



Tailings Storage Facility Engineering and Dam Safety Course: Design, Monitoring and GISTM



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Introduction:

Tailings storage facility engineering and dam safety is the subject of this 5-day course for mine geotechnical, environmental and dam safety engineers and accountable executives, ending with a Tailings Facility Safety and Conformance Plan. Facilities fail when raises outpace design assumptions, pore pressures go unwatched and emergency plans exist only on paper. Nominees already work on tailings design, monitoring or governance, and teaching is by case study on piezometer records, radar data and facility documents. CoreConcept Training Center delivers this tailings storage facility engineering course.

Course Objectives:

- Select a deposition method and impoundment layout and test it against a site water balance for a tailings facility
- Compare upstream, downstream and centreline raise methods and check stability margins for drained and undrained conditions
- Review piezometer, survey and radar monitoring records and set trigger levels with defined responses
- Analyse failure modes and classify the consequences of a dam breach for a tailings facility
- Map facility practice against the requirements of the Global Industry Standard on Tailings Management and rate conformance gaps
- Prepare a Tailings Facility Safety and Conformance Plan that sets emergency response triggers, roles and review actions

Target Audience:

- Geotechnical engineers responsible for the stability design and raise sequencing of tailings dams
 - Dam safety engineers responsible for inspections, instrumentation and performance reviews of tailings facilities
 - Environmental engineers responsible for seepage, water balance and discharge control at tailings facilities
 - Operations staff who run tailings deposition, pond management and surveillance routines
 - Accountable executives who sign off tailings risk, emergency readiness and independent review actions
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Course Outline:

Day 1: Tailings Facility Landscape, Deposition Methods and Water Balance

- Valley, Ring Dyke and In-Pit Impoundment Layout Comparison
- Conventional Slurry, Thickened, Paste and Filtered Dry Stack Deposition Selection
- Tailings Geotechnical Characterisation Using Particle Size, Density and Consolidation Data
- Water Balance Model for Supernatant Pond, Seepage and Evaporation
- Current Facility Condition Gap Assessment Using an Inspection Checklist

Day 2: Raise Methods, Stability Design and Standard Requirements

- Upstream, Downstream and Centreline Raise Method Trade-Offs
- Limit Equilibrium Stability Analysis With Drained and Undrained Strengths
- Liquefaction Susceptibility Screening From Cone Penetration and Tailings State Data
- GISTM Six Topic Areas and Auditable Requirements Mapping
- GISTM Consequence Classification Tables Applied to a Facility

Day 3: Instrumentation, Monitoring and Surveillance of Tailings Dams

- Vibrating Wire and Standpipe Piezometer Network Layout and Reading Review
- Slope Stability Radar and Satellite Interferometry Displacement Trend Screening
- Beach Length, Freeboard and Pond Position Surveillance Records
- Trigger Action Response Plan Threshold Setting for Monitoring Data
- Dam Safety Inspection Schedule and Annual Performance Review Reporting

Day 4: Failure Modes, Breach Consequences and Emergency Preparedness

- Overtopping, Internal Erosion, Static Liquefaction and Foundation Failure Mode Analysis
- Failure Modes and Effects Analysis Register for Tailings Dams
- Dam Break Inundation Mapping and Breach Scenario Assumptions
- Emergency Preparedness and Response Plan With Community Notification Triggers
- Accountable Executive and Engineer of Record Role Definitions

Day 5: Case Study on a Tailings Facility Safety and Conformance Plan

- Case Facility Document Pack and Monitoring Data Review
 - Case Raise Method and Stability Margin Challenge
 - Case GISTM Requirement Conformance Gap Rating
 - Case Emergency Plan Exercise Debrief Against Consequence Class
 - Tailings Facility Safety and Conformance Plan Completion and Peer Review
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Skills You Will Gain:

- Deposition Method Selection
- Tailings Water Balance Modelling
- Raise Stability Assessment
- Piezometer Data Interpretation
- Radar Displacement Screening
- Failure Mode Analysis
- Breach Consequence Classification
- Standard Conformance Rating

Why Attend This Course:

- Deliver a Tailings Facility Safety and Conformance Plan to the accountable executive, engineer of record and mine general manager
- Decide whether a planned raise, a rising pore pressure trend or a radar movement alert needs a design review or immediate action
- Avoid unwatched pore pressure build-up, undefined trigger levels and emergency plans that fail when tested, which expose people and the business
- Coach surveillance technicians and operators on reading instrument records, setting thresholds and logging inspection findings

Conclusion:

Back at work, the participant presents the Tailings Facility Safety and Conformance Plan to the accountable executive, engineer of record and mine general manager, who use it to decide on raise designs, monitoring upgrades, emergency exercises and independent review actions. Surveillance teams apply its trigger levels and inspection schedule from the first week. After the first full monitoring cycle, the unit should review instrument trends, trigger events, open conformance gaps and emergency plan test results, then update the plan.

Frequently Asked Questions FAQ:

What should participants know before a tailings storage facility engineering and dam safety course?

Participants should already work on tailings design, operation, monitoring or governance and be comfortable reading geotechnical data tables and instrument charts. Bringing anonymised piezometer records, inspection reports or an emergency plan extract from their own facility makes the case study more useful.

How does a tailings storage facility engineering and dam safety course differ from a mine closure course?

It concentrates on the engineering and safety of operating tailings dams: raises, stability, monitoring, failure modes and emergency response. A mine environmental and closure course spreads its time across water, waste rock, rehabilitation and closure costing instead.

Why do tailings storage facility engineers use trigger action response plans for monitoring data?

Trigger levels turn raw readings into agreed actions. When piezometer pressure, settlement or radar movement crosses a defined level, the plan states who responds and how, so early warning signs are acted on before they become a dam safety event.

What do participants take back from the tailings storage facility engineering and dam safety course?

Participants take back a Tailings Facility Safety and Conformance Plan, plus a monitoring trigger template, a failure mode register and a conformance gap rating sheet that can be adapted to their own tailings facility.