

Dry Stack Tailings Management

Creative people together transforming our world.





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Opportunities to substitute the deposition of slurried tailings within traditional storage dams with stockpiled dry-stack tailings are increasingly becoming more viable as dewatering technology improves and throughput capability increases. This type of tailings treatment and storage can offer an improved solution for tailings management through a reduced operating risk profile and provision of a stable landform that greatly simplifies mine closure.

The legitimate and continued increase in public and stakeholder expectations around both environmental performance and social licence to operate require the mining industry and its regulators to deliver on a commitment to the safe storage and good management of mine tailings. This is a whole-of-life obligation that continues through and beyond the ultimate hand-back to local communities of the closed facilities.

“The approach to tailings storage facilities must place safety first by making environmental and human safety a priority in management actions and on-the-ground operations. Regulators, industry and communities should adopt a shared zero-failure objective to tailings storage facilities where ‘safety attributes should be evaluated separately from economic considerations and cost should not be the determining factor’.

Existing best practices and regulations may not be enough to eliminate failures – what is required is a fundamental change in the way we produce, reuse and perpetually store tailings (Mount Polley expert panel (IEEIRP 2015).”¹

Although the dry stacking of tailings would appear to offer this fundamental change in managing tailings, it will not provide the silver bullet solution for every tailings management scenario. Each individual case, be it a new build facility or conversion of an existing dam, needs to be weighed up and evaluated on its own merits. However dry stacking of tailings will always feature significantly as a favourable option available to the project team.



Our Approach

Whether your challenges are earthworks construction in difficult tropical climatic conditions or needing to optimise limited real estate and maximise recovery of water, we can provide international mining, earthworks and dry tailings knowledge from initial high level concepts, studies and options through to design, implementation and operations.

We consciously walk in your shoes to develop tailings solutions with you by understanding the project specific drivers you need addressed, for example;

- Reduced disturbed total tailings storage footprint, with limited active exposed construction areas for dust control or surface water ingress
- Provide a self-supporting tailings stack as a stable landform
- Immediate recovery of additional tailings water for treatment for reuse in process or release to the environment
- Reliable source of recovered process water over externally sourced fresh / saline supplies
- Recovery and retreatment of tailings for mineral value
- Limited real estate for tailings storage and overall mine waste
- ARD management facilitated
- May offer a preferred cash flow over conventional slurry management
- Progressive closure is possible and provides a clear achievable plan to full closure
- Responsible environmental management
- Effective and controlled water management and separation of water sources and destinations
- Transition from an existing slurry tailings management to a dry stack solution – this can be initiated at any time through a project and is essentially required to achieve final closure
- Reduced corporate risk, environmental and social consequences associated with failure
- The stacked tailings may provide a potential ore body in the future as new technology and demand evolve.

¹ Roche, C., Thygesen, K., Baker, E. (Eds) 2017. *Mine Tailings Storage; Safety is no Accident*. A UNEP Rapid Response Assessment. United Nations Environment Programme and GRID-Arendal, Nairobi and Arendal, www.grida.no ISBN:987-82-7701-170-7

Services:

Tailings

- Tailings mass balance; ramp up and nominal production
- Dewatered tailings behaviour / testing for mechanical properties
- Evaluation of transitioning from slurry management to dewatered tailings solutions.

Geotechnical

- Ground assessment and site selection
- Soft ground engineering / settlement / establishment of stable ground and tailings surfaces for construction
- Stability of dry stack structure and foundation
- Static liquefaction
- Seismic engineering and geo-hazard studies
- Instrumentation and monitoring.

Civil

- Early works, access, haul roads, water diversion channels, earthworks construction
- Wet climate management / dust control
- Earthworks constructability and productivity
- Mobile fleet analysis and selection.

Water / Hydrogeology

- Regional and localized groundwater characterisation
- Pumps and piping
- Raw water supply.

Optimised separation of clean, contact and process waters

- Site wide water balance and management
- Process water management and treatment
- Stormwater modelling, sediment control and flood studies
- Erosion and sediment control planning.

Process

- Overall operation simulation
- Availability and reliability modelling for equipment sizing
- System mass balance
- Vendor interface / test work for tailings flow properties
- Dewatering equipment selection
- Tailings feed variability management.

Mechanical / Materials Handling

- Vendor interface / test work for material handling properties
- Mobile fleet analysis and selection

- Pumping and handling of slurried tailings
- Dewatered tailings storage and reclaim
- Conveyors and stackers
- Optimising combinations of conveyors, stockpiles and trucking.

Geo-chemistry / Hydro-chemistry

- Process and contact water characterisation
- ARD management
- Groundwater quality monitoring and leachate management.

Environmental

- Environmental impact assessment
- Social assessments and community engagement
- Stakeholder engagement
- Auditing, licencing and permits
- Environmental management plans
- Sustainability
- Environmental monitoring.

Dewatering Plant Design

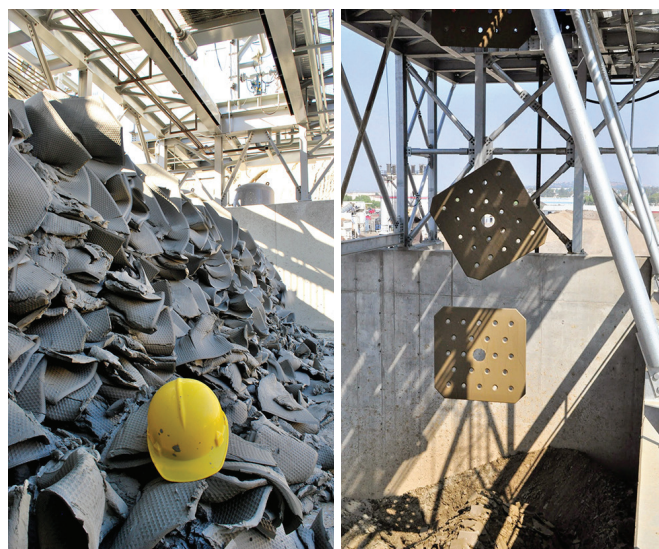
- Development of flowsheets, layouts and arrangements
- Process, mechanical, piping, civil, structural, electrical, instrumentation and controls engineering.

