

Rockcote and Brolton balance green with keeping in the black

With energy costs soaring and greenhouse-gas emissions now a major concern, it is clearly time for industry to be part of the environmental solution. To that end, engineering firm Brolton Group and Rockcote have pioneered development of one of Australia's first green-friendly manufacturing plants, utilizing state-of-the-art powder handling systems and technologies.



Bag placers: the fully automated Weitek four head valve bag filling station is equipped with automatic bag placement and is capable of 24 TPH.



The fluidization system ensures efficient fluidization by introducing a small amount of air through the patented elements to ensure even, efficient material flow.

A leading provider of architectural coatings for the past 20 years, Queensland-based Rockcote lives and breathes the environment. Its products – including Australia's only paint certified by the Asthma Foundation – are manufactured without chemicals to the highest performance and durability standards.

Over the years, demand for Rockcote's pre-mixed render products has grown to the point that the company needed a new manufacturing facility capable of producing an estimated 40,000 tonnes of product per year (the equivalent of one semi-trailer load every hour).

Rockcote, which had previously won acclaim and industry awards for its water- and energy-efficient showroom in Nerang, Queensland, called for tenders for the design and production of its new manufacturing capacity in the Queensland town of Yandina, north of Brisbane. Based on recommendations from an equipment supplier, a RFT was extended to engineering company Brolton Group.

Over the past decade, Brolton Group has emerged as an innovative engineer of automation, electrical and mechanical engineering solutions for major manufacturing, food and beverage, media and industrial companies.

With its track record of translating client briefs into engineering plans, Brolton soon emerged as the partner best-qualified to build the new factory, in line with Rockcote's budget, schedule and commitment to sustainable manufacturing via waste reduction, manufacturing efficiency, integration and non-compromise.

Having designed and delivered unique engineering solutions to some of Australia's largest businesses, Brolton also



Weigh hoppers: raw materials are loaded into the weigh hoppers with high accuracy via the patented double flap dosing valves prior to being batched to the mixer.

brought to the project solid relationships with key suppliers, including mortar plant company Lahti, automatic bagging and palletizing systems suppliers, Weitek and fluid bed drier systems provider, Ventilex.

These relationships meant key team members were already engaged in dialogues with engi-

neers at the vendors' overseas R&D facilities. Rockcote's managing director, Bob Cameron, commented that this dialogue was an important safeguard, given the lack of benchmarks for developing high-performing, low environmental impact industrial facilities.

"This facility is dedicated to producing Rockcote Quick Render, a pre-mixed plaster that is gaining ground because of its quality and consistency," said Cameron.

"When tradespeople mix their own product, they're at the mercy of variations in the raw ingredients that can make the end result rather unpredictable. So delivering a premixed, consistent product is of clear benefit to them. For Rockcote, it's also underpinning the introduction of a new quick render system that we believe will really open up a new era for the Australian industry.

"Its success, and our success, rested on getting a facility that would deliver an absolutely consistent product. So it was vital that Brolton helped us realize a factory capable of delivering to the highest quality. Beyond that, we also wanted to demonstrate that an industrial development can be both sustainable and beautiful – and that's where Brolton was a great ally.

"From the moment Ben [Lynch, director of Brolton] first saw the design centre in Nerang, he grasped the principles that Rockcote is working on, and applied them to engineering the Yandina

pre-mix plant.

“Throughout the design and construction phases we had any number of well-qualified people telling us that a particular process couldn’t be done. But Ben would always come back with how it could be done, and how it was going to make the plant more cost-effective,” he said.

Water efficiency

The plant was designed to be completely self-sufficient in its water usage. The facility has been designed as a huge sand filter, with water from the raw sand being collected and used in onsite gardens and the local community.

The water is drinkable, although it is dedicated to industrial use while the site’s potable water needs are met with 150,000 litre capacity rainwater tanks. The total waste stream is further reduced by Rockcote’s ‘no scraps’ policy through which all compostable rubbish is fed to onsite worm farms and chickens.

Energy efficient production

Brolton designed the production process around a gravity feed system which, combined with energy-efficient machinery significantly reduces the plant’s overall energy requirements.

Lahti systems were chosen for the plant, because of their precision in weighing and dosing and mixing. Relatively unknown in Australia, the Lahti plant system ensures a consistent blend. These precise measurements are important to Rockcote, as its product recipe requires a specific composition of additives and particles of different sizes.

The system is also efficient, providing batch net volumes of 1,000 litres and mixing times of 90 seconds for normal batches and 180 seconds for coloured loads.

Lahti’s next generation WA-951 Batch Controllers are also employed, providing a fast and accurate weighing indicator and advanced calibration. For instance, load cell signals are measured separately enabling detailed, load cell specific diagnostics.

In addition to its gravity feed, pneumatic operations are utilised throughout the process, including in Lahti’s patented fluidization systems.

