



Bulk bag emptier, buffer hopper and Pneumatic Conveying Vessel (PCV) during commissioning.

# Kockums designs Cockburn Cement transfer station

At its Port Hedland facility, Cockburn Cement needed to transfer bulk bags of cement into silos at 50 tonnes per hour for subsequent distribution by pressure discharge road tanker.

**K**ockums Bulk Systems devised a solution whereby bulk bags are lifted into a discharge hopper with cutting knives. As the bulk bag is lowered onto the knives, the bottom is slit fully, and the product released directly into the receiving hopper. From there, the product is transferred into a buffer hopper via a screw conveyor.

The buffer hopper allows for continuous operation as it feeds the batch Pneumatic Conveying Vessel (PCV). The PCV of two cubic metres capacity transfers the powder by a pipeline directly to the 600 tonne capacity silo nest externally via a 125 mm conveying line and a Kockums KH46 pneumatic conveying air power pack.

Pressure discharge road tankers fill directly from the silos then transport and deliver the cement to a client's site silos.

"The whole system is automated, including the filling process of the silo nest. When one silo is filled, the system automatically

Silo nest for tanker loading.



switches to the next silo in sequence," said Colin Powers of Cockburn Cement.

## Relocateable system

To eliminate the need to dig a pit deep enough to house the PCV, a screw conveyor is used to transfer cement from the bulk bag discharger to the buffer hopper for the PCV. Using this method, the whole system may easily be relocated to another site if needed.



Bulk bag of cement entering bag slitter.



55kw power pack for pneumatic conveying, with instrument air compressor behind.

### Specialised equipment

The bulk bag discharger is fitted with a diaphragm and two air filter/fan units to collect dust generated during the cutting operation.

“The cutting operation is so efficient that the bag is drawn clean from the hopper, thus preventing dust cloud generation during the disposal of the bag remnant,” explained Ivan Price, managing director, Kockums Bulk Systems. “By this process, a major difficulty of handling bulk bags related to airborne dust is overcome.”

The two cubic metre capacity PCV and buffer hopper together make a continuous conveying system. As the PCV discharges powder to the remote silos, the buffer hopper is being refilled from the screw conveyor. The moment the conveying is complete from the PCV, the fill valve opens, and the SonoPulse system ensures a very fast fill of the PCV ready for the next discharge to occur.

The highly efficient dense phase PCV discharged to the silo nest at the rate of 60 tonne per hour during the commissioning phase.

“This vessel and the line size are chosen to suit the rate the client requires, and in this case the client’s design rate to feed the system is 50 tonne per hour resulting from the constraint of the crane handling time for the bulk bags,” said Ivan Price. ■

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Left: Clean remnants of bag, with no dust.

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# Alternative PCV transfer systems

Kockums Bulk Systems has supplied a number of systems in Australasia in recent years for the transfer of product from bulk bags to silos, to enable bulk pressure discharge road tanker deliveries of products. Generally, the bulk bags have arrived at the transfer site in 20ft containers.

Some conventional installations have used a fork-lift truck to load a bulk bag emptier. The screw conveyor is again utilised to transfer the product to a buffer hopper mounted above a Pneumatic Conveying Vessel (PCV).

Using a more direct method, the bulk bag discharge unit is mounted at ground level for quick and easy access by the fork truck operator. So, in this case, the PCV is mounted in a pit directly under the bulk bag discharger. The driver loads a bag into the PCV then sends a start signal for the product to be pneumatically conveyed to a silo.

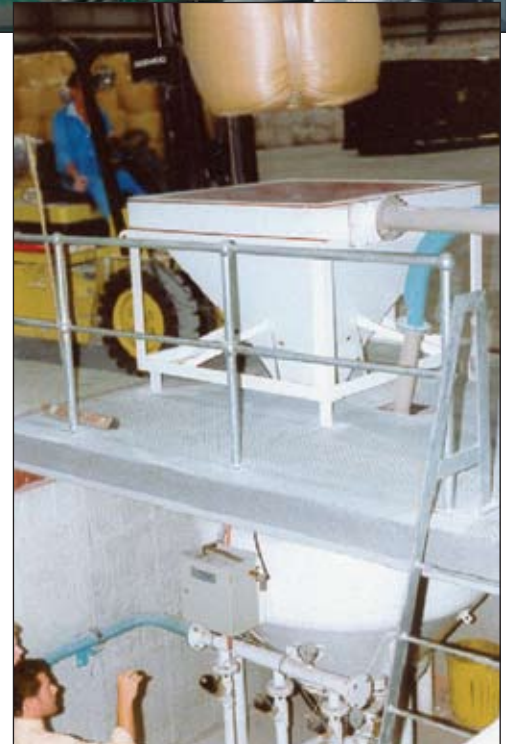
In the meantime, the driver disposes of the spent bag, and collects a fresh bag to be taken to the bulk bag emptier. By the time the driver returns and commences the cutting operation, the last load has been conveyed to the silo, and the PCV is in standby mode awaiting a further charge.

This system has the advantage of omitting a screw conveyor, so there are less maintenance items, and it is easier to clean the system if changing to another product.

According to Kockums Bulk Systems, the PCV transfer system utilising dense phase transfer is a very economical and



Above: The more conventional method of loading a bulk bag emptier by using a fork-lift truck.



Right: Using a pit for the Pneumatic Conveying Vessel (PCV) eliminates the need for a screw conveyor.

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low maintenance method of loading silos. The PCV is controlled by a PLC enabling an automatic basis of operation, with the conveying air compressor being brought on line by the control system as required. The system recognises a load in the PCV and initiates the transfer, generally by a high level control, but in the pictured pit model, it may occur by a signal from an operator.

"These systems are built for rugged continuous operation, with minimum need for service and maintenance," concluded Ivan Price.

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