Cost Estimating / Cash Flow Analysis

- Capital and operating cost estimating
- Cash flow analysis for option assessment
- Scheduling / Productivity.

Closure

- Design and scheduling progressive closure
- Alignment of closure plan with project maturity
- Engineering designs for closure landforms
- Rehabilitation Planning.



About Beca

Proudly employee-owned, Beca is one of the largest and most diverse engineering and related consultancy services companies in the Asia-Pacific. We assist clients across a wide range of markets including Industrial, Power, Buildings, Public Sector, Transport and Water. As well as numerous engineering consultancy services, we provide holistic project services from concept to commissioning, including project management, cost management, planning, urban design, architecture, land information, valuations and software services.

Beca operates from three key market hubs: New Zealand, Australia and Asia. With more than 3,000 technical and decision support staff, we strive for excellence and client satisfaction, building on our long service record as trusted advisors to many existing clients and delivering value to our new ones.

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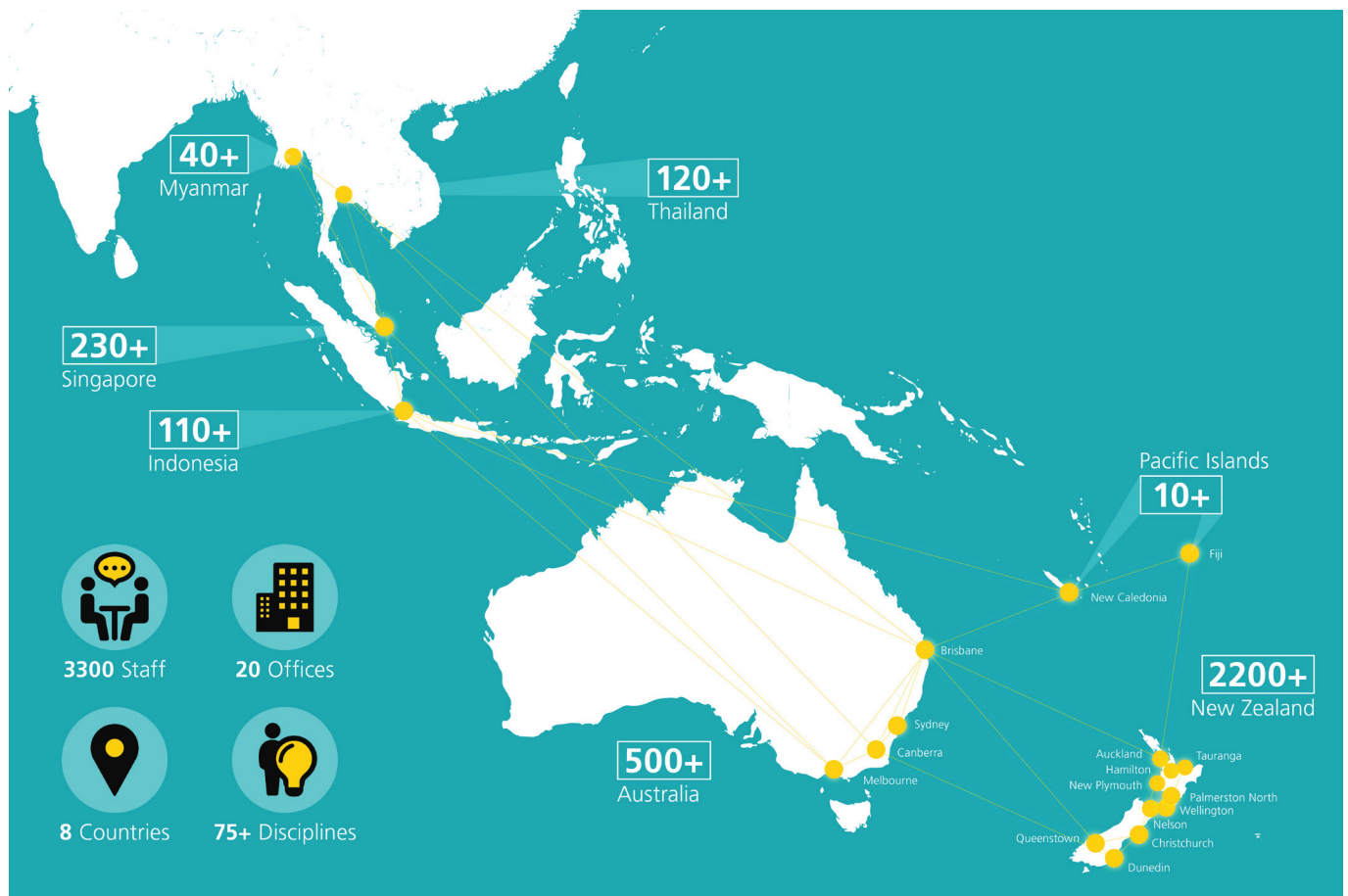
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