Brolton Group’s production design also incorporates a fluid bed dryer, which delivers energy (including gas and electricity) savings of around 20 percent over rotary drum dryers.

Brolton recommended to Rockcote the Ventilex drying and cooling system, a best-practice platform that combines flowing air with mechanical movement to quickly process sand grains with a minimum of dust.

Brolton’s Ben Lynch commented, “While industry as a whole is fairly skeptical about the performance of some fluid bed systems, we know that Ventilex delivers successful outcomes. It’s becoming a global standard – in fact, since the Rockcote installation, we have had five further enquiries from manufacturers interested in installing Ventilex systems.”

Mixing is carried out by a Forberg-1000 mixer with two horizontal mixing rotors, each 11kw and with a combined capacity of 1600kg per batch.

The bag filling process was designed to incorporate four independent spouts, providing a total filling capability of 24 tonnes per hour. Lynch commented that while this capabil-



Weitek bagger: after being filled the bags are lowered to transfer conveyors for cleaning and check weighing prior to palletizing and stretch wrapping.

Sand dryer: the gas fired energy efficient Ventilex unit combines drying and cooling in the fluid bed drier process at 20 TPH of sand to a preset moisture content.

ity represents excess capacity of around 20 percent, it enables the lines to run at nominal, rather than peak speed (ultimately reducing maintenance requirements) and provides scope for production growth.

Palletizing is carried out using the fully automatic Okura Robot system, integrated by Weitek – a low-maintenance, user-friendly technology that has been designed specifically for heavy duty palletizing. The robot

carries loads of up to 120kg and provides extended reach that builds more flexibility into the palletizing procedure.

The entire production process is controlled by Lahti Precision BatchWare HMI software, which provides process visualization and supervisory control of the plant as well as management of recipes, process parameters and detailed reporting.

Construction shows the value of a solid design phase

Construction of the plant commenced late in 2007 and – despite hurdles around building on a clay site and constructing during La Niña weather – the project met its ‘go live’ schedule of launch on July 1, 2008 followed by two or three weeks to ramp up to full production.

For the Brolton Group, the key to the success of the project lay in listening to what the client really wanted to achieve and then applying the engineering principles that supported those priorities.

“This is really a landmark development for environmentally sustainable industry,” commented Ben Lynch.



Sand load conveyor: wet sand is conveyed from the load hopper via incline conveyor to the fluid bed drier.



The Okura A1600 II robot palletizer is capable of accurately placing 1600 bags per hour.



Sand drier: the processed sand is processed through the first of two sieves and a metal particle removal station prior to elevating and storage.

“Despite a lack of pre-existing models, we have managed to construct a building that stands as an example of how sustainable development practices can be profitably integrated into practical solutions. Because it is self-sufficient in its water usage, this facility has no need to manage water waste, or impose a water burden on the community. Its low-impact, energy-efficient design means that Rockcote can look forward to significantly reduced energy costs in the years ahead.

“The facility has even achieved its purpose of being an attractive, healthy place to work. The design has always focused on making an industrial facility pleasant: from the garden right through to windows placed high in the vertical processing operations centre, which brings the green local environment right into the production process.

“During the construction phase, a major challenge was coordinating and integrating systems from different suppliers. Here, we had a real advantage in having worked with most of the vendors on other projects - which meant we already had good lines of communication with the right people in their global headquarters,” Lynch commented.

“For Broton, this project marks a real coming of age. We were able to work closely with our customer in a new territory, and achieve the required outcome based on our trademark approach of developing the solution of best fit - that is, the solution that we know will work reliably, will deliver value for money and absolutely responds to the client’s priorities,” he said.

Bob Cameron concurred, attributing the successful completion of the \$8.5 million facility to the strength of a good design team.

“Not having benchmarks for the product was, overall, the biggest part of the challenge, but because Broton and the team had walked through every part of the design, we knew why and exactly how it was going to work,” Cameron concluded.

About Broton Group

Founded a decade ago by current director, Ben Lynch, the Broton Group today employs more than 70 highly skilled professionals, including electrical and mechanical engineers, specialist technicians and tradespeople.

Originally specialising in mechanical and materials handling engineering, over the years Broton has developed deep expertise in a range of industries.

Today, the company provides automation, electrical and mechanical engineering solutions in a range of services, including mechanical, electrical, civil and construction engineering, preventive maintenance and breakdown support, plant and factory fit out and relocation, through to full turnkey projects.

Broton Group’s specialist electrical and automation division, headed by director Darren Kramer, has a strong record in delivering projects ranging from process automation to turnkey safety solutions and full plant relocations.

Across its services, Broton applies a disciplined methodology that begins with studying every detail of the customer’s requirements before developing a proposed solution that is designed to ‘best fit’ - that is, delivering the project’s objectives in the most efficient, cost-effective and reliable manner. ■

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