

DUST FREE BULK HANDLING

Case Studies



TOC Europe 2015

- Transfer points
- Vehicles - open wagon & wheels
- Open stockpiles
- Ship loading

Dust is generated at any point in the logistic cycle when energy is added to materials



Open wagons



Open stock piles

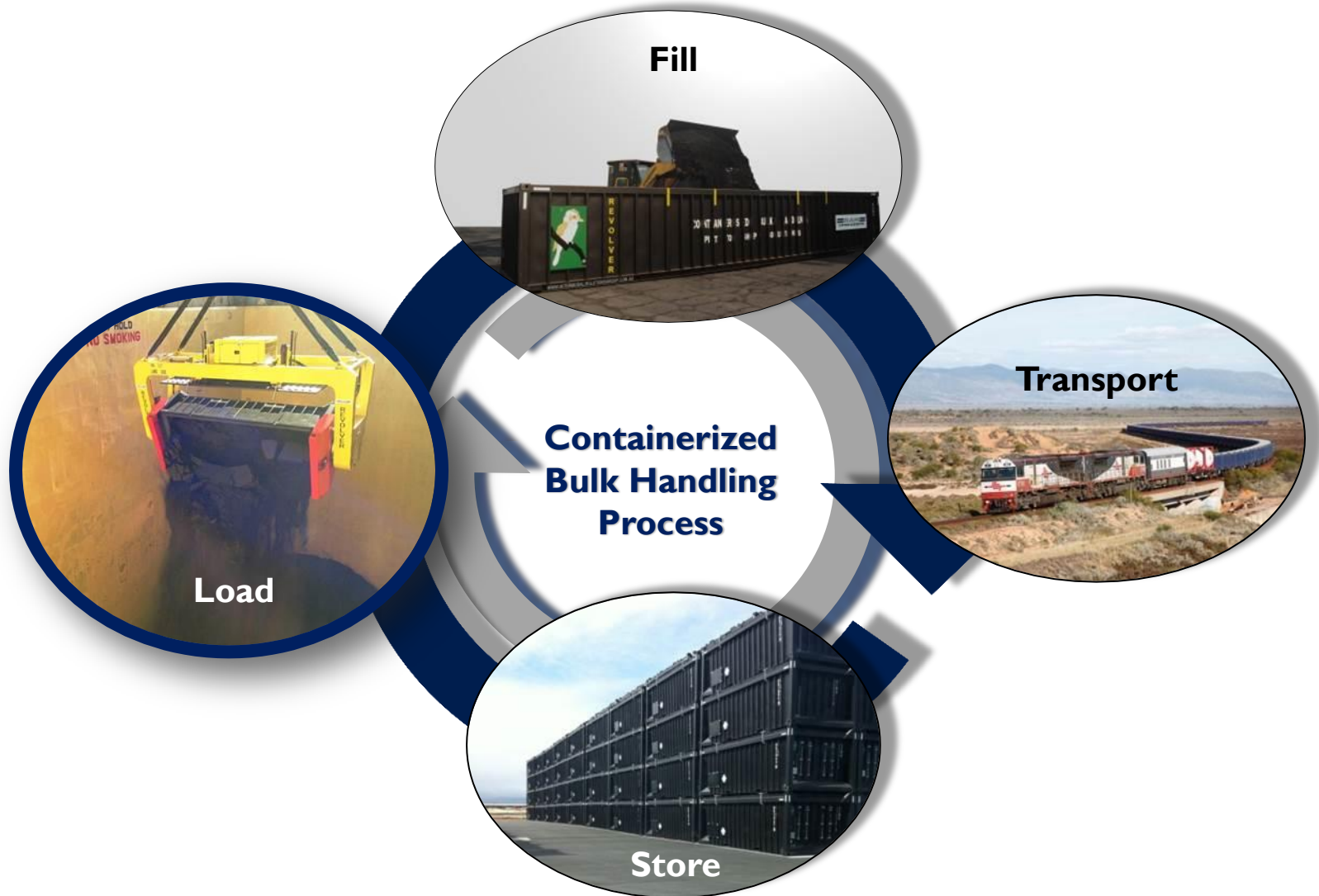


Transfer points and vehicles



