QAL Tailings Dam

Gladstone, Qld

Keller's innovative mass mixing solution allowed substantial cost and time savings over the conventional dig and replace methods.

The project

Queensland Alumina Limited (QAL) is one of the largest alumina refineries in Australia, producing about 3.95Mt of alumina per year. QAL wanted to stabilise material immediately behind the tailings wall to mitigate the risk of future instability or settlement as the tailings storage facility embankment was raised.

The challenge

The tailings comprised low strength, contaminated soft silty clay with a shear strength generally less than 15kPa, known locally as Red Mud, which has a low permeability and is highly saturated.

The solution

Keller proposed dry mass soil mixing as the most appropriate ground improvement method, with extensive testing performed to demonstrate it would improve the tailings effectively. Initial laboratory trial mixing was used to confirm the most appropriate and cost-effective binder dosage before a site validation section was performed. In total over 82,000m3 of material was improved up to 3m deep in less than 6 months, with a real time GPS based data acquisition unit providing quality assurance. Post-treatment testing, comprising Wing Cone Penetrometer, Dynamic Cone Penetrometer, CPT, Shear Vane, Permeability and Observations (excavations/exposures), confirmed the tailings had reached the design shear strength and permeability.

Project facts

Owner(s)
Queensland Alumina Ltd

Keller business unit(s)
Keller Australia

Main contractor(s)
Queensland Alumina Ltd

Solutions
Slope stabilisation
Excavation support

Markets
Industrial

Techniques
Mass mixing