

Olympic Dam Limestone Quarry



PROJECT SUMMARY

BHP Billiton's (BHPB) Olympic Dam Operation uses Concrete Aggregate Fill (CAF) which requires on average three million tonnes of 40mm aggregate each year.

Currently 100% of the aggregate is produced from a limestone quarry on site.

BHPB investigated a number of alternative methods to produce the required volume of aggregate as part of a business wide transformation project. One of the options trialled was to use a surface miner to produce a 75mm product and to modify the CAF mix design to use 75mm Aggregate.

Between December 2015 and January 2016 Global Civil and Mining (GCM) carried out a surface mining trial at Olympic dam employing a Wirtgen 2500 Surface Miner (2500SM) in windrow mode.

Production of approximately 16,066 bcm was achieved over 19 shifts. Therefore production averaged 846 bcm/Shift. Whilst the majority of the material milled was an Andamooka Limestone, with an average unconfined compressive strength (UCS) of 50Mpa, there were also significant volumes of Arcoona Quartzite with an average UCS of 120Mpa. Production was therefore two speed with 200 m³ per hour in the limestone and 80m³ in the quartzite.

In limestone the 2500SM proved that it was able to produce a consistent minus 75mm product (as shown in the photograph above).

Trials of the CAF using 75mm aggregate did not proceed due to concerns that the larger aggregate could cause upstream bottlenecks. Because the 2500SM is a fixed spacing milling machine it does not allow much control of the product sizing so producing a 40mm aggregate without further processing was not possible.

In summary whilst GCM proved that the 2500SM could easily meet the annual production targets and a consistent 75mm product, without further processing, it was not able to produce a 40mm aggregate to the required specification. Despite this result the trials conducted by BHPB identified many significant annual cost savings that more than covered their investment in the surface mining trial.

Case Study
GCM16-03

Year
2016

Client
BHP Billiton

Site/Location
Olympic Dam

Region
South Australia

Scope
Limestone Quarry

Total Production
16,066m³

Rock Type
Limestone & Quartzite

Rock Hardness
Up to 120 Mpa

GET Consumption
Average of 17.3bcm/pick
Variable due to wide range of materials encountered

Safety
Zero LTIs

Project Highlights
Average 195m³ per hour
86% mechanical availability

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