Ship loading

CONTAINERIZED BULK HANDLING



CONTAINERIZED BULK HANDLING

PROCESS



Fill

CONTAINERIZED BULK HANDLING

PROCESS



Seal

CONTAINERIZED BULK HANDLING

PROCESS



Transport

CONTAINERIZED BULK HANDLING

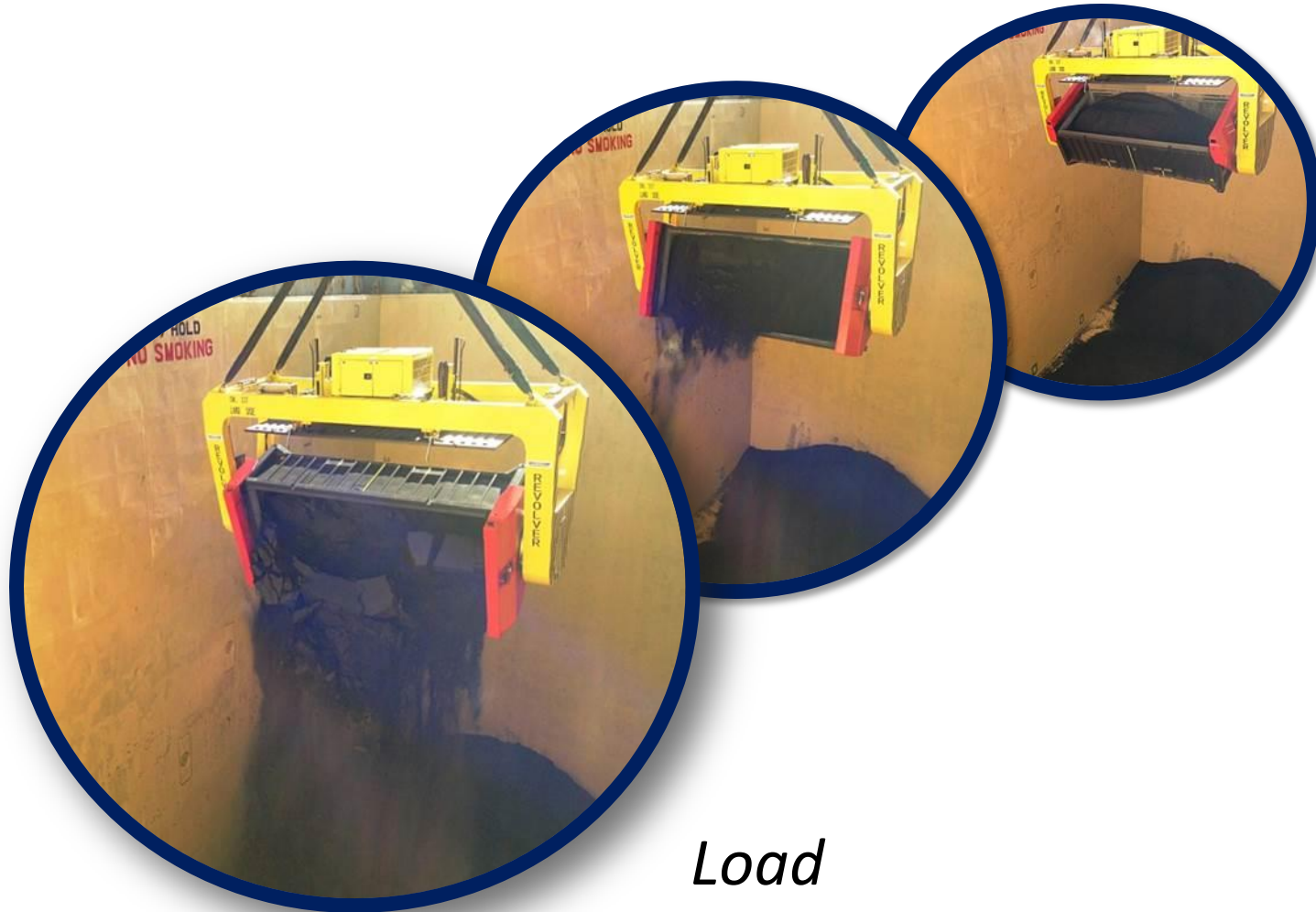
PROCESS



Store

CONTAINERIZED BULK HANDLING

PROCESS



