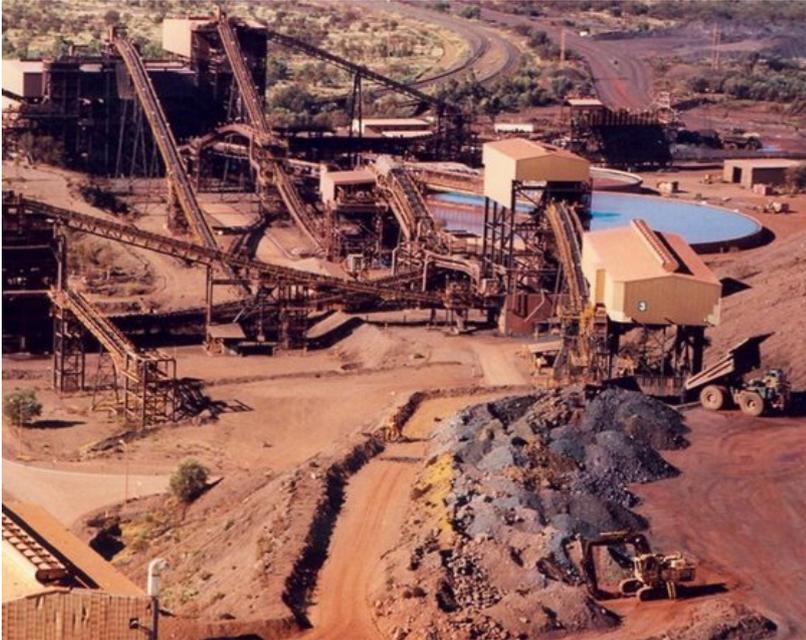


MT WHALEBACK MINE

TUBE À MANCHETTE



Client: BHP Billiton

Engineer: Osborne Geotechnics
Specialist Contractor: GFWA

THE PROJECT

BHP Billiton Iron Ore has seven extensive high-grade iron ore mining operations in the Pilbara, with a number of these located near the town of Newman.

The massive Mt Whaleback mine, established in 1968, is the biggest single-pit open-cut iron ore mine in the world being more than five kilometres long and nearly 1.5 kilometres wide. Adjacent are smaller deposits, Orebodies 29, 30 and 35.

Mt Whaleback ore is exceptionally high grade, containing up to 68 per cent iron. After blasting, excavators scoop up to 70 tonnes of iron ore and load it into haul trucks - which can carry as much as 240 tonnes - to be transported to the primary crusher. The crusher breaks down boulders of up to 1.5 metres in diameter into lumps about the size of a football. It is then transferred to a secondary crusher, where it is broken down into grapefruit-sized lumps.

From there, it is sent to stockpiles ready for loading on to trains, up to a rate of 14,000 tonnes per hour. Waste rock from the mine, which is low in iron content, is retained for use in rehabilitation.

THE ROLE OF GFWA

GFWA was awarded the contract to perform grouting of M110 Drive Tower of the stacker of Mt Whaleback mine using tube à manchette (TAM) technology.

By far the most accurate way to place grout is TAM with the use of a sleeve port pipe. This is a tube that has small port holes drilled at regularly spaced intervals so as to provide the desired grout stage length. The ports are typically covered with a short piece of thin rubber sleeve on the outside to prevent any soil or encasement grout from entering the tube.

TAM is most often placed in an oversize drilled hole. A weak grout is used to fill the annular space between the tube and the wall of the hole. For grout injection, a packer is used to isolate any one of the ports for injection. Injection pressure breaks the weak confining grout and expands the rubber sleeve so that the grout is forced into the formation at that particular location. The packer can be placed over any selected port, and different ports can be injected in any desired order. With sufficient pressure, the same ports are injected more than once.

In this project boreholes were drilled to the depth of 20 m at different angles to avoid the rail tunnel below the treatment area.