

Mission Accomplished

In August 2003, Cement Australia detailed the expansion plans for its Fisherman's Landing plant near Gladstone, Queensland, for World Cement. The project has been completed and the following is a brief summary update of the operating performance.

Introduction

From clinker to lime

By completely refurbishing an old clinker kiln, Cement Australia now has a brand new lime kiln at its Fisherman's Landing site. This unusual project was designed to capitalise on the Australian industrial boom. Demand for lime in Queensland is forecast to exceed 350 000 tpa.

Fisherman's Landing is located 10 km north of the city of Gladstone on the Queensland coast. It is surrounded by alumina refining and smelting industries and there is an abundance of high-grade crystalline limestone nearby.

Rather than building a new lime kiln, Cement Australia decided to invest A\$25 million in completely overhauling and upgrading its mothballed K1 clinker kiln.

Construction

The 18 month project began with demolishing the existing K1 preheater tower, which was replaced with a 12 plunger stone Metso preheater. The second stage saw the fcb.ciment-designed kiln fully refurbished. This required the 71 m kiln to be fully refractory relined and fitted with a baghouse to reduce dust emissions to below 25 mg/Nm³. The existing kiln drive was replaced with a 260 kW AC VVVF drive motor unit. The kiln ID fan was fitted with a new impellor and casing, and the exhaust stack was replaced with a new 128 m stack to raise it above the company's new cement kiln (K2) preheater tower adjacent to the lime kiln.

As the project progressed, it became apparent that an entire upgrade of the site's electrical system plant was needed to meet the current electrical control requirements, so this was incorporated into the project.

Cement Australia also scheduled a major conversion of the coal milling and firing circuit to change it over from semi-indirect firing to direct firing. This greatly reduced the cost of meeting current explosion protection standards. Metso engineer, Blevins Ford, was onsite for three months of the construction process to oversee its installation along with Tom Kearns for commissioning.

Concurrently, during the construction phase, a new 6000 t storage silo for the lime products was built. The 22 lifts of 2.4

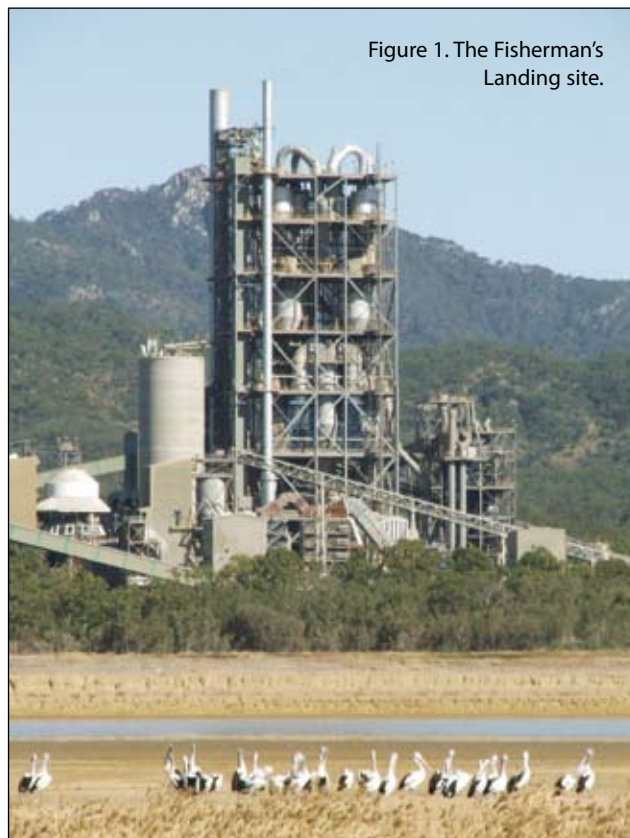


Figure 1. The Fisherman's Landing site.