Load

CONTAINERIZED BULK HANDLING PROCESS

PROCESS

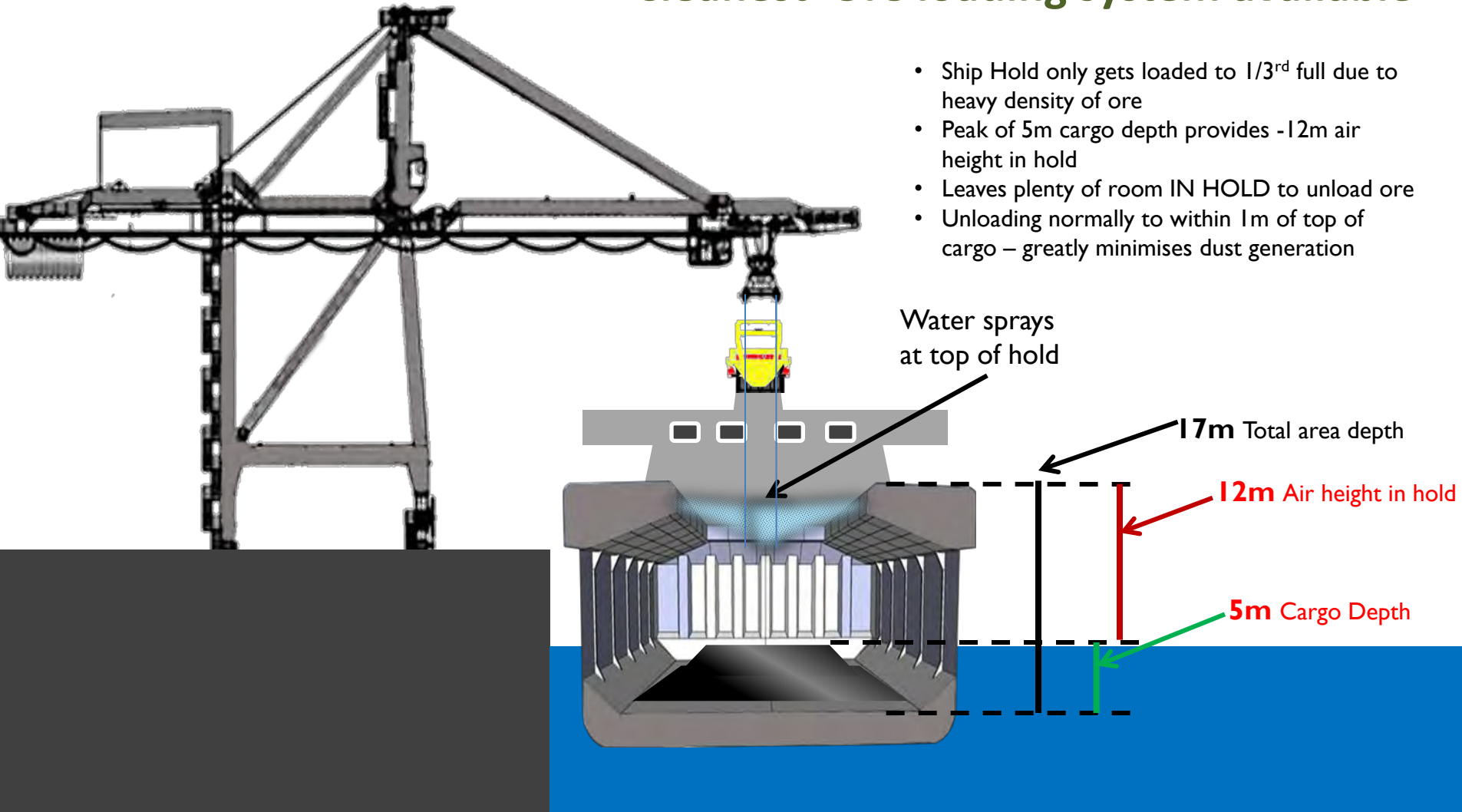


Load with misting system

CONTAINERIZED BULK HANDLING

Rotary loading virtually no dust generated
Cleanest Ore loading system available

- Ship Hold only gets loaded to 1/3rd 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



