covering mining risk. This is creating an imperative for mining companies to find an effective mechanism to provide additional risk-transfer capability in order to safeguard their business.

3. WHERE THE MINING INDUSTRY FINDS ITSELF TODAY

3.1 SIZE AND SCOPE OF THE CHALLENGE

Tailings facilities are integral to any mining operation, irrespective of mining method or mined material. There now exist more than 10,000 dams around the world – the exact number is yet to be determined – of widely varying age, construction type and quality. Size, shape or form can vary considerably, depending on location and/or the commodity being mined. This variability means that there can be no 'one size fits all' solution to insuring these facilities.

Property and business interruption insurance – which is not well-suited to dealing with the perils and exposures that characterise mining operations – has been the home of coverage for tailings facility risks until now. If insured at all, tailings facilities are typically covered as part and parcel of a wider mining operation – i.e. there is no specific 'tailings storage facility insurance' product as such. Instead, insurance cover for facilities can be found in areas such as property insurance, construction insurance, liability insurance, environmental liability insurance, or directors' and officers' insurance. Not one of these products offers anything approaching a comprehensive tailings facility insurance solution.

In light of the recent tailings facilities failures in Brazil and elsewhere, the insurance industry has been revisiting its approach and has been waiting on the release of the Standard for further guidance. The ideal outcome for the Standard is that it becomes truly globally adopted and applied in a way that builds sufficient confidence in the insurance industry for insurers to properly address tailings facilities (Battello 2019).

3.2 LUMP-SUM AGREEMENTS AND HIGHER LIMITS

The shortcomings of property insurance principles become apparent when it comes to business interruption following an insured property damage loss. Loss of revenue due to business interruption is only covered if triggered by an insured property-damage loss. However, tailings of mining operations – the waste from the beneficiation process – are typically a product of little or no value, and thus are not generally covered under generic property policies.

Insurance for tailings facilities was not readily available until about 15 years ago, when the risk of exposure to failing facilities became increasingly apparent outside of the immediate mining world. Insurers responded by providing a lump-sum indemnity for property and business interruption combined, without forensic assessment of each individual tailings dam. Lump-sum coverage effectively treats tailings dam failure as an event (e.g. earthquake) and all subsequent damages downstream of the dam are included in the tailings dam limit. Again though, this cover is limited to property damage and business interruption.

An increasingly competitive insurance environment over the last decade has made it possible for mining companies to conclude such lump-sum agreements, the monetary value of which has increased year after year. However, the wisdom of this approach has been questioned in light of the latest tailings facility incidents. For the moment, the market seems to agree that lump-sum cover is the way to approach tailings dam insurance going forward, with cover limits depending on the quality of the information available and the situation of the actual dam, such as whether it is located above a plant, or at the end of a valley. However, even though lump-sum insurance for property damage and business interruption is better than nothing, it is still only a partial solution.

4. THE WAY FORWARD

The recent tailings facility incidents – and the resultant fatalities, environmental damages and impact on civil society – clearly show that insurance for tailings facilities has to go far beyond the requirements of a property and casualty insurer (although these might be regarded as guiding principles in the initial stages). A different approach is required to provide more effective cover going forward.

4.1 INDIVIDUAL RISK ASSESSMENT: WHY IT IS NEEDED

Much will rest on the ability of the insurance industry at large to correctly assess risks so that they can be insured commensurately. In order to build this capability, insurance professionals who are also experts in the field of mining will need to work closely with mining companies. Structured research should form the basis of the risk assessments for each tailings facility, given that every facility has unique characteristics. This research would provide a basis for calculating critical risk scenarios based on the scope of cover and enable limits of indemnity to be determined. Relevant factors for consideration would need to include the age of a facility, construction type (upstream, centreline or downstream), building materials, probable service life and expected output of operations. Exclusion criteria would also have to be defined. For example, a facility might be excluded if the level of sludge in the retention basin is just below the top of the dam, as this could pose a substantial risk of the dam overflowing during the next heavy rain event.

Assuming that a tailings facility is not excluded from being insured at this initial stage, the next step would be for the insurance underwriters to individually determine the stability of the tailings dams, based on geotechnical reports. This is necessary because, as noted, each tailings facility is different due to varying geological conditions. Important factors to consider in making this assessment would include the material the dams are made from, the method used to raise walls, properties of the soil on which the dam is built, regional weather patterns and seismic activity in the area.

