

GEOTECHNICS OF TAILINGS AND TAILINGS STORAGE FACILITIES

3-0-0-9

Introduction: Course overview; Generation and disposal strategies of mine tailings; Challenges in management of mine tailings; Possible reusability of mine tailings; Role of geotechnical engineering in sustainable management of mine tailings; Geotechnical characterisation of tailings: Gradational properties, specific gravity; Plasticity properties and mineralogy; Densification - settlement, consolidation, evaporation, dewatering; Drained and undrained strengths; Triaxial testing and analysis; Simple shear testing and analysis; Cone penetration testing; Introduction to "state parameter"; Application of critical state soil mechanics to interpret test results; Hydraulic conductivity; Water retention and volume change behaviour; Testing methods for understanding unsaturated response of the material; Disposal of tailings in TSFs: Types of components of TSFs; Physical processes involved in a typical; TSF; Failure mechanism of TSFs; Health monitoring of TSFs; Operator manual, Trigger Action Response Plans (TARPs) ; Global Industry Standard on Tailings Management (GISTM); Governance structure for management of TSFs, stakeholder engagement; Case studies and interaction with industry professionals Forensics of failure: Merriespruit, South Africa, 1994; Mount Polley, Canada, 2014; Cadia, Australia, 2018; Brumadinho, Brazil, 2019; Few case studies from India; Invited guest lectures by industry professionals and academic colleagues on current practice of tailings management; Possible visit to a TSF site