ZERO MATERIAL LOSS

COMPANY

PATRICK STEVEDORE

COMMODITY

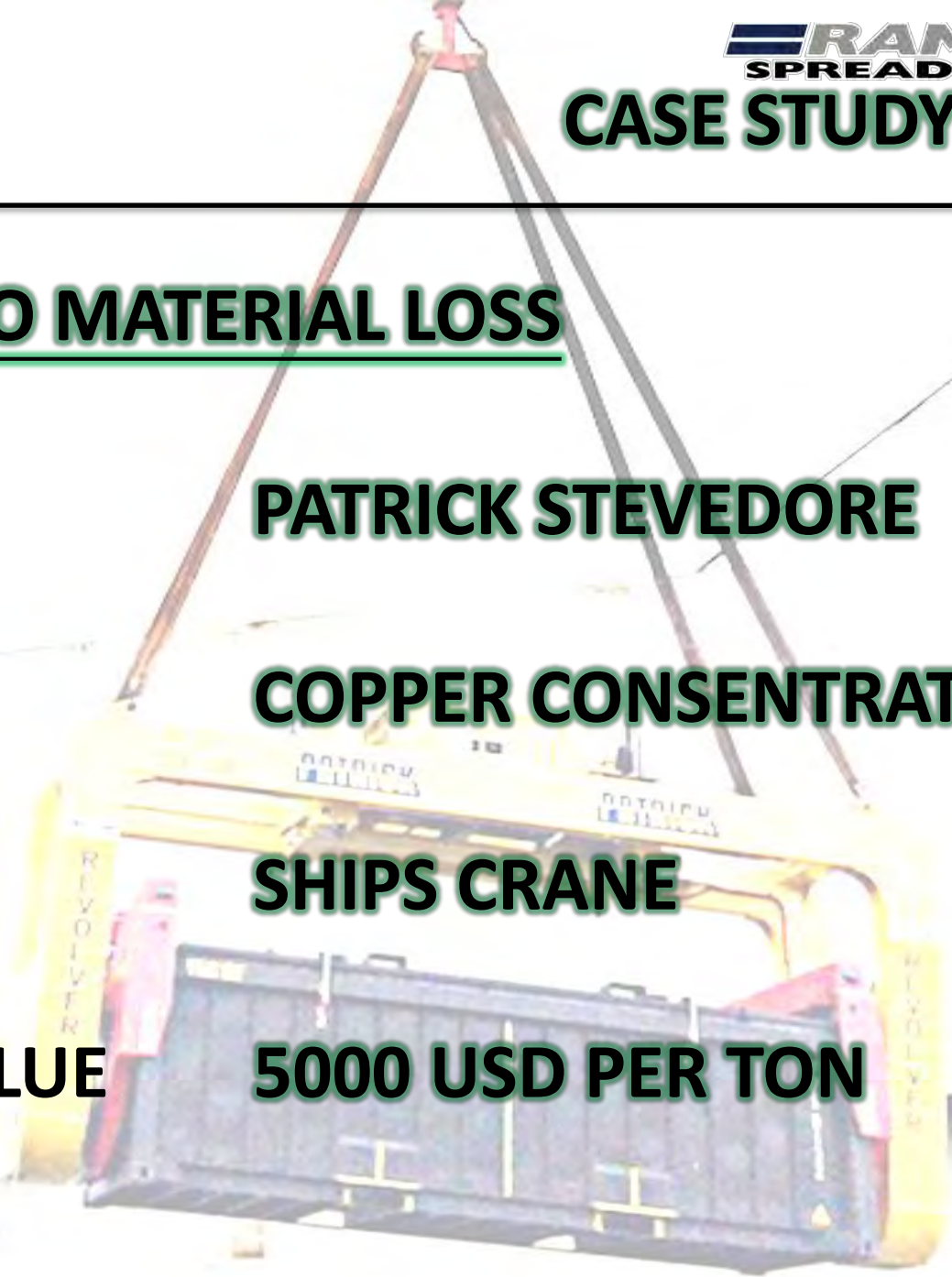
COPPER CONCENTRATE

EQUIPMENT

SHIPS CRANE

MATERIAL VALUE

5000 USD PER TON



AN INNOVATIVE SOLUTION

Uses Ships Crane to handle bulk containers
Capital Expenditure < 1 million USD
Containers leased at \$ per day rate
Free of dust & material loss



SYSTEM SPECIFICATIONS

40 tonne ships gear

8 tonne revolving spreader

3 tonne box

29 tonnes of copper concentrate

Cost ✓

Dust free ✓

Fast ✓



15 Lifts per hour

Tonnes per crane per hour

400

2 Cranes

18000

Tonnes per day

CONTAINER SPECIFICATIONS



3 Tonne tare weight

38 Tonne capacity

6K cost (USD)

Automated lid removal

“Patrick was able to utilize this new revolving spreader technology to export copper concentrate for our client with very little capital”

“....Our Client was extremely pleased with the dust free solution”



Adrian Howard
