

# Containerized Bulk Handling

- This section contains information on alternative systems for handling bulk commodities.

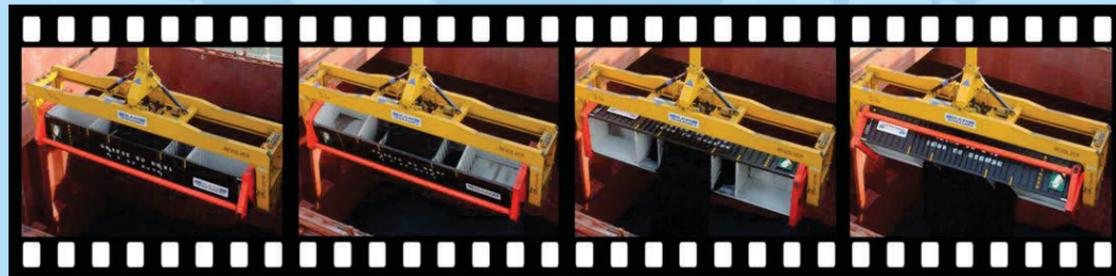


**RAM**  
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# Containerized Bulk Handling



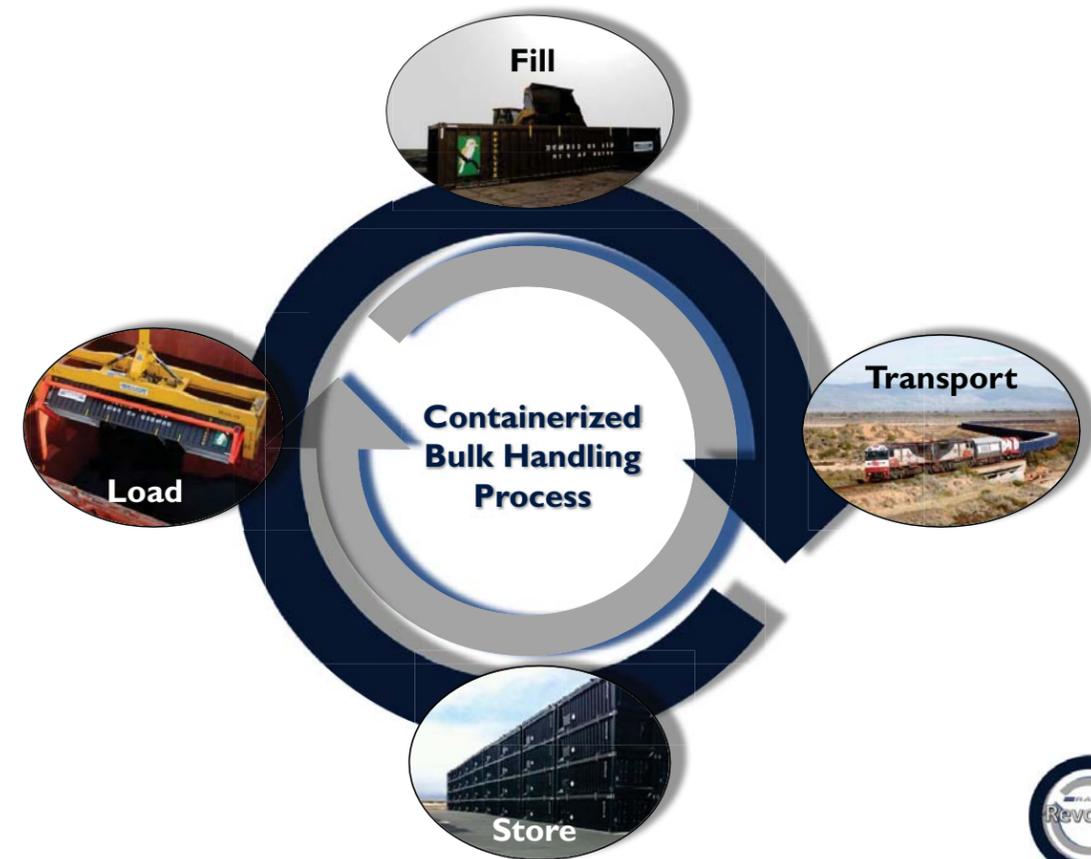
[www.ramspreaders.com](http://www.ramspreaders.com)

[www.cbhgroup.org](http://www.cbhgroup.org)

[www.pittoship.com](http://www.pittoship.com)



