

Seminário Técnico Internacional sobre Barragens de Rejeitos e o Futuro da Mineração em Minas Gerais

International Technical Seminar: Tailings Dams and the Future of Mining in Minas Gerais State

ORGANIZAÇÃO



IBRAM
INSTITUTO BRASILEIRO DE MINERAÇÃO
Brazilian Mining Association
Câmara Mineira de Brasil

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CONSIDERATIONS ON SAFETY OF TAILINGS DAMS

**Common sense approach
to standpoints and solutions**

Aspects to be considered

Unacceptable risks

- Human lives
- Environmental damage
- Material damage

Implicit damages

- Insecurity and fear among population downstream of existing dams
- Devaluation of properties
- Devaluation of businesses
- Migration of population to other areas
- Insolvency of local governments

Traceable vs. diffuse responsibility

Projects implemented under traceable responsibility

- Basic and detailed engineering design of all phases of project implementation
- Budget consistent with safety requirements
- Construction contracts with detailed technical specifications
- Quality control / assurance by independent parties
- As built records
- Clearly defined monitoring procedures

Projects implemented under diffused responsibility

- Lack of continuity of engineering design, supervision and construction services
- Inadequate procedures on tailings disposal management
- Improvisations and adaptations
- Conflicts between dam construction/rising and mine operation

Assured safety vs. emergency controls

Projects with assured /undisputed levels of safety

- Projects inserted into the environment with no conflict with other land uses and third parties

Unsafe projects dependent on emergency control and evacuation procedures

- Projects with unacceptably low levels of safety
- Projects with disputed or even uncertain levels of safety
- Implementation of emergency controls and evacuation procedures to be considered only as provisional contingencies and not be maintained on an ongoing basis

Turning emergency and evacuation control procedures for areas downstream of tailings dams into a permanent status should not be considered.

The concept of managing unsafe existing installations should be replaced by that of implementing effective decommissioning and permanent closure projects.

We should not accept the management of unsafe conditions as normal practice.

Decommissioning/closure of existing tailing dams

- **General guidelines set out by ANM**
- **Each case has its own particular characteristics including:**
 - Local topography
 - Upstream hydrological basin
 - Availability of records on construction and operation
 - Requirements for further site investigations
 - Decision on keeping tailings in impoundment and/or removing it for re-processing or storage into contained areas
 - Potential risks related to loss of lives, environmental and material damage
- **Each site should be treated as an individual engineering and reclamation project with clear definition of scope, schedule, budget, quality and accountability requirements**
- **The involvement of reputable engineering and construction companies on reclamation services would add to credibility of solutions to be proposed.**

Increasing safety of levels of existing dams

- **In dams where the potential risk of liquefaction has been detected, emergency remedial measures may be required in anticipation of adopting final closure solutions.**
- **Current ground improvement alternatives are restricted by the risk of triggering failure by liquefaction due to its impact on saturated loose sand deposits.**
- **Drainage / dewatering alternatives that could be considered:**
 - Construction of ring drainage channels around tailings impoundment to prevent incoming water from hydrologic basin from percolating through tailings deposits
 - Installation of a dewatering system such as a line of vacuum well points (ponteiras a vácuo) on the upstream side of the impoundment, to revert the phreatic surface towards the back of the dam tailings reservoir.
 - The installation of horizontal drains should be avoided as the water circulation required for their installation may weaken the structure of the existing deposits of loose sands.

Additional aspects to be considered

- **Establishing acceptable and normatized design, management, decommissioning and closure procedures**
- **Including the planning of decommissioning and closure measures into the feasibility studies of the projects**
- **Adoption of self regulation and certification by independent entities over project life time so as to enable consistent insurance coverage involving third parties**

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