Commercial Director



MINERS PERSPECTIVE

“Environmentally it is a very clean system due to containers being emptied directly into the ship’s hold thereby minimizing a number of dust generating points”

“...Loading rates of 15,000 wmt/day being achieved are such that it helps to minimize shipping costs”



Jack Cole

North Parkes Mine



THE NUMBERS

12,000 tons of ore per twice month

10 year contractor

EPA reviewed

\$25 PER TONNE

DUST PROBLEMS SOLVED



✓ Solved-Sealed with Lid



✓ Solved-Stockpiles & vehicles



✓ Solved-Ship load-Revolver and misting system

AWARD WINNING



GREEN

Environmental Best Practice

Zero Dust ✓

Low Capital ✓

Fast to Market ✓



DP WORLD
Australia

COMPANY

DP World

COMMODITY

Iron ore

EQUIPMENT

STS Crane



DP WORLD
Australia

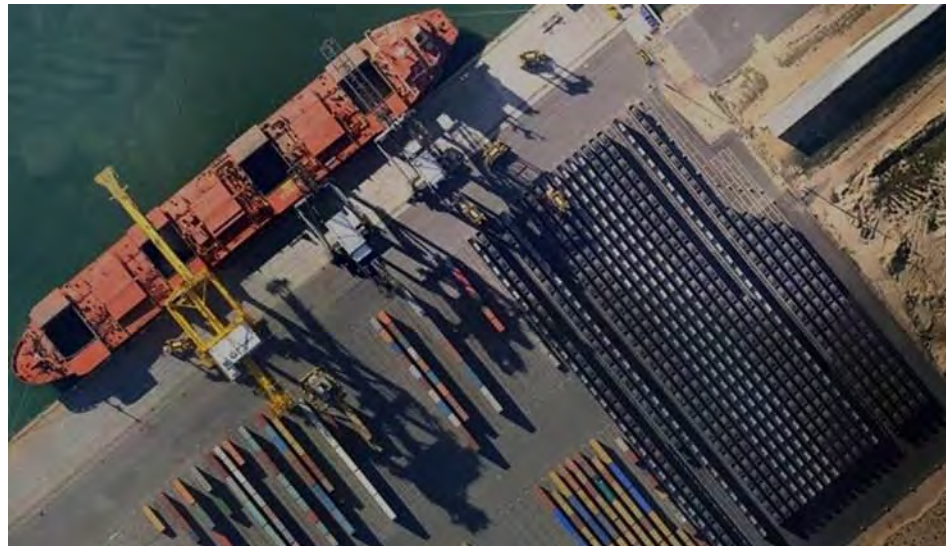
“DPW Adelaide was an under utilized terminal with low berth occupancy and little growth prospects”