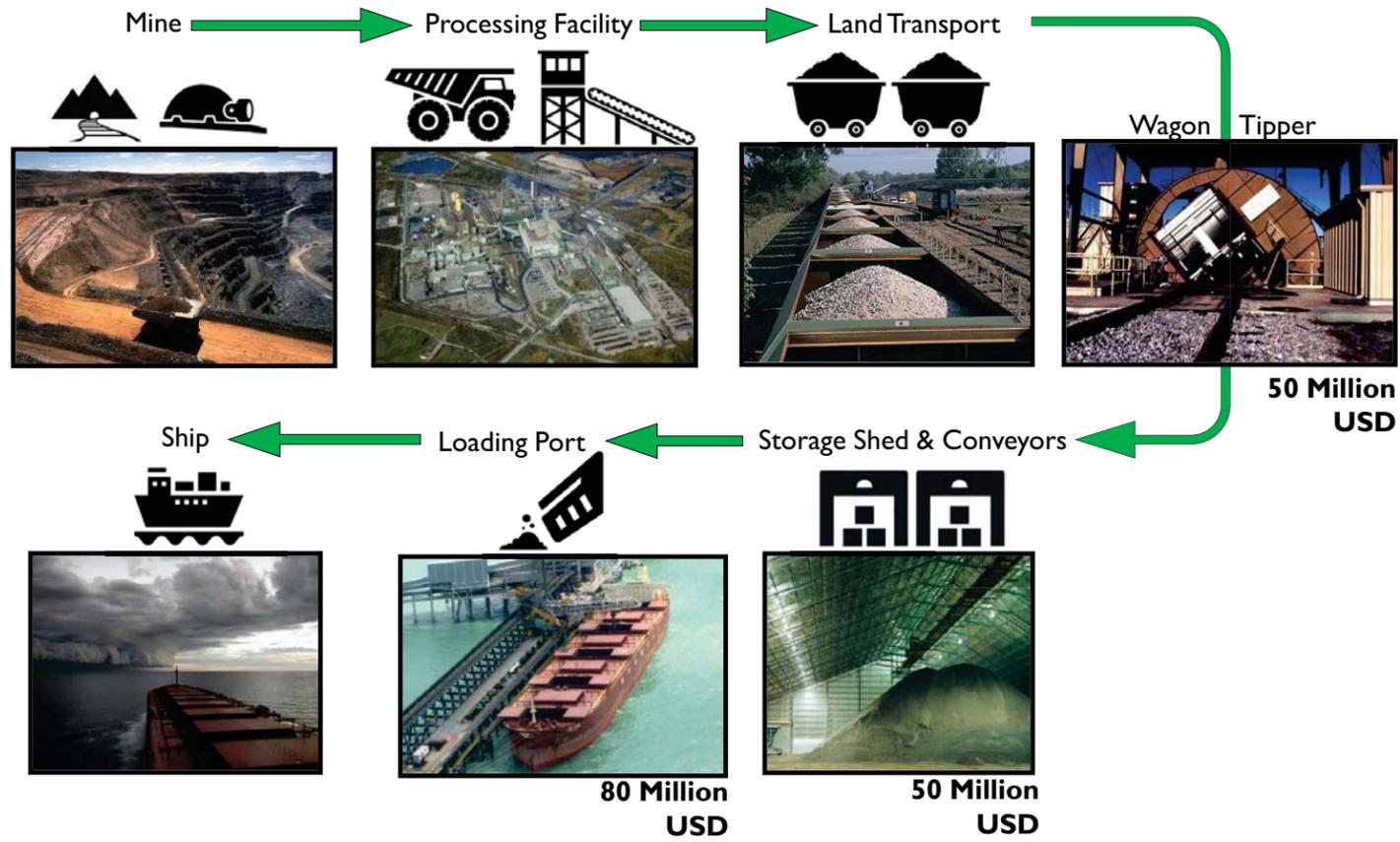
## Containerized Bulk Handling





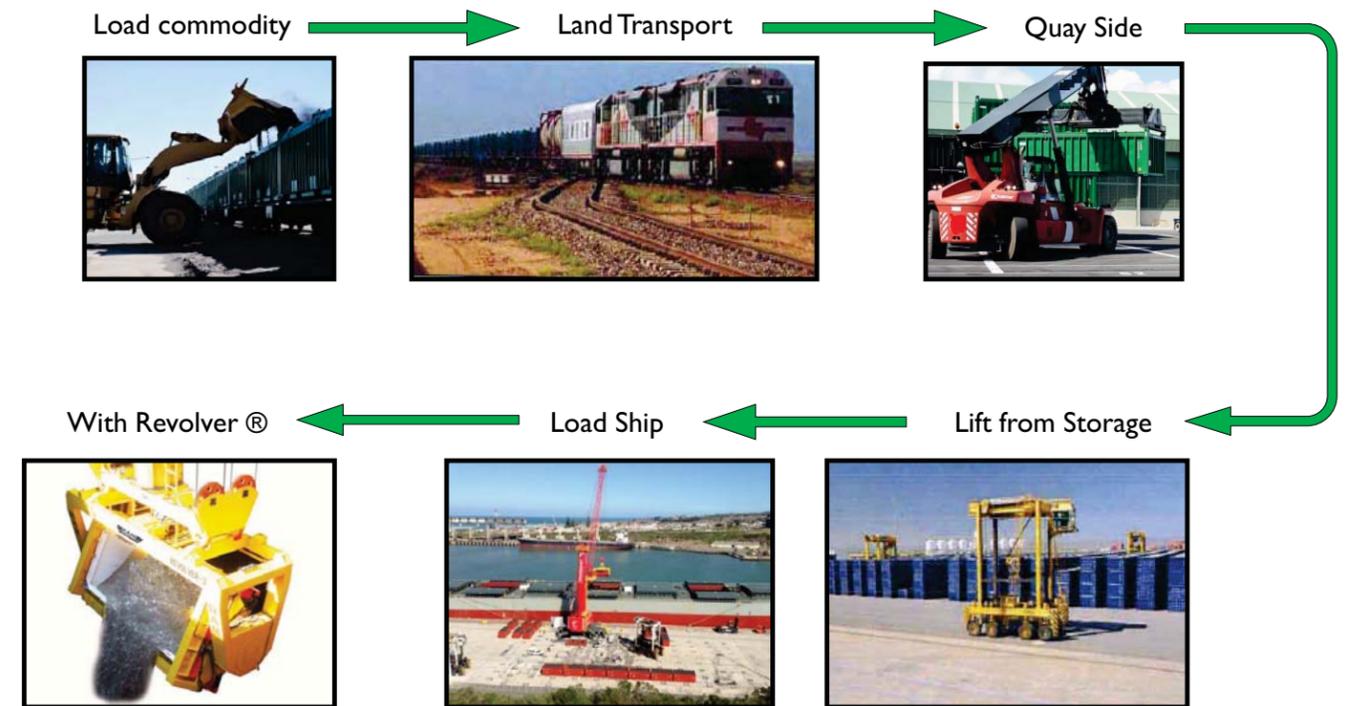
# Containerized Bulk Handling

## Process - Conventional



# Containerized Bulk Handling

## Process





## Containerized Bulk Handling

### Equipment: Integrated Approach



## Revolver Product Range

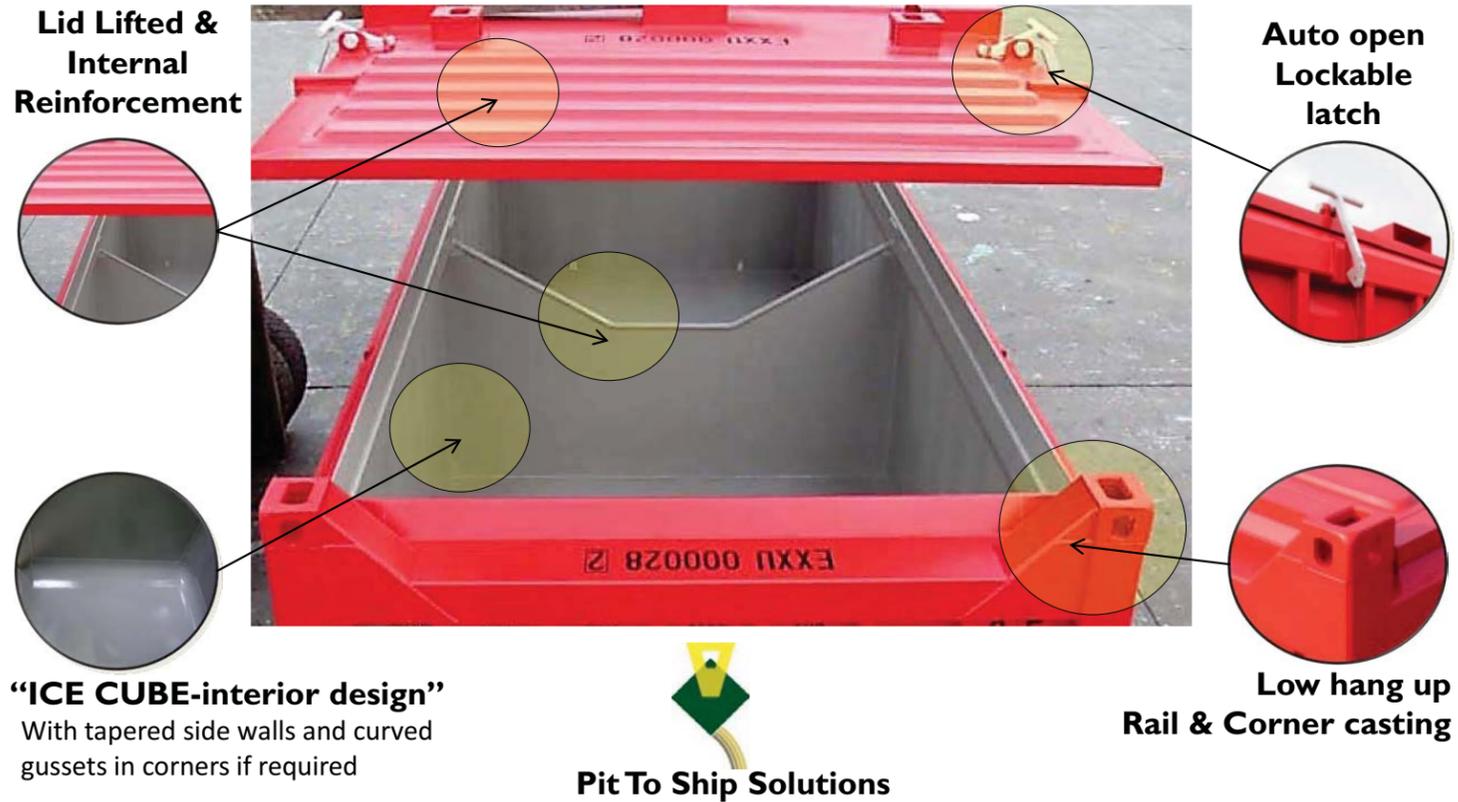
### Equipment: Revolver®





## Containerized Bulk Handling

### Equipment: Containers



## Containerized Bulk Handling

### Equipment: Dust Suppression





Containerized Bulk Handling

## Equipment: Ancillary



**Cranes**



**Mobile Equipment**



**Revolver Specific Trailer**



Containerized Bulk Handling

## Consultants

### Important, WHY?

- They recommend us in studies
- They help us in implementation
- They promote our solution
- They Innovate





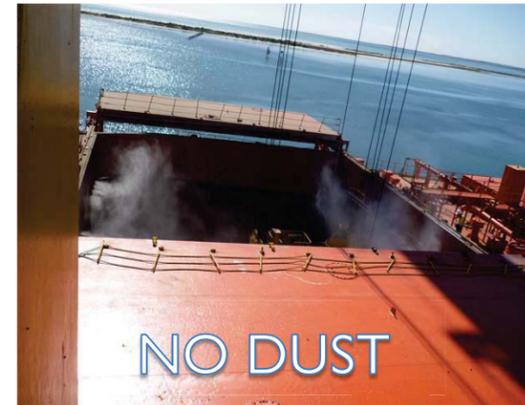
## Environment

### Conventional Operations



## Why we are **green**

- Tips at bottom of hatch so less dust
- Less dust than ship loader as it doesn't displace as much air
- No open stock piles
- No clean down of ship loader between commodities



