

FRANKIPILE AUSTRALIA PTY LTD PILING, DEEP FOUNDATION & GROUND ENGINEERING SPECIALISTS



WORSLEY ALUMINA EFFICIENCY AND GROWTH PROJECT

Frankipile Australia was the specialist foundations & geotechnical contractor selected to install the piled foundations for the Worsley Alumina Efficiency and Growth Project.

The Project will increase the capacity of the Worsley refinery from 3.5 million tonnes per annum of alumina to 4.6 million tonnes through expanded mining operations, additional refinery capacity and upgraded port facilities. The project will also provide opportunities to reduce the intensity of greenhouse gas emissions and improve water efficiency.

Frankipile was responsible for both the design and construction of the foundation scheme, installing in excess of 700 continuous flight augered (CFA) and precast piles from July 2008 to July 2010.





The ground conditions encountered were predominately stiff clays overlying high strength granite; consequently the deepest CFA piles (1200^{mm} Diameter x 42.0M) were drilled with Franki's 2 new Fundex F3500 piling rigs. Delivering upwards of 450kNm of torque the rigs were ideal for these depths and ground conditions.

During the pile construction process, the rig operator utilised the rig instrumentation system, and was able to monitor drill depth, penetration rates, auger torque and match this to the anticipated ground conditions. During the extraction process, real time data including extraction rate, concrete pressure and volume placed were constantly monitored to ensure a sound homogenous pile was formed.



PROJECT CASE STUDY CS 001

Project: Worsley Alumina Efficiency and Growth Project

Location: Worsley – Western Australia

Client: Worsley Alumina Pty Ltd

Managing Contractor Bechtel Australia Pty Ltd

Engineer: Worley Parsons Ltd

Geotechnical Engineer: GHD

Pile Type: Foundation Piles

Pile Installation Process: Continuous Flight Auger Driven Precast Concrete Driven Sheet Piles

Project Duration: July 2008 –July 2010 Project Value: \$25M





Sydney

Level 1, 4 Burbank Place Baulkham Hills NSW 2153 Ph: 02 8866 1100 Fax: 02 8866 1101 Email: sydney@franki.com.au

Brisbane

43 Holt Street Eagle Farm Qld 4009 Ph: 07 3292 3333 Fax: 07 3292 3399 Email: brisbane@franki.com.au

Melbourne

Level 2, Building 4 540 Springvale Road Glen Waverley Vic 3150 Ph: 03 9590 2700 Fax: 03 9561 7598 Email: melbourne@franki.com.au

Perth

Unit 3, 16 Hammond Road Cockburn Central WA 6164 Ph: 08 9414 9644 Fax: 08 9414 9677 Email: perth@franki.com.au

Due to the large bending moments and shear forces involved, the conforming piled scheme was based on large diameter bored piles with full length reinforcement cages. Frankipile proposed an alternative piling process, namely CFA. However, due to the difficulties of plunging long reinforcement cages into piles, Frankipile redesigned the foundation scheme to accommodate a full length plunge column. This proved an economical solution, both in terms of time and cost savings.

A specially engineered designed high slump 65MPa concrete was pumped through the stem of the auger & delivered to the base of the pile. A number of sample cores were taken from the toe of the pile to ratify the integrity of the pile base.







The plunge columns were generally 250UC measuring up to 43.0M in length. They were delivered to site in 3 sections and pitched into a 'rat' hole for splicing prior to plunging into the completed pile. Frankipile's rigorous self-certification system was employed to manage quality assurance on site.

Other related services offered by Frankipile include:

- Large Diameter Bored Piles, Driven Precast and Prestressed Piles
- Franki Piles
- Contiguous, Secant and Soldier Piled Retaining Walls
- Steel Sheet and Tubular Piling
- Displacement Piles



