



CASE STUDY

Blackwater CHPP Dump Structure

near Emerald, Central QLD,
Australia

Reinforced Earth Walls
TerraClass®

Owner: BHP Billiton
 Consultant: Barclay Mowlem
 Roberts&Schaefer JV
 Contractor: Barclay Mowlem
 Roberts&Schaefer JV
 Construction: January 2005

Background

BHP Billiton Mitsubishi Alliance's (BMA's) Blackwater Coal Mine required a new \$234 million coal handling and preparation plant to replace the existing North, South and Thermal facilities. The new plant, with production capacity of 14million tonnes of coal per year, should reduce overall operating costs and enable processing of the Mine's entire production at one centrally located facility. The plant's improved efficiency should also contribute significantly to the Mine's long-term sustainability, to the benefit of the local community.

Barclay Mowlem / Roberts Schaefer Joint Venture (BM/RS JV) was awarded the design and construction in April 2004. The scope of work included:

- Receiving Run of Mine (ROM) coal
- Crushing and raw coal stockpile
- Reclaiming raw coal and feeding to the wash plant
- A two module 1800tph wash plant
- Stacking product coal onto a 450,000 tonne stockpile using two travelling stackers
- Reclaiming product coal using two portal reclaimers
- Transporting product coal to the train loading system, and
- Loading trains at a rate of 7,000tph 24 hours a day.

Challenge

ROM coal was to be supplied to a gravity fed crusher using a dump structure. The design concept for the dump structure incorporated two independent bridges spanning approximately 18m across the hoppers and a traditional rear dump slab. Either fully laden Komatsu 930E dumpers or Kress 300C trucks load the bridges. The structure is required to have a minimum 30-year design life.

Concerns included the suitability of the foundation comprising coal, siltstone and uncontrolled fill and the site topography potentially creating surface water drainage and ingress problems at the base of the structure.

Solution

In October 2004 The Reinforced Earth Company (RECO) was awarded the design and supply of the 21m high dump structure.

RECO proposed the TerraClass® system, comprising reinforced concrete facing panels, galvanised steel soil-reinforcing strips and selected backfill. The highly loaded structure required high strength select fill to ensure stability. Crushed quarry gravel with a friction angle exceeding the required 36 degrees was available on site.



Main Picture: Blackwater CHPP TerraClass® Dump Structure construction nears completion
 Top and Center: REhas® soil reinforcing strips
 Above: Compaction testing

Mining infrastructure



Left: Aerial Photograph
Above: Installation of final course of TerraClass® panels

RECO employed the services of Michael Adler & Associates geotechnical consultants to inspect, assess, design and certify the foundation.

“Tanking” of the structure was considered necessary to prevent ingress of coal-contaminated stormwater into the Reinforced Earth block. A dirty water collection sump lined with an impermeable membrane and equipped with electronic pumps and an emergency overflow pipe (in the event of pump failure) was also used to remove water and protect the structure. An impermeable membrane at the top of the wall prevents ingress of contaminated stormwater in this area.

Special features/benefits

- Australia's largest-ever turnkey design and construct contract for the coal mining industry at the time of construction.
- A highly loaded, complex true abutment structure complicated by difficult foundation conditions and contaminated stormwater ingress potential.
- RECO certified the foundation design, the internal design and the construction of the structure.
- RECO's precasting facility at Wacol near Brisbane manufactured all the concrete facing panels.

Project specifications

System	TerraClass®
Finish	Smooth, grey concrete
Structure	Dump Structure
Area	2820m ²
Max. Height	20.98m
Length	171.8m
Design load	Either fully laden Komatsu 930E dumpers or Kress 300C trucks
Design life	30 years