**In many cases, new projects won't be approved without the lower environmental impact**



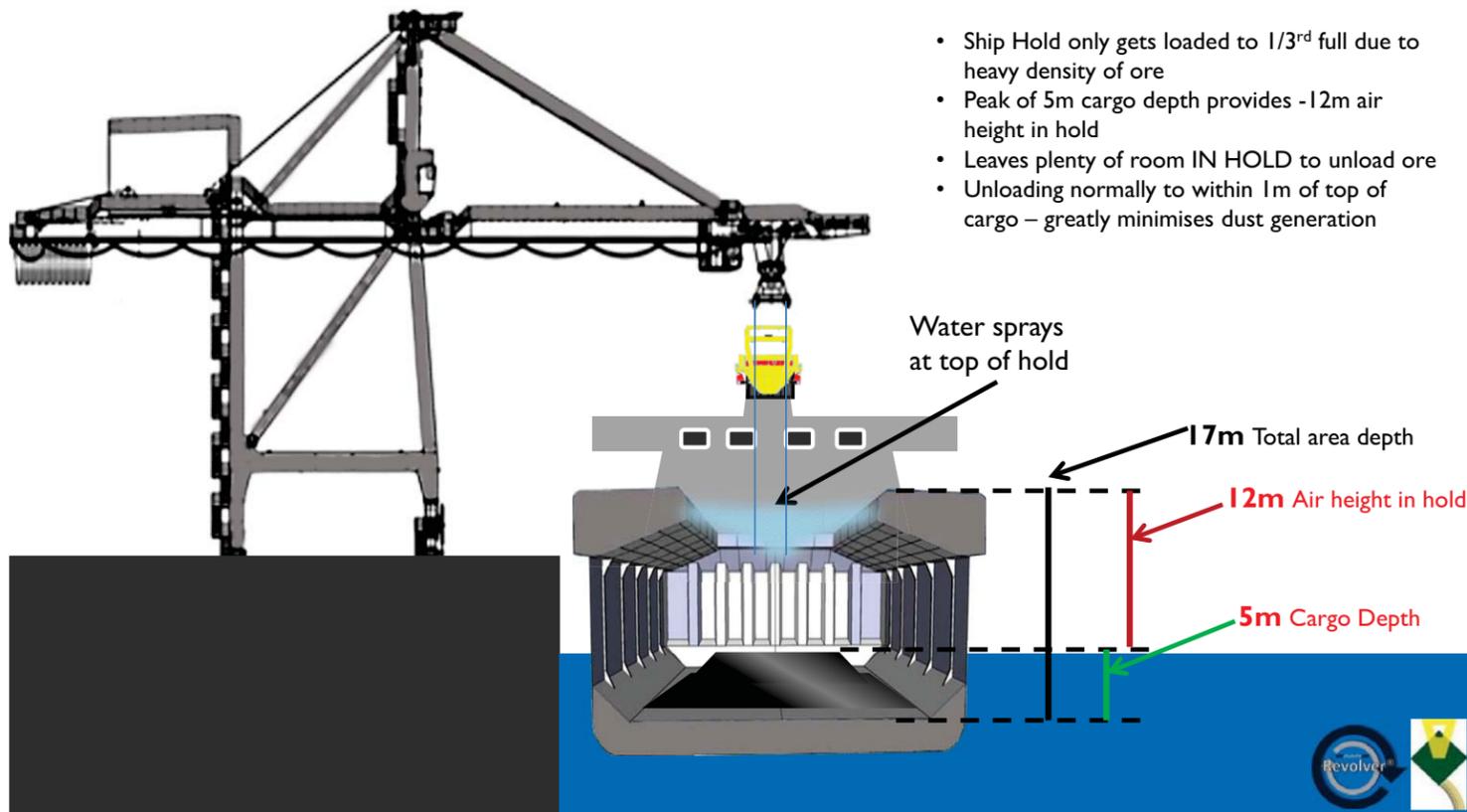


## Containerized Bulk Handling

### Environment

**Rotary unloading virtually no dust generated.  
Cleanest Iron Ore loading system available.**

- Ship Hold only gets loaded to 1/3<sup>rd</sup> full due to heavy density of ore
- Peak of 5m cargo depth provides -12m air height in hold
- Leaves plenty of room IN HOLD to unload ore
- Unloading normally to within 1m of top of cargo – greatly minimises dust generation



## Containerized Bulk Handling



### Why is it needed?

- No Bulk Loader
- No Dust Allowed
- No Capacity
- No Route to Market

### Reasons why it is good

- Low Capital
- Fast to set up =6 Months
- Zero Dust





## Containerized Bulk Handling



Fill



Transport



Store



Load

### System Benefits:

#### Cost

- Lower set up costs (No conveyor, ship loaders, storage sheds) less cost

#### Environmental

- Less dust, less clean up
- This process is considered best practice by EPA with fast approval

#### Safe & Fast

- Virtually man less operation that has loading rates of 1700 TPH per crane

#### Proven & Reproducible

- All three equipment providers have worked to provide a simple proven turnkey solution to exporters



## Containerized Bulk Handling

### Materials Handled



- Grains
- Wood Chip
- Coal
- Iron Ore
- Mineral Sands
- Copper Concentrates
- Scrap Metal
- Bagged Material





## Containerized Bulk Handling

### Business Case Costing Capital

#### MHC model

- Cranes=8 million
- Containers (30 pce)= 300K
- CHE= 500K
- Revolvers= 1.5 Million.



10 Million

#### Ships crane model

- Revolvers=800K
- Containers=200K
- CHE =lease



1 Million



Gray Bulk Concepts



## Containerized Bulk Handling

### CBH Projects



### DPW Maputo

Multi commodity  
Compartment container

- Coal = 40T
- Iron Ore = 40T
- Chrome Ore





Containerized Bulk Handling

## CBH Projects



### Exxaro Congo

- MHC Crane
- Lid lifter
- 44T capacity



Containerized Bulk Handling

## CBH Projects



### Ironclad Ships Crane





Containerized Bulk Handling

## Join the revolution

### Companies

- Exxaro
- Grinrod
- DP World
- Eletheni/ SNR
- BHP B
- Oz Minerals
- Hillgrove Copper
- Transnet
- FQML
- TPR Argentina
- Ironclad



Containerized Bulk Handling

### Case Studies

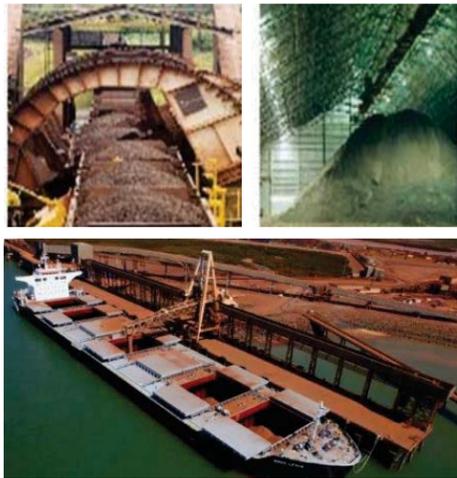


## Containerized Bulk Handling

### Case Study Hi Volume IMX Mining

#### Option 1

New Bulk Loading Infrastructure  
Capital Cost= \$150-250 Million



#### Option 2

Containerised Bulk Handling Process  
Existing Container Port  
Capital Cost= \$2 Million



## Containerized Bulk Handling

### Case Study Hi Value – OZ Minerals

Class 9 dangerous goods and marine pollutant  
Copper Concentrate =\$10K per tonne

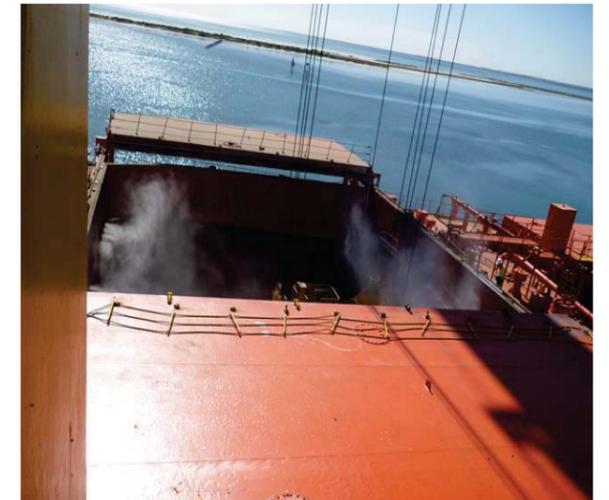
#### Option 1

Conventional process  
5% loss as dust



#### Option 2

Containerized Bulk Handling Process  
Zero dust





## Containerized Bulk Handling

### Case Study Coal in Maputo

#### Option 1

Conventional process  
Skips = 150 tonnes per hour



#### Option 2

Containerized Bulk Handling Process  
Revolver® & MHC = 800 tonnes per hour



## Containerized Bulk Handling

### Contact us:

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Email us at: [sales.uk@ramspreaders.com](mailto:sales.uk@ramspreaders.com)



[www.ramspreaders.com](http://www.ramspreaders.com)

Visit: RAM Spreaders to view the Revolver® and their comprehensive range of container lifting equipment



[www.pittoship.com](http://www.pittoship.com)

Visit: Pit To Ship Solutions to view their comprehensive range of bulk handling containers



**Containerized Bulk Handling Group**

Pit to Ship Export Solution

[www.cbhgroup.org](http://www.cbhgroup.org)

Visit: Containerized Bulk Handling Group to see the full Containerized Bulk Handling Process





**Bulk Handling Facility of the Year (Resources and Infrastructure) winter**

[Australian Bulk Handling Review, National](#), Supplements 01 Dec 2014

Page 20 • 247 words  
Photo: Yes • Type: News Item • Size: 835.00 cm<sup>2</sup> • National • Australia • OZ Minerals - Press • ID: 356507964

Sponsored By Bulk Handling Facility of the Year CONTROL SYSTEMS TECHNOLOGY (Resources and Infrastructure) Flinders Logistics and OZ Minerals One of the night's most prestigious awards, Bulk Handling Facility of the Year (Resources and Infrastructure), went to Flinders Logistics and OZ Minerals. Flinders and OZ Minerals were selected by the judges from a pool of four finalists, which also included Ahrens Group, Allied Grain Systems, and Aurecon Australia and Queensland Sugar.