According to Property and Mining consultant Arnold Pulle (2019):

Underwriters will always request reputable third-party engineering reports to give credence to the information provided to them. In relation to tailings dams this means a growing demand for external audit reports and dam break analysis. Markets are placing greater emphasis on the conclusions of these reports and require insureds to follow up on any resultant risk recommendations. The key is to be able to evidence proper controls are in place with regular maintenance... We have recently seen underwriters refuse to cover tailings dams where the required information was not forthcoming and impose restrictions where they were not comfortable with the standard of engineering.

In addition to addressing risks specific to the tailings facility, consideration also needs to be given to the more general risks that affect all infrastructure projects. These include political dangers and construction, operating, maintenance, legal, contractual, financial and revenue risks, as well as 'acts of God'. How can this diversity of risk be managed? The short answer is to take on individual risks from those who are demonstrably best able to control and minimise them. To do this, the parties involved have to clarify who is assigned which risks.

The challenge for participating insurers is to understand the intricacies of tailings facility risks as a whole, and to assess them in a risk-appropriate manner. Ultimately, what is required is a holistic dam-safety management system that covers all phases of tailings dam projects from planning to closure, including the management of the facilities. Widely used and understood consequence-based principles should be extended to cover the entire life span of tailings dams, including the dam safety management system (Herza *et al.* 2019). The latter is essentially what the Standard proposes, with the aim of preventing another Brumadhino-type disaster.

4.2 BEST PRACTICES FOR EVALUATING TAILINGS-RELATED RISK

Debate surrounds what constitutes best practice in the management of tailings-related risk. Country regulations will differ, but insurers should establish that agreed minimum criteria are being addressed in order to be satisfied that tailings dams are meeting applicable internationally recognised standards. Adherence to local country regulations alone would not be acceptable.

The following list is not comprehensive but can be taken as guidance on current best practice. The list will surely evolve further once the Standard is published and experts in all related fields explore all the necessary practical measures that should be taken.

Those developing, managing and maintaining tailings facilities should ensure that:

- Appropriate quality assurance and control procedures are in place to ensure safe construction of dams and subsequent lifts.
- An operation, maintenance, and surveillance (OMS) manual has been developed and is in use.
- Operating parameters are continuously monitored, e.g. phreatic surface, freeboard, beach width,

etc. Insurance coverage is only available if such minimum conditions are being maintained.

- The rate of rise of dam walls is limited below certain maximum thresholds.
- Levels of responsibility are clearly defined, and oversight arrangements are in place. For example, senior managers are on site, an Engineer of Record has been appointed, third-party audits are undertaken, and an Independent Tailings Review Board has been established.
- Audit and inspection recommendations are implemented as soon as practicable.

Significant deviations from these best practices may limit or invalidate available insurance cover.

There are certain types of tailings facilities that may not be insurable under any circumstances due to their high-risk nature. An example would be upstream-constructed dams located in seismically active regions where the potential for liquefaction is increased.

Once it has been established that a given tailings facility is insurable, then the parameters of such cover should be clearly defined. If there is a lack of clarity about what cover is being provided, then significant delays could be incurred in determining indemnity and additional costs. It is important to note that tailings and other waste material are always excluded from cover, and this may further limit the amount insurers may be liable for in the event of a loss. Other considerations that would need to be addressed include the extent to which downstream exposures are covered as a consequence of being damaged by the release of tailings from their containment and what, if any, delays in production may be indemnifiable. Insurers must also be confident that the values being declared for tailings dam cover are adequate and have been calculated in accordance with the basis of settlement in the policy wording. This can prove contentious, particularly for dam structures that have been in existence for a prolonged period of time.

Alternative tailings disposal methods and storage options may prove more resilient to failure, for example: dry-stack tailings, co-disposal facilities, in-pit storage, riverine-disposal, and deep-sea disposal. However, all of these alternatives will have specific hazards and failure mechanisms of their own, which mine operators will need to manage appropriately, and insurers will need to assess for risk.

Ultimately, the question to be asked of mine operators is: ‘Can you do more to make these structures and disposable methods safer, in line with the best practices outlined above?’ The answer should dictate the relative insurability of such infrastructure.

