TailingsIQ - An AI-Enhanced Tool for Improving Tailings Storage Facility Oversight

Author:
Stephen Darmawan
BEng MEng CPEng RPEQ
Principal Geotechnical Engineer at Geotesta Pty Ltd
Email: sd@geotesta.com.au

Abstract:

Significant operational challenges exist in managing Tailings Storage Facilities (TSFs) safely and efficiently. Engineers and managers must handle vast amounts of information from diverse sources – monitoring sensors, design reports, operational logs, and compliance checklists. Bringing this disparate information together for rapid risk assessment, informed operational decisions, and demonstrating compliance with standards like GISTM is often difficult and time-consuming using traditional methods, increasing the risk of overlooking critical insights.

This paper introduces TailingsIQ, a practical software tool developed to help overcome these challenges using Artificial Intelligence (AI). To combat the issue of siloed information hindering holistic risk assessment, TailingsIQ integrates crucial TSF data into a single, user-friendly platform, providing a clearer overall picture. Its key innovation addresses the challenge of accessing specific data buried within reports or complex datasets: an AI assistant that understands questions asked in plain English. Personnel can directly ask the system about monitoring trends, specific report details, or compliance status, receiving synthesized answers quickly and easily.

A working prototype confirms the concept's viability. By significantly reducing time spent searching for information and improving data accessibility, TailingsIQ offers engineers and asset managers a powerful tool to enhance situational awareness for proactive risk management and increase confidence in compliance reporting. This work demonstrates a practical application of AI as an emerging technology to improve safety, operational efficiency, and regulatory adherence in TSF management.