[Read full text - View print article](#)

**Keywords** 5,837 CIRCULATION

mine(2),OZ Minerals(5),Prominent Hill(2)

**All the winners from the 2014 Bulk Handling Awards**

[Australian Bulk Handling Review, National](#), General News 01 Dec 2014

Page 14 • 1148 words  
Photo: Yes • Type: News Item • Size: 2,066.00 cm<sup>2</sup> • National • Australia • OZ Minerals - Press • ID:

On Thursday, November 6, more than 200 members of Australia's bulk handling community and their guests gathered at Doltone House, by Sydney's Darling Harbour. They were there to celebrate the industry's finest projects, initiatives, technologies and individuals, at the 2014 Australian Bulk Handling Awards. Ti Tedia personality and musician James Valentine served as IVAmaster of ceremonies for the evening. Coining the term 'The Bulkies', Valentine entertained the audience with anecdotes, quips and his own, idiosyncratic insights into the sometimes arcane world of bulk handling.

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**Keywords** 5,837 CIRCULATION

mine(8),miner(2),Mining(1),OZ Minerals(2),Prominent Hill(1)

**Case Study: Exporting copper concentrate from Port Adelaide**

[Australian Bulk Handling Review, National](#), General News 01 Dec 2014

Page 46 • 1152 words  
Photo: Yes • Type: News Item • Size: 1,942.00 cm<sup>2</sup> • National • Australia • OZ Minerals - Press • ID:

Working in close partnership with copper miner OZ Minerals, Flinders Logistics has developed Inner Harbour Berth 29 in Port Adelaide into a bulk handling facility that offers some of the highest standards of environmental and safety management for stevedoring bulk commodities in Australia, the logistics operator told ABHR. OZ Minerals located and operates an open pit Adelaide in copper owns the Prominent Hill gold mine, 650km north-west South Australia. The operation consists of mine and underground mine, with a second underground mine in development.

[Read full text - View print article](#)

**Keywords** 5,837 CIRCULATION

mine(4),miner(1),miners(1),OZ Minerals(19),Prominent Hill(5)

Bulk Handling Facility of the Year  
(Resources and Infrastructure)

Sponsored By



Winner

Flinders Logistics and  
OZ Minerals

One of the night's most prestigious awards, Bulk Handling Facility of the Year (Resources and Infrastructure), went to Flinders Logistics and OZ Minerals. Flinders and OZ Minerals were selected by the judges from a pool of four finalists, which also included Ahrens Group, Allied Grain Systems, and Aurecon Australia and Queensland Sugar.

OZ Minerals operates the Prominent Hill copper-gold mine, 650km northwest of Adelaide in South Australia. Flinders worked with OZ to develop a pit-to-port supply chain for the mine's copper concentrate, which resembles a fine black powder.

Concentrate is loaded into special, lockable containers at Prominent Hill. These are moved by road to a rail head and then by train to Flinders' specialist bulk handling facility at Berth 29 of Port Adelaide's Inner Harbour.

There, the bespoke 20-foot containers are tipped into ships. To minimise dust during this process, Flinders has refined its misting system. Its patented DF Misting system uses lightweight fans to provide complete coverage of a vessel's hatch; nozzles producing tiny droplets ensure that no dust escapes.

Flinders has also automated the handling of containers on the wharf during ship-loading and installed noise control systems.



Daniel Sloan, manager of operations for Flinders Logistics (left), accepts the award from Ian Burrell from Control Systems Technology.



Flinders Logistics' rotating container tippler empties OZ Minerals' copper concentrate into the hold.



DF Misting - four fans provide dust suppression across the cargo hatch.



AWARDS

## All the winners from the 2014 Bulk Handling Awards

On Thursday, November 6, more than 200 members of Australia's bulk handling community and their guests gathered at Doltone House, by Sydney's Darling Harbour. They were there to celebrate the industry's finest projects, initiatives, technologies and individuals, at the 2014 Australian Bulk Handling Awards.



Australian bulk handling industry members and their guests enjoying the 2014 Australian Bulk Handling Awards at Darling Harbour, Sydney.

Media personality and musician James Valentine served as master of ceremonies for the evening. Coining the term 'The Bulkies', Valentine entertained the audience with anecdotes, quips and his own, idiosyncratic insights into the sometimes arcane world of bulk handling.

ABIR editor, and judging panel moderator, Charles Macdonald, said the Awards' ninth annual instalment was without doubt the best yet held.

"The Awards were closely contested, and attendees had a great time on the night," Macdonald said. "As category winners were announced, there was celebration in parts of the room. Others, inevitably, were quieter. But the networking was intense, and I'm sure many new contacts were made, and fruitful associations hatched."

The finalists, winners and those highly commended were as follows:

### Innovative Technology

#### WINNER: Sandpit Innovation and Lewis Australia

WHY: Sandpit's robotic idler roller change-out robot, 'The Spidler', was selected by the judging panel for the Innovative Technology award due to its efficient and clever solution to a common problem in the bulk handling industry.

The Spidler is a rail-mounted robot designed to straddle an industrial conveyor, such as the ones found on mine sites and bulk export facilities.

Using robotic arms and its own system of idlers, the Spidler is able to lift a portion of a conveyor belt off its rollers, while the conveyor is still in operation.

Once the belt is lifted, a robotic arm swings down and replaces one or more of the conveyor's idler rollers.

#### HIGHLY COMMENDED: Cooperative Vision Systems

WHY: Cooperative Vision Systems developed a technology called the Visual Displacement System, which helps with the accurate loading of bulk rail wagons. The system uses cameras beside the rail track, and special barcode type tags on the wagons, to measure - to fractions of a millimetre - the displacement of wagons during loading.

FINALISTS: Advanced Spiral Technology, Ahrens Group, Aspec Engineering, Cooperative Vision Systems, Elastotec and Sardvik, Flexco Australia, GPSat Systems Patrick Ports and Stevedoring and RAM Spreaders, Sandpit Innovation and Lewis Australia, Technostat, WA Betting Solutions.

#### Dust Control Technology, Application or Practice

#### WINNER: Proof Engineers

WHY: Proof Engineers' Proof Mobile Dust Monitor was recognised for its clever method of assessing the extent of dust around haul roads on mine sites and other resources operations.

The monitor is a box that can ride on any light vehicle. It uses

light-scattering technology on tiny dust particles and then transmits data via 3G to Proof's servers for analysis. Through this analysis, mine operators can view results displayed in colour-coded graphs, which recommend action at various parts of the mine, whether it be extra watering, road maintenance, or other measures.

FINALISTS: Camfil Australia, Patrick Ports and Stevedoring and RAM Spreaders, Proof Engineers.

### Excellence in the Application of Gears, Motors or Drives

#### WINNER: Bonfiglioli Transmission (Australia)

WHY: Bonfiglioli helped Rio Tinto enhance its rail capacity in the Pilbara with the supply of helical bevel gear units to the miner's rail welding facility in Karratha, northern WA.

Rio, in expanding its output to 295mtpa, tasked Bellingham Engineering with expanding the huge rail welding facility. Bonfiglioli has supplied its A-Series gear units to the Karratha project, where they power 27 hoists that can lift up to 400 metres of rail at once.

FINALISTS: Bonfiglioli Transmission (Australia), Ermin Vibratory Equipment, LINAK, SEW-Eurodrive.

### Supplier of the Year

#### WINNER: Jacmor Engineering

WHY: From humble beginnings in founder Jack Morris' friend's garage in 1949, Jacmor built its first screw conveyor in the early 1960s, and this became a specialism the firm retains to the current day. The design and manufacture of screw conveyors which are often used to handle heavy and demanding materials.

FINALISTS: Jacmor Engineering, Advanced Spiral Technology, Aspec Engineering.

### Environmental Project of the Year

#### WINNER: Aurecon Australia and Queensland Sugar

WHY: Aurecon advised on, and then designed and managed the recovery project for Queensland Sugar's Lucinda Bulk Sugar Terminal in the aftermath of Tropical Cyclone Yasi. In February 2011, the structure was severely damaged and had to be repaired and re-commissioned in time for the start of the 2012 sugar season.

