

Renewed passion and foresight for Tailings



Tailings storage facilities (TSFs) – the focus of this issue – were in the past considered the rubbish dumps of the mines. They were afterthoughts that were mostly kept out of sight and out of mind. In more recent years, there have been several high profile TSF failures (including Samarco in 2015 and Brumadinho in 2019), which were in the media spotlight because of the multiple fatalities, or widespread contamination of river systems that occurred. These failures acted as the catalyst for the creation of the Global Industry Standard on Tailings Management (GISTM) – a more demanding benchmark for tailings dam safety and sustainability.

Among the GISTM's many positive effects has been to raise the profile of TSFs and, hence, raise the budgets available for their management. The higher budgets have allowed for better, site-specific, characterisation of tailings and the underlying foundation materials, through more comprehensive in situ geotechnical investigations and advanced laboratory testing. Where designs in the past were often based on empirical rules-of-thumb, better designs are now possible based on a greatly improved understanding of tailings behaviour and foundation conditions.

Improvements have also been achieved in the monitoring of TSF performance. There has been widespread adoption of state-of-the-art, real-time monitoring technologies including vibrating wire piezometers, fibre optic sensors, InSAR, drone surveys, and automated data analytics. These advances enable the continuous performance monitoring of facilities and early detection of potential issues.

There has also been a welcome clarification of roles and responsibilities among the various parties involved in TSF management. This has strengthened governance and accountability, resulting in greater attention being paid to critical activities such as risk management, adherence to design intent, and effective community engagement.

Upskilling of various role players has also increased, with non-geotechnical parties becoming more familiar with the geotechnical aspects around TSF behaviour. Training on the application of site specific operating manuals has improved, aligning the operator more closely with the TSF's design intent.

One of the GISTM's focuses is on better documentation, that is, of aspects such as designs, design intents, and as-built records. Operation and safety standards in South Africa have in the past generally been to a high standard, due to the application of the SANS 10286 Code of Practice for Mine Residue; however, documentation may not always have been in place to reflect this. The GISTM has now facilitated improved documentation of various aspects, including what has actually been constructed, especially where changes have been made between the design stage and what is actually built.

The GISTM has, however, also resulted in some unforeseen negative impacts. There has been a scramble for tailings engineers, for instance, as the GISTM requires more engineering roles. These roles have had to be sourced from the existing – and limited – resource pool of engineers. There have also been cases where GISTM compliance has been pursued in a hurried and superficial manner, with appointments not always empowering individuals to perform their required roles. There have even been cases when the focus on achieving GISTM compliance has distracted role players from focusing on physical risks. For example, efforts to improve documentation for the sake of compliance may have side-tracked the need to spend time on actual stability concerns.

The Southern African Institute of Mining and Metallurgy (SAIMM) held its fourth Tailings Conference in March 2026. This forum showcased the excellent standard of work that is being undertaken since the introduction of the GISTM. It highlighted new technologies and lessons learnt from past failures, which will help the industry achieve higher standards of safety, environmental protection, and responsible tailings stewardship into the future. The conference also provided a platform for role players to discuss some of the challenges around GISTM implementation, and how these are being addressed at different operations. The key takeaway from the conference was that a dedicated passion for this field is what is needed most of all to keep the tailings industry growing even stronger into the future. We are fortunate that the Southern African tailings industry is full of passionate individuals, so there is little doubt that the custodianship of tailings facilities – now and into the immediate future – is in good hands!

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