Challenges and opportunities for effective management of waste in the mining and metals sector

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Overview

- About ICMM
- Mining waste overview
- Tailings storage
- Impurities
- Waste not
At a glance

Bringing together the world’s leading mining and metals companies to address the sustainable development challenges faced by the industry.

Representing 900+ sites in 58 countries

How we work

Leadership through performance
Enhance understanding
Listen and engage
Shape policy

CEO led
Member networks (1–20 topics)
National & commodity associations
Mining waste

There are two categories of mining waste:

- soils, rocks and water removed during the preparation for mining that do not enter into the beneficiating processes
- wastes which are obtained during the process of separating minerals from ores and other materials extracted during mining e.g. tailings, water, furnace slag

Origins

Ore: A mineral or an aggregate of minerals from which a valuable constituent, especially a metal, can be profitably mined or extracted

Ingot: a mass of metal cast into a convenient shape for storage or transportation to be later processed
Ore Processing (Beneficiation)

PROCESS:
Milling:
- Crushing/grinding (or liberation)
- Concentration

Smelting and Refining:
- Metals recovery

WASTE:
Milling:
- Tailings (sand / silt)
- Water (may include chemicals)

Smelting and Refining:
- Slag

Concentrate and Tailings
The catastrophic failures of tailings dams are unacceptable.
Outputs and headline findings

• The review was global in scope and looked at how best to effectively maintain the safety of tailings dams.
• There is extensive guidance, national and international, that frames good practice and provides the necessary tools to manage TSFs safely.
• Every tailings storage facility is different, no one technical solution will be relevant to all.
• The review found that a greater focus on governance is needed to assure that the extensive existing technical and management guidance is effectively applied.
• Therefore, a governance framework, embedded in a binding position statement back by full CEO commitment was the most effective contribution we could make to addressing TSF safety.

ICMM position statement

Its purpose is to enable enhanced focus on those key elements of management and governance necessary to prevent catastrophic failures of tailings storage facilities (TSFs).

1) Accountability, Responsibility and Competency
2) Planning and Resourcing
3) Risk Management
4) Change Management
5) Emergency Preparedness and Response
6) Review and Assurance
Impurities

- Copper concentrate market is 60Mtpa
- An average concentrate contains only 25-28% copper prior to smelting
- Concentrates increasingly contain impurities such as arsenic, lead, zinc, bismuth, mercury, uranium and fluorine
- Regulators are responding to community concerns about their environment
  - Chinese import limit of 5,000ppm Arsenic
  - Japanese and Korean restrictions on uranium
- There is greater focus on product stewardship by producers and smelters
Impact of impurities

Impurities in copper concentrate can:

- Impact the occupational health and safety of the smelter and refinery employees
- Increase the cost of waste disposal
- Increase the overall operational cost
- Increase the smelter-refinery capital cost
- Reduce the cathode quality and thereby the revenue stream.

Opportunities

- Reduce the content of impurities
  - Removal during concentration
  - Pre-treatment at smelters
- Improve the capture, sequestration and disposal of impurities
- Internalise the cost of handling impurities
Waste not, want not
Integrated materials management

For more information

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