

Smart safety solution helps grow capacity and reliability at plaster mill

Winstone Wallboards benefits from smart safety solution for material handling

Challenge

To design, install and commission a smart safety solution to help grow capacity and reliability at the mill.

Solutions

Smart Safety

- Allen-Bradley® GuardLogix® delivered integrated control and safety over Ethernet/IP
- Guardshield™ POC Safety Light Curtains provided zone separation for the mill
- Guardmaster® 442G Multifunctional Access Box (MAB) delivered integrated access control and guard locking

Seamless Integration and Commissioning

- Studio 5000® Logix Designer software significantly reduced engineering and commissioning time
- The Ethernet/IP connectivity of the MAB reduced wiring and commissioning time and costs

Results

Increased Capacity and Reliability

- Improved fault finding
- Downtime due to safety system failure was reduced resulting in OEE improvement of 0.3%
- Increased equipment availability to produce for an additional 24 hour period during the year
- New solution meets AS/NZ Standard 4024 and provides ease of maintenance and also ease of adjustment



Winstone Wallboards is New Zealand's only manufacturer and marketer of gypsum plasterboard, drywall systems, and associated products and services.

Background

Over the last 90 years, Winstone Wallboards has grown from modest beginnings to become New Zealand's only manufacturer and marketer of gypsum plasterboard, drywall systems, and associated products and services.

Winstone Wallboards has facilities in Auckland, Christchurch and Wellington. The company is committed to ongoing research and works closely with researchers at universities at New Zealand's major industrial research and development centres to continually improve its products, systems, and solutions.

A core section of the plant is the joint and finishing compounds area, within the company's Auckland plaster mill. This is the only production facility capable of producing joint and finishing compounds in New Zealand. As the final step of a complex process, this material handling section seals, conveys, orientates, palletises and wraps finished product.

The material handling equipment for the joints and finishing area was installed in 2002. The installation represented a fundamental leap forward in productivity and technology as the large quantities of manual handling previously required in the area were significantly reduced. However, in the last 15 years machine safety standards and general expectations on machinery within manufacturing have been substantially updated.

**Rockwell
Automation**

To comply with the latest safety standards and improve reliability, Winstone Wallboards approached NHP Electrical Engineering Products, distributor for Rockwell Automation products and services, to design and deliver an industry leading solution to meet their palletising requirements and assist with the growing the company's production capacity.

Automated materials handling

The materials handling equipment has the challenging task of handling the two incoming streams -the dry and wet product packaged in different mediums simultaneously. The finishing compounds area is divided into three sections; the dry mix section – end user is required to mix the product which is packed in a variety of different sized bags from 5kg to 20kg; the wet mix station – ready to use product are packed in pails of varying sizes from two litres up to 15 litres and also a 14 litre box. The third section merges both the wet and dry mix on the robot palletising system. Safety is therefore a key priority for the system operators.

While reviewing these materials handling zones, Winstone Wallboards had conducted a risk assessment which identified areas of the plant which required updating to meet new standards.

"The initial scope of the project was to replace an aging palletising robot that was no longer meeting capacity," explained Shaun Sanders, Manufacturing Safety Engineer

at Winstone Wallboards. "We decided to upgrade the safety in the joints and finishing area to comply with the standards for palletising cells and implement a new safety system – from control through to devices – in that area," he said.

Smart safety solution

The functional safety specification helped identify the products and solutions that would best meet Winstone Wallboard's safety requirements. "We decided to use the full spectrum of Rockwell Automation products to deliver a completely integrated and connected safety system," said Sanders.

Integrated control and safety for the materials handling equipment was delivered by the Allen-Bradley® GuardLogix® programmable automation controller (PAC). The control system was programmed using Studio 5000® Logix Designer software over Ethernet/IP – for seamless integration and providing time-savings in design, engineering and project development with simplified validation and verification through minimized hardwiring tests.

Given the safety hazards associated with the materials handling equipment at the plant, it was important to provide appropriate guarding between the hazard and operators so the machine could be accessed in safe mode if required. Guardshield™ POC Safety Light Curtains



The Allen-Bradley 442G Multifunction Access Box installed on safety gate.

provided zone separation for the mill and the latest Guardmaster® 442G Multifunctional Access Box (MAB) provided an ideal solution for this application. It is an integrated access control and guard locking device which provides a complete safeguarding solution for full body access applications.

The 442G MAB gate access lock has Ethernet/IP connectivity, avoiding the requirement for hardwiring the system. "The MAB provides a pre-built access unit that is easy to install and replaces separate solenoid lock, latch mechanism, mechanical stops, multiple buttons, indicators and emergency stop operator and escape release mechanism, which would all have to be integrated and engineered – the MAB is a simple and economic choice that is pre-engineered and TUV certified to PLe performance level," explained Simon Johnson, technical consultant for connected components, Rockwell Automation.

The new smart safety solution at Winstone Wallboards provides the flexibility to perform sophisticated safety control. All tasks are available and rich diagnostic information is captured by the MAB and GuardLogix. Harnessing the power of safety and operational data can substantially improve safety compliance and performance – enabling smart machines for use in The Connected Enterprise and helping to increase productivity and minimise downtime while reducing total cost of ownership.

Enabling smart machines for use in The Connected Enterprise helped to increase productivity and minimise downtime while reducing total cost of ownership.

"The installation and commissioning time was reduced significantly using the MAB. We had approximately 14 days during a planned shutdown to remove the existing system and have the safety upgrade installed and commissioned. Using an integrated safety solution enabled us to achieve this, otherwise we would have struggled to complete it on time. In addition, we integrated the system with other processes onsite and everything was done easily through digital communications," said Sanders.

Maintaining uptime

"The new solution meets AS/NZ Standard 4024 and provides ease of maintenance and also ease of adjustment. From a maintenance and fault-finding



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perspective it has given us great benefits. It is part of a big picture for the plant, moving towards integrated equipment," said Sanders.

As a result of the solution downtime due to safety system failure has been reduced. With the old safety system fault events could take several hours to diagnose while now with the new Guardlogix based smart safety system, diagnostic information on the state of safety system is immediately available to the operator and maintenance teams. This facilitates rapid repair and production resumption, resulting in an OEE improvement of 0.3 percent. This means that the safety system provides increased equipment availability to produce for an additional 24 hour period during the year.

Furthermore, the system provides the tools for Winstone Wallboards to drive compliance, while ease of use provides the operator with safe operating procedures whilst enhancing productivity. By incorporating safety information into Environmental Health and Safety management systems, day to day discrepancies between policies and operating procedures can be identified – improving insight into worker behaviour and compliance.

Previously, to gain more diagnostic data traditional safety devices required more complex wiring solutions. Using a smart safety solution enables greater access to diagnostic

data and simplifies your wiring system. An integrated smart safety solution provides the information needed to create a comprehensive picture of the status of the machine or production line.

In addition, enhanced visibility into safety-system performance and stoppages can help determine the root cause of shutdowns. Safety and production data also can be combined to understand the frequency, duration, time and location of safety-related shutdowns.

“This project is the first step towards building the communications infrastructure for the entire plant. Having a platform like GuardLogix, lays the foundation for where the future of the plant will lie with integrated safety. The success of this project has given Winstone Wallboards the confidence to use newer technologies and invest in further upgrades at the plant,” said Adam Kane, Technology Specialist – Safety & HAE, NHP.



The joint and finishing compounds area is a core section of Winstone Wallboard's plaster mill..



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