



Application for Niemac Award 2015

Barney Fuller

Blackhead Quarries Ltd

Walton Park Wet Sand Plant



Applicant:

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Overview

Walton Park Sand has been producing sand at Fairfield, south of Dunedin City for over 70 years. A plant was built on the current site in the 1970's and sand for most of the concrete produced in Dunedin has been supplied from this plant ever since.

The raw material has traditionally been taken from the Fairfield site but with increased overburden and stripping below water level an alternative source, Ferny Hill across the Taieri Plains is now used to supply the plant. This resource is a massive deposit over 190 meters thick and will last for 200+ years.



Although this deposit is still geologically part of the Taratu formation, a sand deposit along Coastal Otago, it has its own characteristics which slightly change the processing requirements from the previous resource.

Old Plant

This initially led us to putting a mobile screening plant at the Ferny Hill quarry site to take out larger clay clumps and ‘ironsand’ blocks.



The semi processed material was then trucked to the existing processing plant at Fairfield.

The Fairfield processing plant consisted of a bin, feeder, small screen, scrubber, pebble screen and cyclone with associated pumps etc.

The change in resource meant the input was different and the product was also slightly different, the sand was to the same specification but the volume and proportions of by products had changed. We were running two plants to get the sand grading right so a rethink was required to produce sand through a single plant with a minimum cost per tonne. The cyclone at the end of the plant was still making the right sand to the right grading but we needed better screening at the front and middle of the process.

Although this is a relatively simple plant with screening and washing it had to be configured right to produce a consistent grade of sand to a tight specification for our concrete customers as well as produce sand for filters, foundries and resin floors.

The Upgrade

Running two plants was not an economic option as the costs were high so raw material was trucked to the Fairfield plant for processing.

An existing bin was upgraded by extending the sides and making a concrete front bin. An angled grizzly was built over the bin to take out any lumps over 70mm. A 900mm flat feed belt with a variable speed drive was put under the bin as a feeder. The bin was lined with slippery plastic to help with the flow of sticky material.



The 6x4 pebble screen on the original plant was stripped down and overhauled to a new screen condition and used as the scalping and initial washing screen taking of the +20mm material, mainly clay, and conveyed to waste.



The existing scrubber was in good condition so while it was removed a new base was put in place giving a stronger base but also making cleaning around the plant easier and improving guarding.

As the plant cascades down the hill we shift the material in pipes. This has required some bends to take the energy out of the sand / water slurry.



A new 12x5 screen was built to do the final washing and screening the top size before the sand is washed down to be pumped through the cyclone and becoming a product. Water for the plant is pumped from onsite settling ponds with a new pump able to regulate its flow depending on demand.

During the upgrade the control room was tidied up and relined. Electrical work was upgraded to current standards. The whole plant was designed with cleaning in mind; the natural fall of the land and strategically placed hoses now makes this job easy and safe for staff.

Safety around the plant was a key consideration in the design and build process with guarding to industry best practice and good access and walkways.

The plant has now been working for 10 months and produced 40,000 tonnes of sand to a high specification. This includes 2,400 tonnes of golden sand for the Oriental Parade beach in Wellington Harbour.

The new plant has reduced the cost per tonne of sand significantly and provided a safer work environment for staff.



Barney Fuller

Barney has been working in the quarry industry for over 40 years. He started working for Fulton Hogan on their mobile crushers in the early 70's and has been the manager of the sand plant for 30 odd years. When Blackhead Quarries, a joint venture between Fulton Hogan Ltd and Palmer & Son took over the sand plant in 2004 Barney stayed on as the manager. This is a very good little business Barney has built up with not only the washed sand plant but also a dried sand plant supplying high grade sand across New Zealand.

Barney has been a member of the Institute of Quarrying for over 30 years and is a regular attendee at the annual conferences.

Work on the plant changes including design and build was all managed by Barney and a large portion of the work was carried out by Barney and his staff with help from local engineers where required.