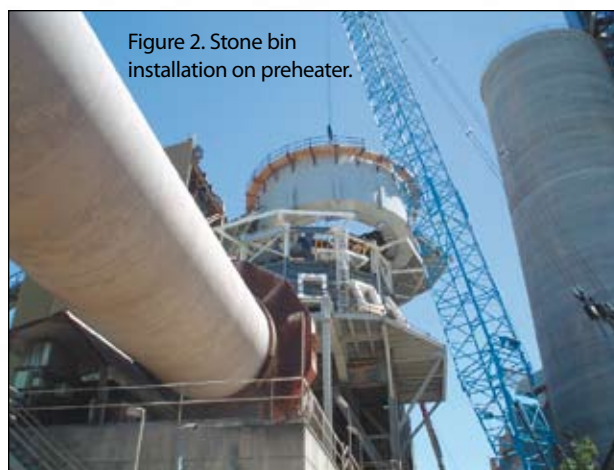


Figure 2. Stone bin installation on preheater.



Figure 3. Inside the slipform for the lime silo.



Figure 4. The kiln had a new backend cone and seal ring fitted to suit the Metso preheater.

m each took six months to complete, including installation of the crushing and screening plant and construction of the product bins.

The final major element of the project required the construction of a limestone stockpile recovery system and a conveyor from the stockpile to the Metso preheater. Limestone is delivered using the existing cement raw materials train unloader and stacker, which has been modified with a swivel base to allow 180° rotation to form a separate limestone stockpile. The conveyor and the silo are two of the most notable visual changes to the site. Smaller project tasks to ensure compliance with environmental conditions included the construction of onsite roads and stormwater diversion and collection facilities around the new stockpiles.

Commissioning

The complexity of transforming a cement kiln into a lime kiln on an active site created some timing issues for commission-



Figure 5. Construction of the limestone conveyor across existing buildings to the lime kiln preheater.

ing. Towards the end of construction it was clear that the electrical installation work on the conveyor was going to hold up the commissioning schedule. The time pressure came from the inability of the previous lime production facility to meet demand as it was scheduled to make other products.

The actual schedule did not change too drastically as rolling commissioning schedules were used. As plant became available, close communication between the construction contractor and the commissioning team ensured each section of plant was commissioned as soon as possible. Refractory dry out began 11 days over schedule on 18 July 2004 with the first batch of product leaving site on 29 July 2004.

Commissioning operations were successful with the kiln meeting and significantly exceeding Metso nameplate capacity of 860 tpd and dispatching first product within 10 days of light up. Post commissioning operations during the first 12 months were the usual mix of successful periods and teething troubles. The principal issues were caused by minor failures and malfunctions of some older sections of plant and their interface with new installations. The main culprits were the ID fan, main damper, coal mill and coal feed and the cooler, which was an unmodified grate cooler. The interruptions caused made it more difficult to achieve consistent performance and develop a stable operating programme for the kiln. The main effects for product were higher than acceptable levels of non-conforming product (less than 92% CaO) and sometimes limits on production capacity.

Kepner Tregoe has assisted the Cement Australia staff to identify the process control priorities necessary to reach a stable performance base. The target was to be within 5% of nameplate production, with a non-conforming product rate of 1 - 3%. The results of this programme together with the elimination of the reli-



Figures 6 (above). Pre kiln modification.

Figure 7 (right). Construction of the new lime silo.



ability issues noted above have provided consistent kiln production rates exceeding 830 tpd, with peak rates over 950 tpd. At the same time, non-conformance rates are less than 3% and average quality supplied to customers is maintained at the expected 95% available CaO. Some key findings were the sensitivity of the kiln to gas balance and flow and

that a better process control outcome was achieved when using back end temperature as a key process control target.

Markets and distribution

Cement Australia has agreements for the supply of lime products throughout Queensland, and in northern New South Wales, the Northern Territory and nearby Pacific export markets.

In addition to supplying nearby alumina refineries, lime is also being sent to mines and minerals processing operations around Mt Isa, 2000 km west of Fisherman's Landing. Production will be tailored to suit the peak requirements of the sugar mills stretching the East Coast of Queensland from Bundaberg to Cairns between June and December. Additional lime product customers include water treatment plants operated by municipal councils.

With the ability to supply accurate two or three component blends of ingredients such as quicklime, hydrated lime, lime kiln dust and fly ash to suit specific needs through a myriad of logistical solutions such as road/rail ISO pneumatic tank systems, the company is well positioned to meet increasing market demand.

As a result of this new supply of lime into regional markets, old inefficient equipment has been decommissioned. The trial using Cement Australia quicklime has proved very successful and resulted in improved environmental and energy efficiency performance. ◆

