

Case study:

Alumina Refinery lifts off with Alimak downunder



Comalco Alumina Refinery, Gladstone, Queensland, Australia

ALIMAK

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In 2004, three Alimak rack & pinion elevators of stainless steel were installed to provide access for maintenance and services at the Comalco Alumina Refinery in Australia.

During construction of the Comalco Alumina Refinery (CAR) project in Australia, Comalco relied on three Alimak rack & pinion elevators operated in construction site 'hoists' style mode of operation, which allowed contractors to meet critical completion schedules, before reverting to industrial access operations as the process lines were handed over for commissioning.

Construction of Australia's first Greenfields refinery to be built in the past decade in Australia is currently moving from a commissioning to operations phase; with three Alimak industrial elevators reverting from essential construction site duties conveying materials and labour to conventional permanent lifting duties providing access for maintenance and services.

The three Alimak elevators – two SE 1600 FC and an SE 2400 FC – operating in a construction site mode allowed the contractors of the Comalco Refinery, located in Gladstone, Queensland 530 km north of Brisbane to meet critical completion dates, finishing on-schedule.

A spokesman for the CAR project main engineering, procurement and construction contractor Bechtel Australia Pty Ltd stated that the Alimak industrial elevators were specified for their record of reliability, performance and ease of installation with the elimination of constructing a permanent elevator shaft; relying instead on proven rack and pinion techniques.

The first phase of the Comalco Alumina Refinery has been designed to produce 1.4 million tonnes of alumina per year which can be incrementally expanded in later phases to produce more than 4 mtpa. Construction of phase 1, at an estimated cost of US \$750 million, started in 2002.

Biggest in Queensland

Installation of the largest of the three Alimak elevators on the alumina calcinations building was completed in March 2004. Forming part of the Theiss Goldings Joint Venture contract, the installation proved the most challenging. Needed urgently by Theiss Goldings to undertake construction mode lifting duties, meant constant critical installation schedules being met.

Initially installed at the fourth floor level as a con-

struction elevator carrying people and materials, it was extended floor by floor as building progressed to the seventh floor with a final lifting height of 44 m.

The Alimak elevator was purposely positioned to sit between two 'lobster back' process units as a 'tailor made' installation including an area of limited space, allowing vehicle access past the plant and easy reversing and unloading into the elevator area.

Since its installation at the end of March, the elevator has 'clocked' 920 hours operation in six months. Travelling at 0.6 m/sec this equates to almost 1600 km (1000 miles).

Featuring a 2,400 kg capacity and car dimensions of 2,210 mm x 1,560 mm, the high payload capacity elevator is one of two SE 2400 FC's to be installed in Australia – the first being at Comalco's bauxite mine in Weipa, Northern Territories. Throughout Australia more than 100 permanent Alimak elevators have been installed.

Precipitation tanks

The first of the three Alimak elevators was installed in July 2003 providing specialist USA steel tank contractor Chicago Bridge & Iron (CBI) with construction style 'hoist' duties for the projects precipitation tanks.

Featuring a final lift height of 30.5 m, the SE 1600 FC has today reverted to industrial lift duties over the four floors. It provides access to the tanks and the adjacent hydrate washing processes.

Contract 330 – John Holland

Sub-contractor, John Holland has also relied on a second Alimak SE 1600 FC during construction of the plants 4-storey high liquor filtration process line in contract 330. With a travel distance of 22 m, the elevator was installed earlier this year. Both SE 1600 FC elevators installed on the Comalco site feature a 1600 kg capacity and a travel speed of 0.8 m/s.

On-site power supply

With an on-site power supply rating of 690 V, the Alimak installation team had to install transformers to each elevator assembly to step-down the voltage to 420 V operation at 50 Hz.

All three elevators were specified by Comalco as stain-

less steel cars together with all landing doors. The masts for contracts 330 and 490 feature a galvanised finish with the unit for contract 420 painted to meet a higher specification.

The Alimak elevators all feature 'frequency controlled' operation ensuring 'soft start' and 'soft stop' providing maximum comfort.

Boilerhouse

Contractors are also relying on an Alimak Scando 20/32 construction hoist with a 2000 kg capacity and a 3.2 m long car for lifting duties on the boilerhouse.

A 45 m high structure, the hoist ensures every maintenance and service access to various levels of the boilerhouse. A replacement to an industrial Alimak elevator is anticipated in the near future.

The units 3.2 m extended length is a local health and safety requirement to allow a stretcher in the unlikely event of an emergency.