5. EXPANDING POTENTIAL INSURANCE SOLUTION OPTIONS

As discussed above, it may not always be possible for mining companies to obtain cover for existing or new tailings facilities due to the uncertain history of a storage facility, limited resources, poor upstream construction, hazardous location, or some other factor beyond the control of the mining company that renders them unable to qualify for insurance. However, the very real need for insurance still remains in these instances. In fact, the needs of mining companies that are unable to qualify for, or pay for, insurance are likely to be greater than for those companies that are able to meet the requirements for insurance.

So how can we put these companies in a position where they can protect both themselves and the environment they operate in? One possible answer may lie in the formation of national and global funding pools. For example, a ‘Global Tailings Facility Pool’ could be subsidised by individual mining companies, governments, or by international organisations such as the UN and the World Bank. This option is explored in more detail below.

5.1 THE BENEFITS OF POOLS

A challenge involved in the insurance of tailings facilities is that neither insurers nor individual markets, may have the capacity to cover the risk on their own, especially where these risks are large and there is high accumulation loss potential. Creating pool solutions is a means of keeping these risks manageable for the industry and making them in principle insurable.

Reitsma (2019, p.715) identifies the following reasons for why pools are commonly formed:

- the number of risks to be insured is relatively small
- the risk (amount) to be insured is largely unknown
- the risks to be insured require a capacity which could not be provided within the means of individual members
- the nature of the risk in question makes coverage by conventional methods difficult if not impossible.

These criteria, with the exception of the first, largely

align with the insurance needs of a great many tailings facilities, especially older facilities, for which the insurance pool concept would make a great deal of sense. An international pooling mechanism would also result in economies of cost, the benefits of which could be shared by participants in the pool. Demonstrating full compliance with tailings facility safety standards, as set out in the Standard, would be a prerequisite for participating in the pool.

5.2 SETTING UP A GLOBAL POOL

A means of creating a global fund would be to form a global company, or other stand-alone entity, to:

- manage contributions and invest them appropriately
- sponsor research to identify the best practices for mining companies and tailings facility management
- select and appoint engineering firms to check compliance and provide tailings facility certification
- offer loans to mining companies for immediate clean-up costs
- provide reinsurance capacity to insurers.

Such a fund would be subsidised by mining companies, governments (e.g. using a percentage share of earned royalty income) and insurers – who could, for example, pay a premium for access to the capital, such as a percentage share of their committed capacity (Birchall 2020).

6. MAXIMISING THE IMPACT OF THE NEW GLOBAL INDUSTRY STANDARD ON TAILINGS MANAGEMENT

The new Standard will only be effective in preventing future catastrophes to the extent that it is implemented by the mining industry, encouraged by governments and, not least, actively promoted by the UN. Investors will also have an important role to perform, as discussed by Barrie *et al.* (this volume).

6.1 GOVERNMENT INVOLVEMENT

In addition to any role governments might play in setting up national or global pools, each national government should have a political, financial and safety interest in encouraging adequate tailings facility insurance, supporting the principles of the Standard, and monitoring compliance by mining companies and the uptake of this form of insurance. In certain instances, it may even be in a government’s interest to build the recommendations of the Standard into a

regulatory framework. Governments could also play a role in selecting and appointing local engineering companies (to be certified by the International Council on Mining and Metals [ICMM] or some other body) who would manage compliance with Standard requirements.

6.2 UNITED NATIONS INVOLVEMENT

Efforts to tighten safety standards and requirements for tailings facilities risk being undermined through bribery and corruption. The UN can help curb these unfortunately widespread practices by working with national governments and other bodies to promote independent compliance checks and strengthen regulatory mechanisms. The open, active and energetic support of the UN will be key to the successful implementation of the Standard and to the development of more effective tailings facility insurance mechanisms. At a broader level, the UN can play a valuable role by continuing to promote good practices in the private sector, through its support for initiatives such as the Principles for Responsible Investment (PRI) and the Principles for Sustainable Insurance (PSI).⁵

A FINAL WORD

Whether the Standard leads to safer tailings facilities and fewer catastrophic events will depend heavily on key stakeholders fulfilling their responsibilities. These stakeholders include not only mine operators, their shareholders, partners, employees and technical consultants, but also insurers. Assuming an ideal world, the insurance sector would very much like to see the Standard adopted as a prerequisite for considering the transfer of tailings facility risks. The benefits of reduced hazards and the transference of risks could then be measured and appreciated in commensurate prices for insurance. However, given the complex situation in the real world, insurers remain sensitive to the fact that it is not possible to solve all challenges at the push of a button.

