

AUSTRALIA

# BULK HANDLING

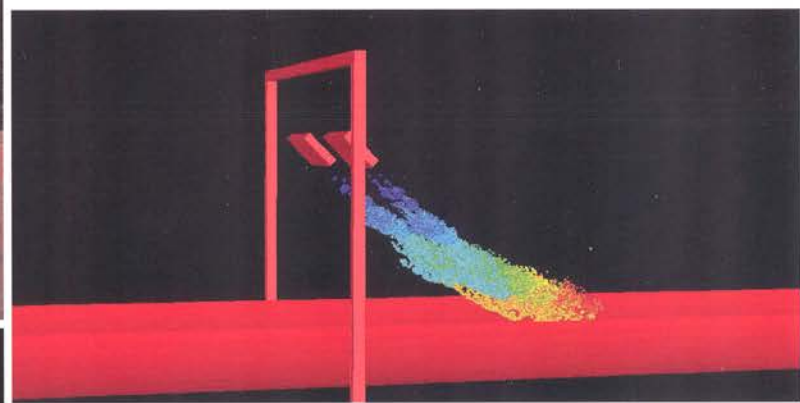
REVIEW

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# Flexicon bag filler for Cristal's mineral sands

Logistics provider Qube Bulk has installed a Flexicon bulk bag filling system at its site in Picton, Western Australia, for handling abrasive mineral sands belonging to Cristal Mining Australia



The automated bulk bag filling station fills bulk bags with up to 160,000 kg of abrasive materials per eight-hour shift.

When Cristal decommissioned its in-house bagging operation, Qube Bulk's Picton facility seized the opportunity to improve bagging of the sands by devising a bulk bag filling solution in concert with Flexicon.

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

## 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, productivity is key to the bulk bagging process, according to Jos Pascoe, Qube Bulk regional manager. "Often, due to market situations, we receive orders fairly late and need to bag the product in a short time span to get the shipping containers loaded with bulk bags and to the port on schedule," he 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 having a 2.5 m<sup>3</sup> capacity hopper and a 220 mm-diameter, 3 m-long rigid tube screw conveyor moving materials to the

bulk bag fill head. It delivers 20 m<sup>3</sup> per hour, filling bulk bags weighing 1,000 kg or 2,000 kg. The skid measures 4 m by 2.25 m, and the unit stands 3.4 m high.

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

## 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. He says about half that time is actual material filling and half is 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 2,000 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 45°. 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 design of the conveyor itself does not include any bearings or rotating seals at all, 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 142 g specimen from the material stream during the fill cycle, for product quality documentation.

Pascoe plans for greater productivity as his crew gets used to the new system. "We're targeting 100 bags in an 8-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 between releasing of shipping containers for pick-up and packing of containers to meet shipping deadlines.

### Ergonomic features

In keeping with Australia's focus on workplace health and safety, Pascoe required operation that was ergonomic as well as efficient. To this end, the pivot-down fill head allows safe, rapid connection of the 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, the latches automatically release the 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



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.



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*Skid-steer loader deposits mineral sands into the 2.5 m<sup>3</sup> capacity hopper while the screw conveyor moves the material to the bulk bag fill head.*

injuries,” Pascoe says. “We were concerned about workers being exposed to dust in the storage sheds, but the filler discharge chute contains all dust.”

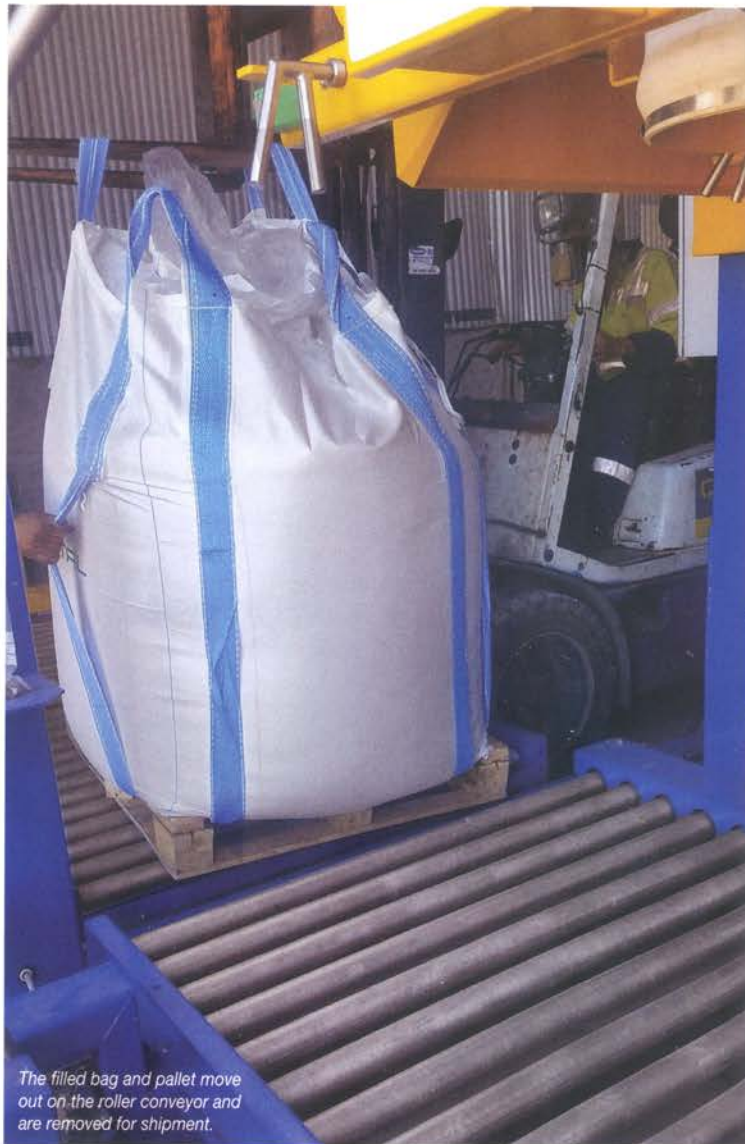
**Automated control**

The unit’s PLC automates everything except connecting of the bag straps to the latches and pulling the bag spout over the deflated spout seal. “It’s all programmed, and its accuracy has been impressive,” Pascoe reports. “All you have to do is set the PLC for 1,000 kg or 2,000 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.

Qube Bulk, a division of Australia’s largest provider of import and export logistics services, manages more than 20 million tonnes of bulk product shipments per year.

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



*The filled bag and pallet move out on the roller conveyor and are removed for shipment.*



*A touch-screen interface on the PLC allows program setup and activation of filling cycles.*



*A pneumatically operated product sampler captures a 142 g specimen from the material stream for product quality documentation.*