Alimak elevators

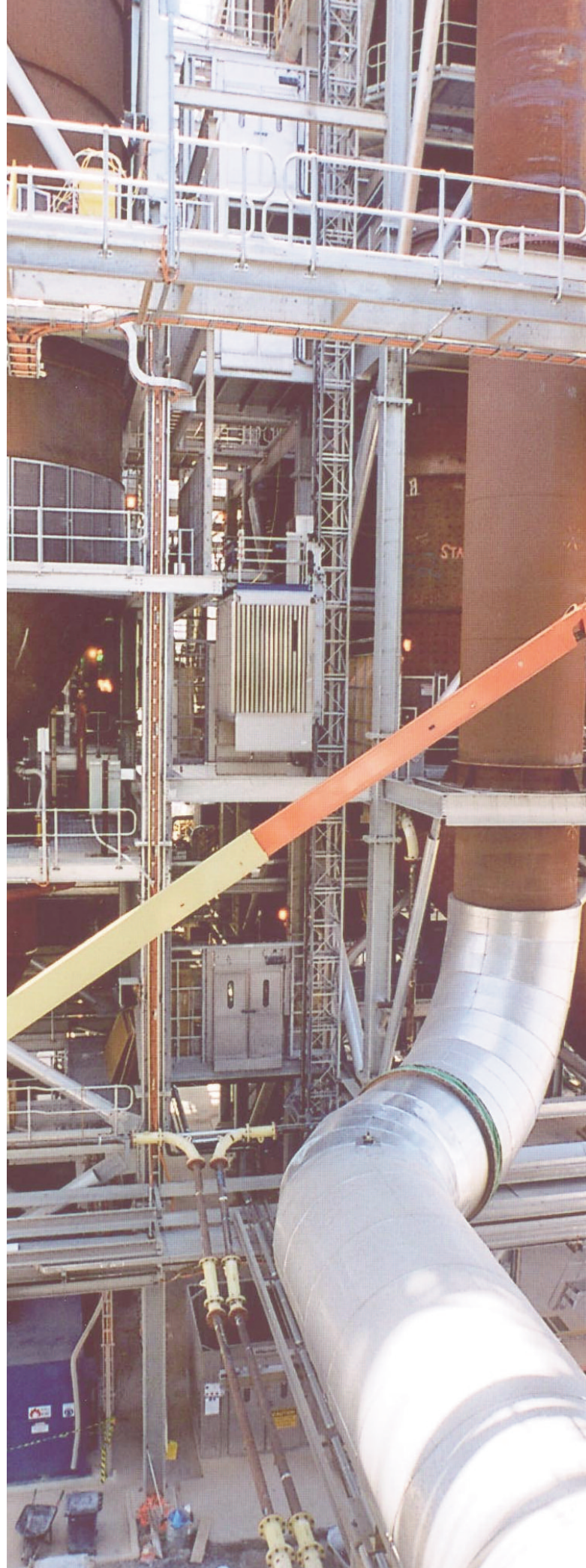
The range of Alimak industrial elevators feature a modular build with up to 30 different car sizes, measuring 0.78 m x 1.04 m – 1.56 m x 3 m and travel speeds of up to 1 m/sec. Lifting heights in excess of 250 m can be obtained using the rack and pinion techniques able to lift capacities of between 300 kg – 2,400 kg.

A recent report in the USA quoted that the cost of stairs-related falls annually within the States is estimated to be in the region of US\$ 15 billion. Clearly the use of industrial-style permanent elevators can eliminate many of the accidents.

Alimak platforms post-tension duties

Following construction by Bechtel of two 40 m high concrete final product storage silos, four Alimak platforms were used to allow access for post-tensioning of the reinforcement bars. The platforms were positioned on four buttresses around the perimeter of each 40 m diameter silo.

Throughout construction of the refinery, contractors also used three additional Alimak Scando rental hoists.



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Comalco

Alumina produced from the first stage of CAR will be shipped to Comalco's smelters in Tasmania and New Zealand. The company has also signed a long term supply agreement with the Norwegian company Hydro Aluminium to supply 300,000 t of alumina in 2005 and 500,000 t a year from 2006-2030. This represents one of the biggest alumina agreements ever signed.

Comalco is a wholly owned subsidiary of Rio Tinto and is a major supplier of bauxite, alumina and aluminium products for the world markets.

ELEVATOR DETAILS

Location:	Comalco Alumina Refinery, Gladstone, Australia
Application:	Alumina Refinery
Elevator type:	Rack & Pinion
Elevator model:	ALIMAK SE 1600 FC & 2400 FC
No. of elevators:	3
Capacity:	1600 kg & 2400 kg
Lifting height:	Varies between 22 m – 44 m