In designing for increased resilience, Aurecon had to get a good understanding of the severity and frequency of extreme events. The firm engaged in sophisticated analysis of cyclones, wind fields and waves.

The project lies within the Great Barrier Reef World Heritage Area and demanded exemplary environmental practices from Aurecon and Queensland Sugar.

FINALISTS: Camfil Australia, Patrick Ports and Stevedoring and RAM Spreaders, Proof Engineers, Aurecon Australia and Queensland Sugar.



### Excellence in Engineering Photography

#### WINNER: MINCO Photography

WHY: MINCO founder Damien Carty first discovered an interest in photography about 15 years ago when he was travelling around Australia. In 2005, Carty was working at various mine sites, and decided to combine his love of photography with his mine site experience.

He says he is passionate about photographing infrastructure, machines and people in their work environment, and this passion shines through in his work.

FINALISTS: Archer Imagery, Ashby Martin, MINCO Photography.

### Best Practice in Work, Health and Safety

#### WINNER: CASWA

WHY: CASWA developed AccessPack, an access control system that is finding favour worldwide for companies like BHP Billiton, Rio Tinto, Komatsu, Hitachi and Rolls Royce.

The system uses smart card technology to stop the wrong people using high risk equipment. This improves work, health and safety outcomes by ensuring machine operators have all appropriate tickets.

#### HIGHLY COMMENDED: Mideco Dust Control

WHY: Mine site workers can enter Mideco's de-dusting booth, which it calls the Bat Booth, throughout the working day. The Bat Booth uses low pressure compressed air to safely clean contaminated clothing, freeing it of 50% more dust than traditional methods, according to the company.

FINALISTS: CASWA, Diakon Australia and Consolidated Plastics & Epoxy and Glencox Coal Newlands Complex, Downer EDI Mining and Australian Diversified Engineering, Enerpac, Mideco Dust Control, Technostat Industries, WearX.

### Excellence in Transport and/or Conveying Technology

#### WINNER: Conveyor Technologies

WHY: Alex Harrison, proprietor of Conveyor Technologies, has developed a technology which prevents belt failure and can extend belt life by two or three times the expected life.

The system uses a belt scanner installed on the conveyor to measure damage. Results are streamed over the net to Harrison's HQ, where software converts the signals to actionable information. From his Australian base, Harrison remotely performs 140 scans per year on conveyors in North and South America and Australia.

#### HIGHLY COMMENDED: Parsons Brinckerhoff and KEPCO Australia

WHY: KEPCO is developing the Bylong Coal Project in NSW, and hired Parsons Brinckerhoff to improve the project's economics. Parsons Brinckerhoff came up with the idea of using a two-way conveyor between the project's open cut pit and its coal preparation plant. Such a design is very rare in Australia.

Effectively, one two-way conveyor replaces two standalone conveyors running parallel to one another. The two-way conveyor simultaneously carries coal from the mine on the upper belt, and rejects from the coal washery on the lower belt.

FINALISTS: Air Springs Supply, Air Tip, Conveyor Technologies, Ermin Vibratory Equipment, Flexco Australia, Kilo Engineering, Metso and Boral, Parsons Brinckerhoff and KEPCO Australia, TW Woods Group.

### Bulk Handling Facility of the Year (Resources and Infrastructure)

#### WINNER: Flinders Logistics and OZ Minerals

WHY: Flinders worked with OZ to develop a pit-to-port supply chain for the miner's copper concentrate, which resembles a fine black powder.

Concentrate is loaded into special, lockable containers at Prominent Hill, South Australia. These are moved by road to a rail head and then by train to Flinders' specialist bulk handling facility at Berth 29 of Port Adelaide's Inner Harbour.

There, the bespoke 20-foot containers are tipped into ships. To minimise dust during this process, Flinders has refined its misting system. Its patented DF Misting system uses lightweight fans to provide complete coverage of a vessel's hatch; nozzles producing tiny droplets ensure that no dust escapes.

FINALISTS: Flinders Logistics and OZ Minerals, Ahrens Group, Allied Grain Systems, Aurecon Australia and Queensland Sugar.

### Bulk Handling Facility of the Year (Manufacturing and Processing)

#### WINNER: Metso and Boral

WHY: Metso supplied Boral with a large in-pit crushing system for the latter's Peppertree quarry. Boral says the system will deliver it economic and environmental benefits, primarily through doing away with a large truck fleet.

Weighing in at 285 tonnes and measuring 12m high by 25m in length, the Metso Lokotrack LT160 at Peppertree is the largest mobile crusher in the southern hemisphere.

FINALISTS: Integrated Bulk Systems, Kookums Bulk Systems, Metso and Boral.

### The A.W. Roberts Award

#### WINNER: Andrew Grima

WHY: Recognised by the ASBSH as a young engineer who has made a significant contribution to bulk solids handling in the areas of research, design and/or practice, Grima has worked with BMEA since July 2011.

In his career there he has collaborated on multiple occasions with international companies to complete major projects.

The January/February 2015 edition of ABHR will include a full profile of Andrew Grima.

### Australian Society for Bulk Solids Handling Award

#### WINNER: Brian Moore

WHY: Moore was acknowledged for his outstanding personal contribution to the field of bulk handling. Throughout his lengthy career, he has undertaken a wide range of projects from feasibility through to final engineering and execution within Australia, and globally in such countries as New Caledonia, Canada, Indonesia, India, Sierra Leone and Brazil.

The January/February edition of ABHR will include a full profile of Brian Moore.

Accompanying the November/December print edition of ABHR is a glossy, commemorative edition called 'The Winners', recording all the highlights of the big night.

### 2014 Sponsors



## Case Study: Exporting copper concentrate from Port Adelaide

Working in close partnership with copper miner OZ Minerals, Flinders Logistics has developed Inner Harbour Berth 29 in Port Adelaide into a bulk handling facility that offers some of the highest standards of environmental and safety management for stevedoring bulk commodities in Australia, the logistics operator told ABHR.



An aerial view of Berth 29 at Port Adelaide's inner harbour.

OZ Minerals owns and operates the Prominent Hill copper-gold mine, located 650km north-west of Adelaide in South Australia. The operation consists of an open pit mine and underground mine, with a second underground mine in development.

Prominent Hill produces copper concentrate, a product that resembles a fine black powder. In 2013, Prominent Hill produced 73,362 tonnes of copper and 128,045 ounces of gold. Production guidance for 2014 is between 85,000 to 90,000 tonnes of copper and 130,000 to 140,000 ounces of gold.



The DF Misting system's multi-layer spraying bars in action.

Copper-gold concentrates produced at Prominent Hill are transported by road to a rail siding and then by rail to Port Adelaide. The concentrate is then shipped to customers in Asia and Europe.

Flinders Logistics is a wholly owned subsidiary of Flinders Port Holdings, the same company which owns Flinders Ports and Flinders Adelaide Container Terminal. Flinders Logistics, established in 2012, is a specialist bulk logistics company looking to offer miners pit-to-port export solutions.

Since its launch Flinders Logistics says it has experienced

exceptional growth, quadrupling the amount of bulk mineral cargoes it handles. The company operates at three sites in Port Adelaide:

- a specially designed bulk handling facility at Berth 29 in the Inner Harbour for copper concentrate exports
- common-user areas at Berths 18, 19 and 20 in the Inner Harbour for soda ash imports
- a common-user area at the Outer Harbor for iron-ore exports

OZ Minerals is Flinders' key customer at the Berth 29 bulk handling facility. OZ was looking to export its copper concentrate efficiently, while avoiding double handling and bypassing concentrates sheds and other traditional loading facilities.

Flinders Logistics consulted closely with OZ Minerals and completed a detailed analysis of the export supply chain options from pit-to-ship for OZ Minerals' copper concentrates. This review considered various combinations of road and rail transport and compared conventional bulk transport and storage and containerised bulk options.

### The Flinders/OZ Minerals export operation

Flinders developed a transport and storage solution using containers called the Enclosed Bulk System. Under the system, copper concentrates are loaded into OZ Minerals' containers at Prominent Hill. These containers, featuring secure, locking top lids are then moved by road to a rail head and transported by train to the Berth 29 facility.

The basis of the Enclosed Bulk System is that containers are used to store and transport the copper concentrates, cutting down on handling of the product along the supply chain. The method also cuts the number of transfer points where copper concentrates could be disturbed and escape into the environment. OZ Minerals' containers also feature gravity locks to ensure a fail-safe locking



The Container Spreader Guidance Apparatus helps the container spreader line up above the container more efficiently.

mechanism and robust security, safeguarding against accidental spills of copper concentrates on land transport and during storage.

