Providing Global Mineral Processing Solutions

Cemented paste backfill has become an increasingly popular method of optimising underground mine support and tailings management systems to increase project revenue. Cemented paste mine fill is a product that can be pumped or directed underground by gravity but does not release liquid after placement.

GR Engineering has an outstanding capability to assist with all phases of paste backfill projects from initial scoping studies and metallurgical testwork to detailed design, plant construction and project management. Principals of GR Engineering were heavily involved in the Kanowna Belle paste backfill plant definitive engineering study and subsequent detailed design, construction and project management. Kanowna Belle was the first continuous paste backfill plant commissioned in Australia. GR Engineering personnel supervised the metallurgical testwork, completed the definitive engineering study and carried out the design and construction of the facility under a lump sum contract.

Paste backfill plant services provided by GR Engineering include:

- Metallurgical testwork including sizing analysis, cement consumption, paste strength testing and flow loop testing;
- Flowsheet development and equipment selection;
- Paste pumping and underground distribution piping design;
- Feasibility studies ranging from scoping studies to bankable and definitive feasibility studies;
- Plant operating and capital cost estimating services including preparation of asset management plans;
- Design, construction and project management services.

Savannah Paste Backfill Project, GR Engineering's first design and construction project.
EXPERIENCE

Wassa Paste Backfill Plant
Golden Star Resources Ltd owns and operates the Wassa gold project located 150 km west of Accra, the capital of Ghana. GR Engineering was awarded a contract to design and supply all equipment and materials for a new 133 m³/h paste backfill plant at Wassa in August 2019. The scope of work includes the provision of construction assistance and commissioning of the facility. The design incorporates the use of ceramic disc filters, a first for GR Engineering paste plant designs. The complete design of the underground distribution piping system is included in the design and supply contract. The project is scheduled to be complete during the third quarter of 2020.

Fosterville Paste Backfill Plant
GR Engineering was awarded the engineering, design, procurement, construction and commissioning of a 65 m³/h paste plant at the Fosterville Gold Mine in Victoria. The scope of work comprised the design, supply, fabrication, installation, commissioning and handover of all works necessary to provide a paste plant including works at the existing Fosterville processing facility at a new paste plant location and the complete design of the underground distribution piping system. Tailings filtration is achieved using vacuum disc filters. The project was completed in January 2020.

Carosue Dam Paste Backfill Plant
GR Engineering was appointed to construct a paste backfill plant capable of producing 110 to 120 m³/h of paste for filling stopes in the Karari underground mine. The design utilised vacuum belt filters and allows for expansion to incorporate additional stope filling requirements for the nearby Whirling Dervish deposit at a later stage. The plant was completed in April 2019 under an EPC design and construct contract.

Nova Nickel Paste Backfill Project
GR Engineering was awarded the detailed design and commissioning for the paste backfill plant at the Nova Nickel Mine as part of an EPC lump sum contract for the delivery of the concentrator plant and non-process infrastructure in March 2015. The paste plant design utilises the low sulphide tailings, filtered using a belt filter to produce 70 m³/hr of paste. The plant was commissioned in March 2016.

Jabal Sayid Paste Backfill Project
GR Engineering was awarded the detailed design of the paste plant for the Jabal Sayid Mine located in Saudi Arabia in January 2013. Due to change of ownership the project was halted in 2014 and recommissioned in 2015. The paste plant is designed to produce 114 m³/h of paste from 176 t/h of cycloned tailings using vacuum disc filters. GR Engineering also assisted with construction and commissioning under an EPCM contract.

Degrussa Paste Backfill Plant
GR Engineering was awarded the design and construction of the paste backfill plant at the Degrussa project in March 2012. The plant utilised a horizontal belt filter of 96 m² to produce 120 m³/h of cemented paste. Paste delivery to the mine borehole was via a pumping arrangement. The plant was completed in November 2012 under an EPC contract.
EXPERIENCE CONTINUED

Prominent Hill Paste Backfill Project
GR Engineering was awarded the detailed design and construction of a paste plant for OZ Minerals at Prominent Hill in January 2011. Because the tailings from the existing treatment plant are too fine to economically produce paste, the paste plant includes a desliming cyclone stage to produce a coarse slurry for use in paste production. The paste plant is designed to produce 90 m³/h of paste from 146 t/h of cycloned tailings using vacuum disc filters. GR Engineering were also appointed to design the plant’s underground distribution piping system.

Porgera Paste Backfill Project
GR Engineering completed the detailed design of a paste plant for Barrick Gold’s Porgera Gold Mine in Papua New Guinea in 2008/09 and provided Project Management services for the site construction of the facility. The Porgera paste plant is designed to produce 100 m³/h of paste from about 140 t/h of cycloned tailings using vacuum disc filters. The paste will be pumped to the stopes via positive displacement piston pumps capable of operating at over 15,000 kPa.

Higginsville Paste Backfill Project
The Higginsville paste plant was designed for a throughput rate of 123 dry t/h of tailings and produced 79 m³/h of paste using vacuum disc filtration. Design and construction of the facility was completed in 2009 under an alliance style contract. The facility was commissioned on schedule and under budget during October 2009.

Savannah Paste Backfill Project
The Savannah paste plant was designed to filter and then repulp existing plant tailings with cement and deliver the resulting paste underground via a dedicated borehole and underground reticulation system. The plant has a design throughput rate of 96 dry t/h of tailings at a feed density of 65% solids. At nominal cement dosing rates, a design throughput rate of 100 dry t/h of paste (63 m³/h) is achieved. The plant was successfully commissioned on schedule in November 2007. The Savannah paste backfill plant was GR Engineering’s foundation design and construction project.