

AUSTRALASIAN

CONNECT WITH 'AMSJ'   

# MINE SAFETY

JOURNAL

SUMMER 2017  
ISSUE #31

WWW.AMSJ.COM.AU

## MENS HEALTH:

### IF YOU FEEL DOWN, SAY SOMETHING

PAGE 20

PROUDLY AUSTRALIAN OWNED & OPERATED

ISSN 1833-3036 PRINT

FEATURE

#### POINT OF NO RETURN

Avoid costly mistakes and unnecessary death

P.48

COMMENTARY

#### EMERGENCY MANAGEMENT IN MINING

Forming relationships when disaster strikes

P.10

SPECIAL FEATURE

#### 5 PATHWAYS TO DISASTER

Why industry continues to kill workers

P.64



# AUSSIE LOGISTICS LEADER FILLS-UP

A premier mineral sands mining company has procured new automated bag-filling technology, writes David Boger.



THE AUTOMATED BULK BAG FILLING STATION FILLS BULK BAGS WITH UP TO 160,000 KG OF ABRASIVE MATERIALS PER EIGHT-HOUR SHIFT



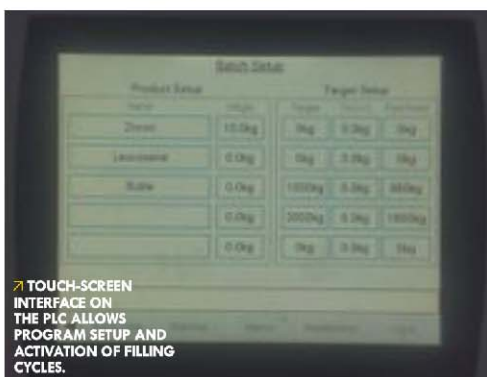
SKID-STEER LOADER DEPOSITS MINERAL SANDS INTO THE 2.5M<sup>3</sup> CAPACITY HOPPER WHILE THE SCREW CONVEYOR MOVES THE MATERIAL TO THE BULK BAG FILL HEAD.



THE FILLED BAG AND PALLET MOVE OUT ON THE ROLLER CONVEYOR AND ARE REMOVED FOR SHIPMENT.



THE SWING-DOWN FILL HEAD PIVOTS TO A VERTICAL POSITION, ALLOWING THE OPERATOR TO SAFELY AND RAPIDLY ATTACH BAG STRAPS TO FILLER LATCHES WHILE STANDING ON THE PLANT FLOOR. PUSHING ONE BUTTON INFLATES THE MATERIAL INLET AGAINST THE BAG SPOUT, AND INITIATES ALL AUTOMATIC BAG FILLING FUNCTIONS.



TOUCH-SCREEN INTERFACE ON THE PLC ALLOWS PROGRAM SETUP AND ACTIVATION OF FILLING CYCLES.



A PNEUMATICALLY OPERATED PRODUCT SAMPLER CAPTURES A 4.3OZ (142G) SPECIMEN FROM THE MATERIAL STREAM FOR PRODUCT QUALITY DOCUMENTATION.

**C**ristal Mining Australia recently procured Flexicon Corporation Australia's Bulk Bag Filling System for the Qube Bulk Picton Facility, 80km southwest of Sydney.

When Cristal decommissioned its in-house bagging operation, Qube Bulk seized the opportunity to improve sandbagging operations by devising a bulk bag-filling solution in concert with Flexicon.

The result was a mobile system that filled up to 80 bulk bags or 160,000 kg with the abrasive materials per eight-hour shift — automatically, accurately and dust-free.

A division of Australia's largest provider of import and export logistics services, Flexicon manages more than 20 million tonnes of bulk product shipments per year. This now extends to filling bulk bags with three different types of abrasive mineral sands.

### **QUICK TURNAROUND DEMANDS MOBILITY**

Bulk truck shipments from Cristal's Mineral Separation Plant are delivered to storage sheds at Qube Bulk's Picton Facility. With limited lead time for outgoing orders, the company admits productivity is a critical part of the bulk-bagging process.

"Often due to market situations, we receive orders fairly late and need to bag the product in a short timespan to get the shipping containers loaded with bulk bags and to the port on-schedule," Qube Bulk regional manager Jos Pascoe says.

"The need to respond to orders for any combination of the three materials stored in different sheds demanded a mobile solution."

Flexicon proposed a skid-mounted mobile bulk bag filling station with a 2.5 sqm capacity hopper and a 220mm-diameter, 3m-long rigid tube screw conveyor to move materials to the bulk bag fill head. The solution was promised to deliver 20m<sup>3</sup> per hour of material into bulk bags weighing up to 1000kg or 2000kg each. The skid measures 4m by 2.25m and the unit stands 3.4m high.