At the port, Flinders Logistics uses a crane with a rotating container tippler to unload bulk from containers inside a ship's hold.

To combat fugitive dust the company developed its DF Misting dust suppression system, which was first used for Flinders' iron ore tipping operations elsewhere at Port Adelaide. A Flinders Logistics review found that the DF Misting system could be adapted to match the particle sizes and hatch conditions that could occur when loading copper concentrates.

Under the DF Misting system used at the copper concentrate tippler operation, bars are lowered into the ship's hold and positioned there at different levels. The bars generate layers of fine mist of differing depths.

**DUST CONTROL**

Fans enhancing the effectiveness of the DF Misting system.

The containers used in the OZ Minerals export operation are shallower and heavier than standard twenty-foot containers.

Combining the bars with various sizes of nozzles, Flinders Logistics can generate droplets to match the particle size of concentrates and take account of prevailing weather conditions. This results in an extremely fine mist dispersing across the ship's hold to form a natural barrier which contains the dust particles inside the vessel.

DF Misting deploys high-pressure, purified water, which will not calcify and clog the delicate nozzles in the sprayer system. The water droplets in the hold eventually evaporate returning to the water cycle.

OZ Minerals chose enclosed bulk containers and a modified DF Misting system as its supply chain for copper concentrates because it offered the highest available environmental and safety standards.

Intermodal Solutions supplied customised containers for the operation.

Designed to interface with the rotating container tippler, OZ Minerals' bespoke twenty-foot containers are shallower and heavier than regular containers, standing 2.2m high and weighing 3.45 tonnes unladen; heavier than standard twenty-foot containers because they contain an additional smooth internal lining to facilitate unloading of copper concentrates during container tipping.

To complete the process, OZ Minerals and Flinders Logistics liaised with OZ Minerals' other transport stakeholders - Giacci and Genesee & Wyoming - to ensure the new containers could be successfully integrated into the road and rail stages of the supply chain.

Ahead of the first consignment of copper concentrates from OZ Minerals, a new rail spur linking the Berth 29 Bulk Handling Facility to the Australian rail network was constructed.

On top of this, Flinders Logistics also initiated a number of safety and environmental upgrades at the Berth 29 bulk handling facility, including:

- the purchase of a new, additional Terex Gottwald Mobile Harbour Crane, two new Terberg Terminal Tractors and two new Kalmar Reach Stackers
- the development of a fully automated container guidance system to eliminate manual handling of containers on the wharf
- a stormwater management system to reduce pollution risks from stormwater for Port Adelaide's Port River through Berth 29

Flinders says commissioning the new mobile harbour crane, terminal tractors and reach stackers has enhanced its overall business efficiency. Productivity has increased for OZ Minerals and Flinders Logistics' other resources sector clients at Berth 29 because ships now spend less time in port.

New hard stand has been created at Berth 29, providing extra

storage space, allowing for peaks in export volumes or storage requirements for OZ Minerals and other Berth 29 clients.

Flinders Logistics' container guidance system, called the Container Spreader Guidance Apparatus, is designed to eliminate the need for manual handling of containers on the wharf during ship loading.

The development of the new stormwater management system saw the site separated into three catchment areas: southern, central and northern.

Two settling ponds installed in the central and northern areas collect stormwater. The central settling pond holds 753,000 litres while the pond at the northern edge of the bulk handling facility can capture up to 1,008,000 litres of stormwater. A pipe network with a capacity of 200,000 litres serves as storage for the southern area. Any residues collect in these ponds and pipe network through stormwater runoff, for example emissions from vehicles, or dust particles blown into Berth 29 from other stevedoring operators.

The stormwater that is collected is then taken off site for disposal by a licensed waste disposal company.

**Focus on further development**

Since developing the supply chain for copper concentrates through Berth 29, Flinders Logistics and OZ Minerals have continued to work together.

From its inception the DF Misting system has been constantly refined and improved. It now features four different types of nozzles with bespoke filters and a water-wise innovation that has reduced the amount of water used to generate the fine mist spray.

In the last 12 months, Flinders Logistics has worked with OZ Minerals on DF Misting fan technology. In windy conditions, though the system with multi-layered bars was still effective, it was hard to use. On project cargo ships or vessels with very large hatches, it was not always possible to fit the DF Misting bars around the entire hatch and provide complete coverage. On these non-standard vessels and in windy conditions, small amounts of copper concentrate would accumulate on the edge of the cargo hatch.

Several solutions to mitigate this dust problem were trialled, and the DF Misting fan technology was selected.

The DF Misting fans use water pressure rather than electricity to generate a fine mist across the ship's hold. The lightweight fans weigh five kilograms each and can be installed anywhere on the ship's hold, so access limitations on project cargo vessels are avoided. Lightweight and flexible, these fans are safer, easier and faster to install than the DF Misting system's multi-layer bars, Flinders says. Higher water pressure on the fans also makes them more efficient than the bars.

Between four to six fans provide complete coverage of the vessel hatch; twenty bars from the DF Misting multi-layer droplet system would be needed to achieve the same result.

In addition to the fan technology, Flinders Logistics has made a number of in-house improvements for OZ Minerals and other resources sector clients at Berth 29.

These initiatives include a noise reduction system for both Flinders Logistics' mobile harbour cranes. The noise control system fits across the air-inlet fan of each crane, and has cut noise levels around the cranes by almost 60%.

A targeted testing programme for the stormwater is in place to check the contaminant levels of the water collected in the settling ponds. As well as monitoring the quality of the water, this also informs ongoing investigations into stormwater treatment options. Over the last two years, alternatives to the off-site disposal of stormwater have been considered and investigated. This has involved desk-top studies and field trials of bio-filtration and hybrid technologies. The aim is to identify then implement the best option for treating stormwater on site at Berth 29. ■

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



IMX's open-top containers stockpiled at Port Adelaide.

## One million tonnes and counting for IMX Resources

Earlier this year, IMX Resources' previous managing director, Duncan McBain, told ABHR that by utilising a containerised supply chain system, the company only spent \$22m to enter production. It would have cost around \$40m to build a shed and bottom dump facility, McBain said.

Since that discussion, IMX has gone on to export well over 1mt of ore from its Cairn Hill mine, which is located 55kms south east of Coober Pedy. The project's operations manager, Simon Parsons, said the containerised supply chain is a resounding success and has the capacity to cope with production increases.

Parsons ran through IMX's loading rate at port. He said capacity reaches up to 25,000t a day, tipping about 25 containers an hour, with two shipments a month.

"We target a 75,000t cargo per ship and if we can squeeze in a little bit more, then we do. Our record vessel cargo was 80,471 tonnes, which was a new port record also," he said.

"Every 10-14 days a vessel comes in and, depending on how many containers we have hidden away we can turn it around in a week and she's out the door and gone."

IMX leases a fleet of 3,052 specially designed containers to carry ore. Rail haulier Specialised Bulk Rail carries 6,000t of ore from minesite to port, six times a week. Parsons said when IMX was developing the project, the name of the game was to get into production despite the tough climate of the GFC.

"We made the conscious decision with all our suppliers that whatever capital costs they incur they pass onto us as an operational cost.

"So with all our service providers we have signed contracts with them and

they recover their capital over the life of the contract and then we have words in the contract where we can extend things after the initial contract period.

"For a junior would-be producer it was the best way to go, especially during the GFC, we minimised capital expenditure upfront by putting everything into operational expenditure."

Parsons said that getting the environmental approval to commence operations was difficult. However, once production started the Department of Primary Industries and Resources of South Australia (PIRSA) passed IMX on its inspection with flying colours. A misting system lines the rim of the ship's hold to suppress dust, which is the only point ore is exposed to open air in the supply chain.

# Covered Rail Cars

- Cut sheets for two possible rail cars are included.