From the insurers’ point of view, the Standard is undoubtedly an important first step towards providing responsible mining companies access to more comprehensive and improved insurance cover and making it more attractive for insurance companies to provide tailings facility cover. Both of these aspects can play a key role in preventing future catastrophic events that cause serious negative consequences for both the environment and society. In the unfortunate but possible circumstance of a loss event, both aspects will also contribute to mitigating the financial impact. This is the economic and societal role of insurers, and they are committed to delivering on that role.

5. Information on these two initiatives can be accessed at <https://www.unpri.org/> and <https://www.unepfi.org/psi/>

KEY MESSAGES

1. Tailings facilities are integral to almost any mining activity. While the facilities themselves represent minor economic value compared to the remainder of the operation, their leakage or rupture can have considerable consequences for people, ecosystems and property.
2. Even if the highest available standards for the safe construction, maintenance and operation of tailings facilities are strictly adhered to, it will never be possible to have full control over forces of nature such as extreme weather events or earthquakes; nor can human error be ruled out.
3. The insurance industry stands ready to meet its role in alleviating the potentially catastrophic effects of a tailings facility failure on innocent third parties and the mining operators themselves. An indispensable prerequisite, however, is that the insured party undertakes whatever is humanly possible to prevent such an incident from occurring.
4. What these precautions should include, in terms of technical to organisational measures, has been defined in the Standard. Adherence to the Standard must be seen as a premise for any insurance cover.
5. Consideration should be given to organising insurance cover in the form of a pool, with a view to creating sufficient capacity to cover the risks of tailings facility failures.
6. As the mining sector is a global industry, the Standard should likewise be applied globally. National governments, regulatory bodies, insurance associations and the like should actively promote the acceptance of the Standard within their respective spheres of influence.
7. This support can be further enhanced by supranational organisations such as the UN and the World Bank, along with global initiatives such as the Principles for Responsible Investment (PRI) and the Principles for Sustainable Insurance (PSI).

GLOSSARY

Business Interruption Insurance	Insurers indemnify the insured for Loss of Revenue for the time its business was interrupted by an insured property damage incident.
Claim	Request by a policyholder or third party from an insurance company for compensation of losses covered by insurance.
Deductible	Specific amount the policyholder must pay out-of-pocket before the insurer pays a claim.
Exclusion	Items or conditions that are not covered by the general insurance contract.
Insurance	A contract in which an insurer financially indemnifies the insured against losses from specific contingencies and/or perils. This is provided by insurance companies, which are for-profit organisations.
Insurable	Fundamentally anything can be insurable, for a cost. The relative insurability of tailings storage facilities has waxed and waned as the insurance market has moved through its various cycles and in consequence of loss experience.
Named Perils	Perils specifically covered on insured property.
Obligatory duty	Obligation of the Insured to do whatever is necessary to avoid an incident giving rise to a claim.
Policy Limit	The maximum amount an insurer will pay under a policy for a covered loss.
Premium	A policy's premium is its price, typically expressed as a monthly cost. The premium is determined by the insurer based on the risk profile of an individual or business.
Products	The insurance industry offers a wide array of products designed around the needs of a specific industry or situation. Of particular relevance in the tailings facility context are liability insurance, property insurance, directors' and officers' liability, and building and construction insurance.
Property	Anything that has value. Traditionally, tailings are defined as having no value and are thus uninsurable.
Reinsurance	In effect, insurance that an insurance company buys for its own protection. The risk of loss is spread, so a disproportionately large loss under a single policy does not fall on one company.
Risk Management	Management of the pure risks to which a company might be subject. Risk management means risk transfer from one party to another, where the party that assumes the risk is paid a premium to do so.
Sub-limit	A sub-limit caps the cover of a specified risk at an amount below the full coverage limit under an overall policy. For example, the insurance coverage falling under property policies for losses associated with tailings facilities is usually sub-limited, meaning it is capped to an amount below the full coverage limit under the property policy.

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