BENEFICIATION PLANT

STONE COLUMNS

Client: Goldsworthy Mining

Specialist Contractor: GFWA

THE PROJECT

In mining, beneficiation is a variety of processes comprising crushing, screening, gravity separation and flotation to remove impurities. The extracted ore from mining is separated into mineral and gangue, the former suitable for further processing or direct use.

In 1987 the then Goldsworthy Mining Ltd commissioned a testing and investigation programme preceding the development of an area on Finucane Island (Port Hedland), previously reclaimed with dredge spoil for the construction of major plant and stockpile areas. The investigation showed that the site was underlain by approximately 8 m of sand varying from loose to dense. The upper 3.5 m was dredged fill with balance of alluvial origin. Below this sand layer, 2m of soft marine mud was underlain by interbedded stiff clay and dense sand.

Circular main stockpiles were proposed to be constructed to 24 m height, equivalent to 630 kPa of pressure. Initial calculations showed that the ground would be subject to excessive settlement and a potential risk of failure of the stockpile.

THE ROLE OF GFWA

GFWA was awarded the contract for performing the ground improvement works in the same year.

Stone Columns were carried out to a depth of approximately 11 m under stockpile areas and to a depth of about 7 m for the various plant structures. The design envisaged stone column improvement through the soft marine mud and densification effects through the upper sands. Rejected iron ore was used as column backfilling material.

It is believed that if not the highest, the stockpiles represent at least one of the highest service loads ever applied to ground improved by vibro compaction/stone columns.

The reclaim facility has performed well in service and reported settlement at the centre of the tunnel has been reported to be approximately 150 mm.

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