## ORIGINAL COVER



## COVER OPEN



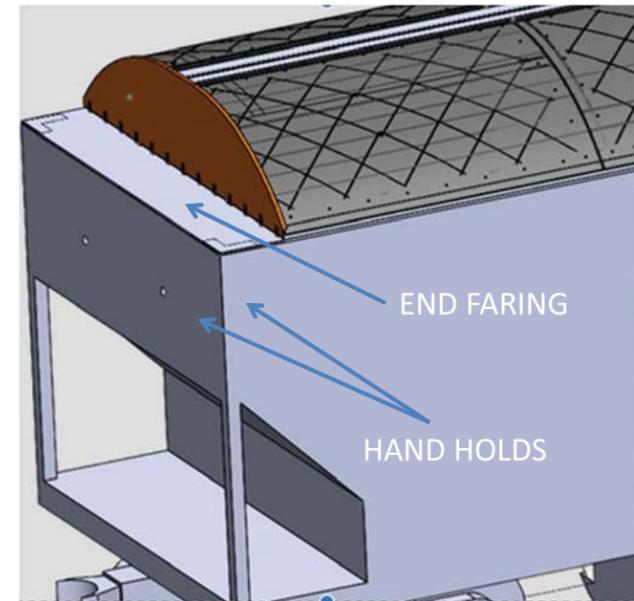
# HAND HOLDS COVERED IN SILO



END CAP OVER HAND HOLDS

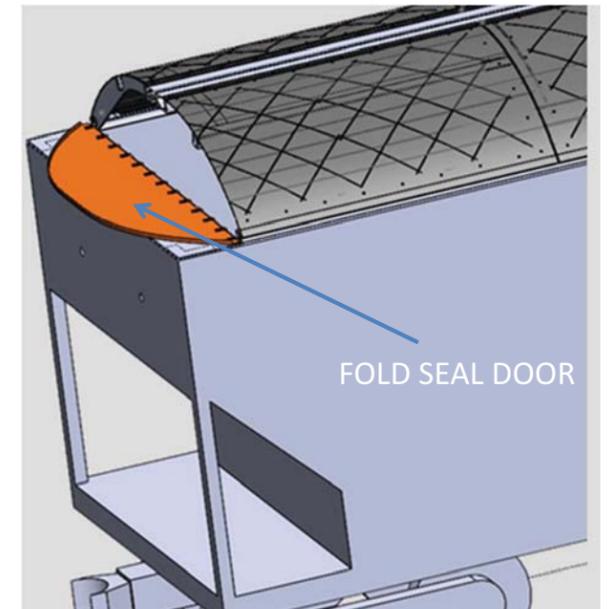
# FARING & DOOR

S-2044



END FARING

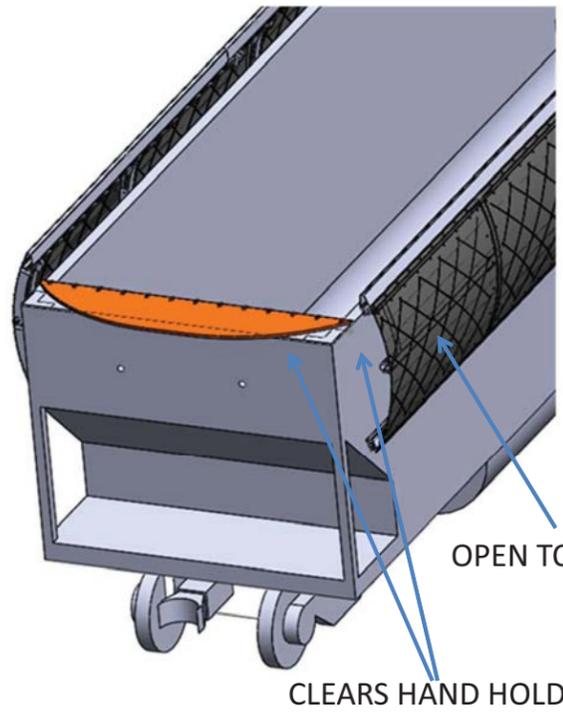
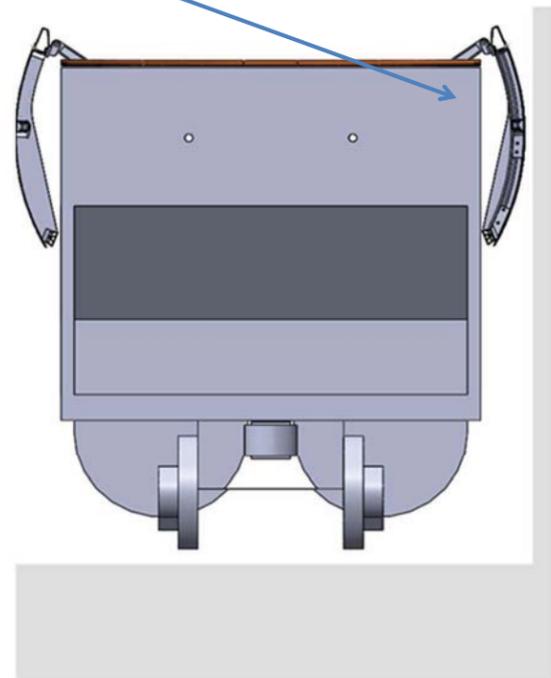
HAND HOLDS