A forklift moves the mobile filler between storage sheds, depending on which material needs to be loaded. Pascoe claims the system, including its 2.75 m-long offload roller conveyor, can be set up and running at a new location within 20 minutes.

### **FROM BULK TO BAG IN THREE MINUTES**

Once an order is received and the filling station is positioned in the appropriate storage shed, Pascoe's crew can fill up to 80 bags per eight-hour shift. Pascoe says from that timeframe about half is actually spent filling with the material and the other half spent placing pallets, hanging empty bags and conveying filled bags out of the station.

"Obviously, filling larger bags takes a bit

longer," he says, "but that's still only about three minutes per 2000 kg bag."

A skid-steer loader empties bulk material into the feed hopper. The bottom of the hopper funnels the granular mineral into the steel tube screw conveyor inclined at a 45-degree angle. The conveyor is equipped with a heavy-duty stainless steel spiral to handle the free-flowing but abrasive mineral sands, which range in density from 2200 kg/m<sup>3</sup> to 2750 kg/m<sup>3</sup>.

The conveyor design itself does not include any bearings or rotating seals, and the drive motor is mounted above the discharge point, preventing abrasive minerals from grinding on bearings or seals at the drive shaft.

A pneumatically-operated product sampler automatically captures a 142g specimen from the material stream during the fill cycle, for product quality documentation.

Pascoe plans for greater productivity as his crew becomes acclimated to the new system.

"We are targeting 100 bags in an eight-hour shift," he says.

"That will allow us to fulfill a typical 40-container order in about five working shifts."

The short turnaround is critical because Pascoe's biggest scheduling concern is the time spent between releasing of shipping containers for pick-up and packing containers to meet shipping deadlines.

### **ERGONOMIC FEATURES PROTECT WORKERS, BOOST PRODUCTIVITY**

In keeping with Australia's focus on workplace health and safety, Pascoe required operation that was both ergonomic and efficient. To this end, the pivot-down fill head allows safe, rapid connection of bag loops to the filler latches without standing on the roller conveyor, straining to reach overhead bag connection points or inserting hands between fill head components.

Dust is contained by an inflatable bag spout seal and a telescoping discharge chute between the conveyor outlet and filler inlet, and by venting displaced air and dust to a filter sock.

Once a bag is filled latches automatically release bag loops, and the roller conveyor moves the bag out of the filling area for tagging and transfer to the shipping container.

"Features like easy bag attachment and no manual handling of loaded bags or pallets minimise worker exposure to potential injuries," Pascoe says.

"We were concerned about workers being exposed to dust in the storage sheds, but the filler discharge chute contains all [the] dust."

### **AUTOMATED CONTROL DELIVERS PRECISE MEASUREMENT**

The unit's PLC touch screen automates everything except for connection between bag straps and latches, and pulling the bag spout over the deflated spout seal.

"It is all programmed and its accuracy has been impressive," Pascoe says.

"All you have to do is set the PLC for 1000 kg or 2000 kg bags. Once the bag is in position, you press the start button, the inflator for the bag spout starts automatically and the product starts flowing."

Load cells under the filler send signals to the PLC to stop the conveyor when the bag gains the desired target weight.

The PLC also automates other aspects of the process including activating the powered roller conveyor and product sampler and other actions based on feedback from sensors.



#### **PROFILE**

### **DAVID BOGER**

**GLOBAL BUSINESS DEVELOPMENT VP, FLEXICON**

David is vice president, global business development at Flexicon Corporation, which is headquartered in Bethlehem, Pennsylvania, USA. During his tenure at Flexicon, he previously held the positions of service engineer, applications engineer, sales manager, and sales and marketing vice president. He holds a Bachelor of Science degree in chemical engineering from the Rensselaer Polytechnic Institute in Troy, New York.

Flexicon is touted to be a global leader in the design and manufacture of bulk handling equipment, with manufacturing facilities located on four continents. Flexicon manufactures a broad range of equipment including flexible screw conveyors, tubular cable conveyors, pneumatic conveying systems, bulk bag fillers, bulk bag conditioners, bulk bag dischargers, weigh batching systems, manual dumping stations, drum/box/container dumpers, and custom-engineered plant-wide systems integrated with new or existing processes.

Flexicon Corporation (Australia)

78 Westgate Street, Wacol Qld 4076

Phone: 07 3879 4180

Email: [sales@flexicon.com.au](mailto:sales@flexicon.com.au)

Website: [www.flexicon.com.au](http://www.flexicon.com.au)