FOLD SEAL DOOR

## COVER OPEN TO LOAD CLEARS HAND HOLDS

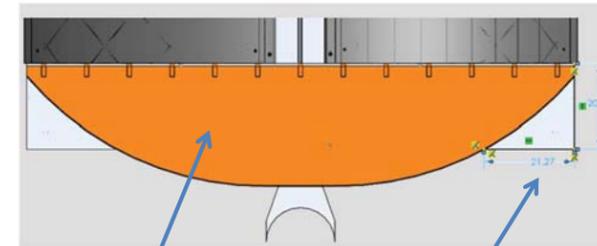
CLEAR HAND HOLDS



OPEN TO LOAD

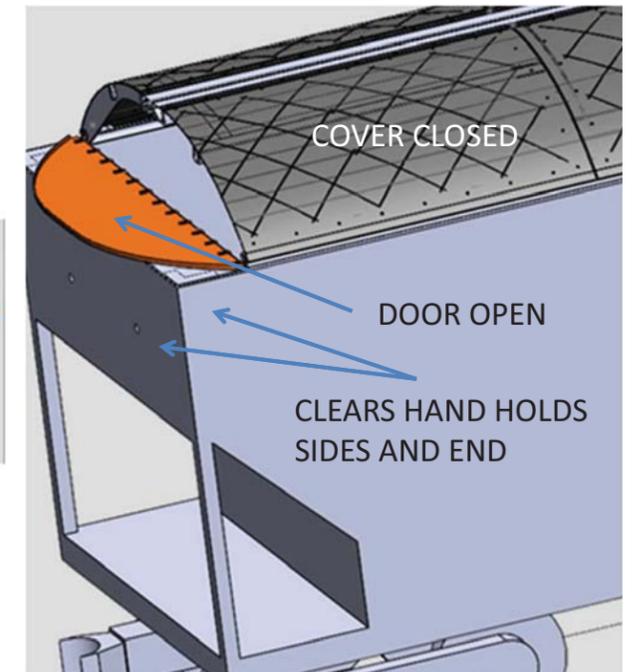
CLEAR HAND HOLDS

## DOOR OPEN TO LOAD



SEAL DOOR

CLEAR HAND HOLDS

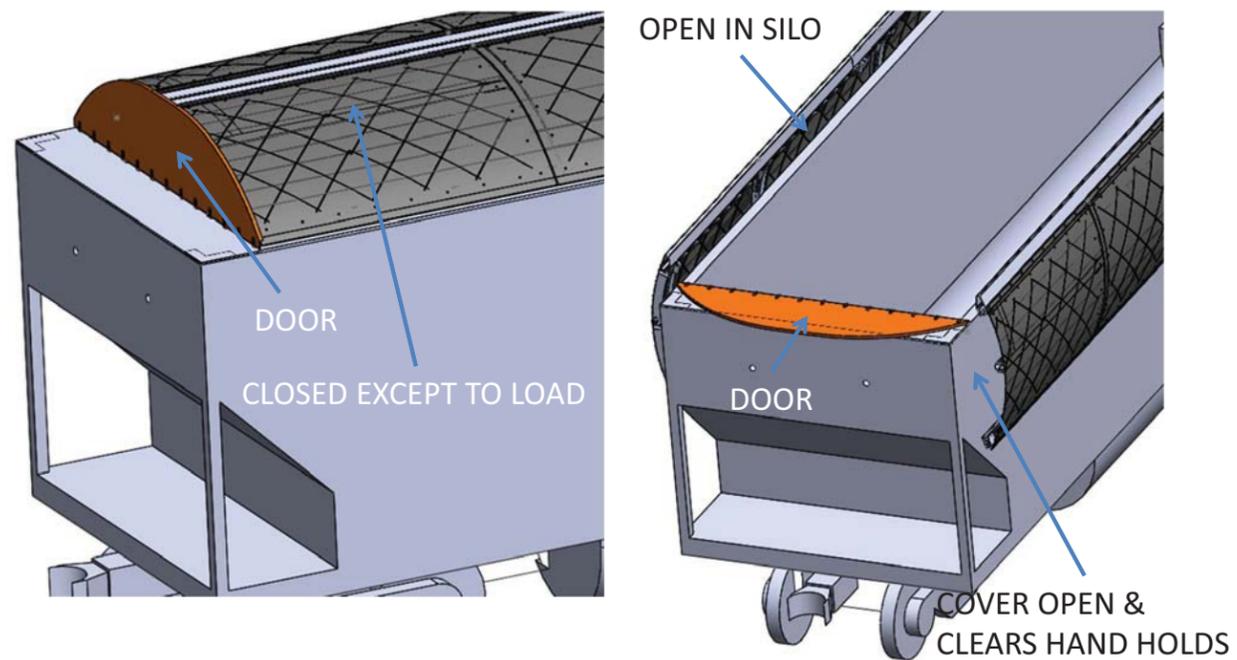


COVER CLOSED

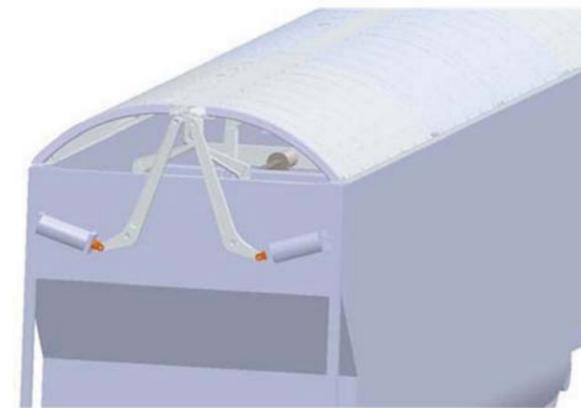
DOOR OPEN

CLEAR HAND HOLDS  
SIDES AND END

## CLOSED & LOADING



## DRIVE CYLINDERS ON THE END



- CAN NOT COVER THE HAND HOLDS
- MAY NEED TO PUT DRIVE INSIDE THE CAR



## 4250 COVERED HOPPER

### DIMENSIONS (APPROX.)

LENGTH, INSIDE .....	42' 8 1/8"
LENGTH, OVER COUPLERS .....	47' 10"
LENGTH, BETWEEN TRUCK CENTERS .....	35' 3 1/2"
HEIGHT, EXTREME .....	15' 6"
WIDTH, EXTREME .....	10' 8"
DISCHARGE GATE SIZE .....	30" X 30"
HATCH OPENING .....	34' 6"
CLEARANCE .....	AAR PLATE C

### WEIGHT/CAPACITY (EST.)

LIGHT WEIGHT .....	57,000 LBS.
GROSS RAIL LOAD .....	286,000 LBS.
LOAD LIMIT .....	229,000 LBS.
CUBIC CAPACITY .....	4,250 CU. FT.

### CURVE NEGOTIABILITY RADIUS

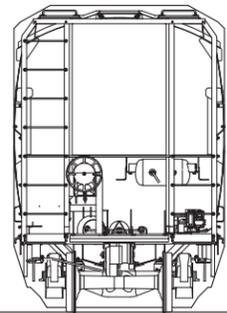
UNCOUPLED .....	150'
COUPLED TO LIKE CAR .....	199'
COUPLED TO BASE CAR .....	197'

DESIGNED AND BUILT TO AAR SPECIFICATION FOR M-1001

THESE GENERAL DIMENSIONS ARE REPRESENTATIVE AND SUBJECT TO CHANGE WITHOUT NOTICE AS REQUIRED BY CUSTOMER SPECIFICATIONS OR DESIGN IMPROVEMENTS BY THE GREENBRIER COS.

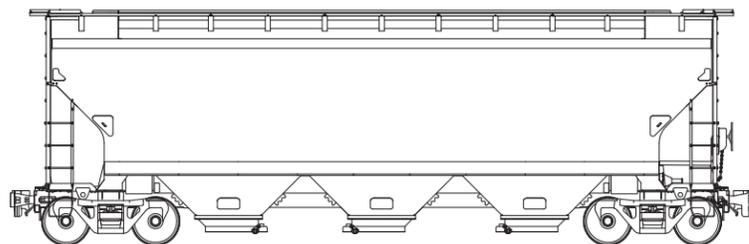
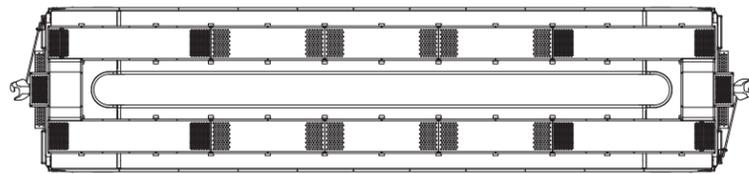
### SODA ASH AND POTASH SERVICE

This 4,250 cubic foot capacity covered hopper car is a curve-sided design with three compartments and outlet gates suitable for soda ash and potash services. This car features the robust strength provided by a through center sill and can be furnished lined. Various roof hatch configurations are available.



There are three different types of roof arrangements on the car:

- 1) Continuous trough (37' 6") (shown)
- 2) Segregated troughs (3 x 10' 4")
- 3) 30" dia. circular hatches



# Enclosed Bulk Material Handling

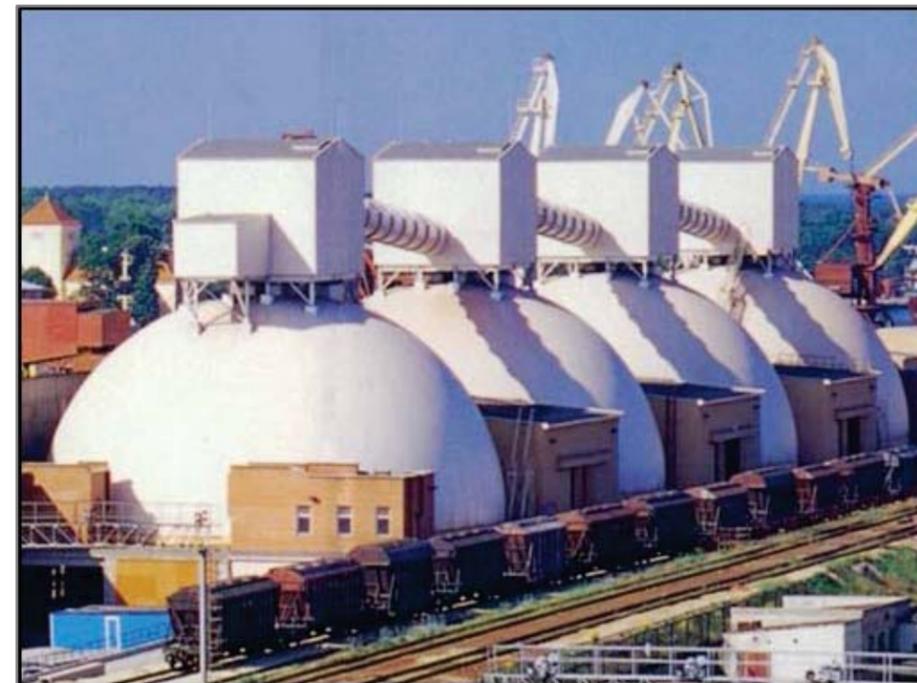
- This section has examples of completely enclosed material facilities.

# Examples of Typical Facility Features

Completely Enclosed Warehouse



Dome Storage



# Examples of Typical Facility Features

Completely Enclosed Shiploader



Dustless Shiploading Spout



# Examples of Typical Facility Features

Railcar Dump Station with Dust Collection Unit

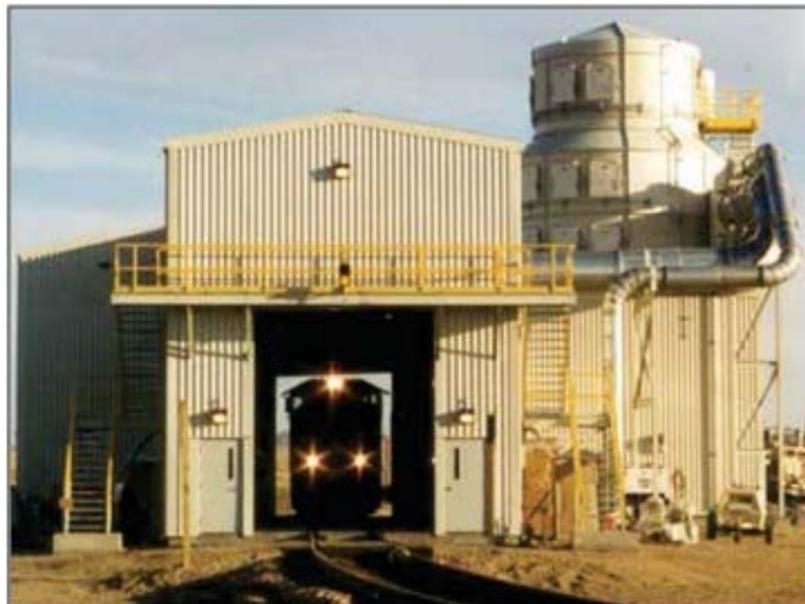


Figure 1. Bottom dump station with dust collection unit. Courtesy of: Aircure

Completely Enclosed Conveyors