“....to grow the terminal we needed to think outside traditional income sources”



Ray Lee

Regional Director
DPW Australia
2009-2011





CONTAINER TERMINAL BULK LOADING

“Using the RAM Revolver and purpose built containers we increased our volume by 20% making DP World Adelaide the most profitable terminal in the group ” ... Ray Lee



DP WORLD
Australia



2000 tons per hour



IMX crosses 2m-tonne export milestone

BUSINESS EDITOR CHRISTOPHER RUSSELL - THE ADVERTISER - JULY 05, 2012 11:24AM
COOPER Pedy iron miner IMX Resources has passed a milestone two million-tonne mark for exports.

The company has gone on to load a record 85,140 tonnes at Port Adelaide aboard the Trans Hangzhou which departed on the weekend.

“Thanks to the efforts of our broker, Probulk in Singapore, and operator Cargill, we managed to locate a uniquely sized vessel that fitted the requirements of Port Adelaide,” IMX logistics manager Mark Hoepfl said.

“We have shipped over two million metric tonnes to date and we usually average approximately 75,000 metric tonnes per vessel.

“Our previous record was 80,471 metric tonnes, making this a landmark shipment,” Mr Hoepfl said.

The ore – a unique blend of iron and copper – is from IMX’s Cairn Hill mine southeast of Coober Pedy.



IMX Resources' logistics manager Mark Hoepfl with a cargo ship bound for China.
Picture: Bianca De Marchi. Source: The Advertiser

THE NUMBERS



DP WORLD
Australia

85,000 tonnes of ore per twice month

8 year contract

\$ 250 CONTAINER

\$ 900 000 REVENUE PER SHIP

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



NO DUST





COAL
MHC Crane



TRANSNET



port terminals



Tshipi é Ntle
Manganese Mining



MANGANESE
STS Crane

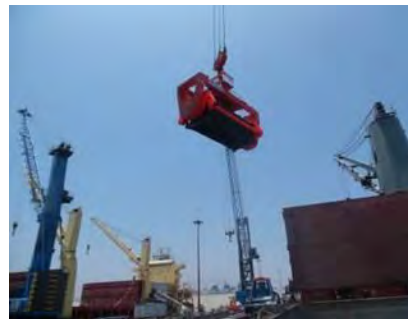


exxaro

IRON ORE
MHC Crane



Puerto Angamos Chile

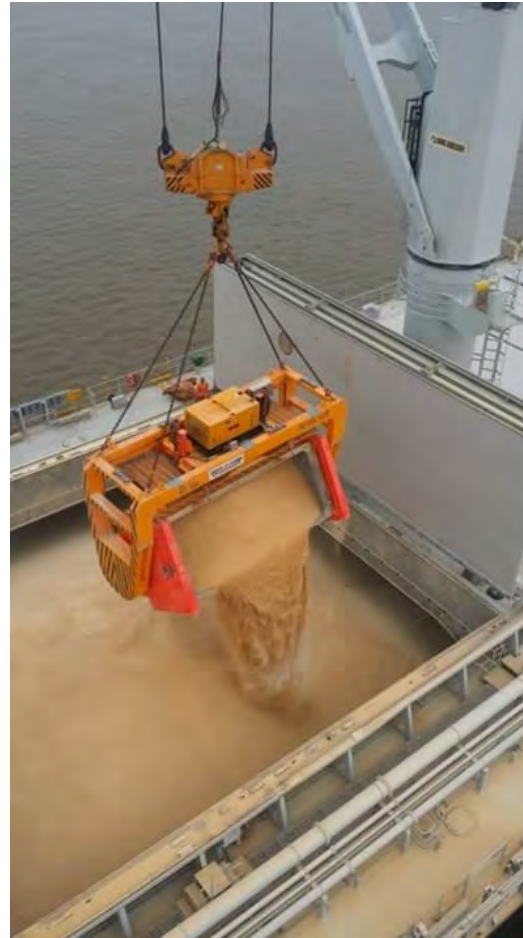
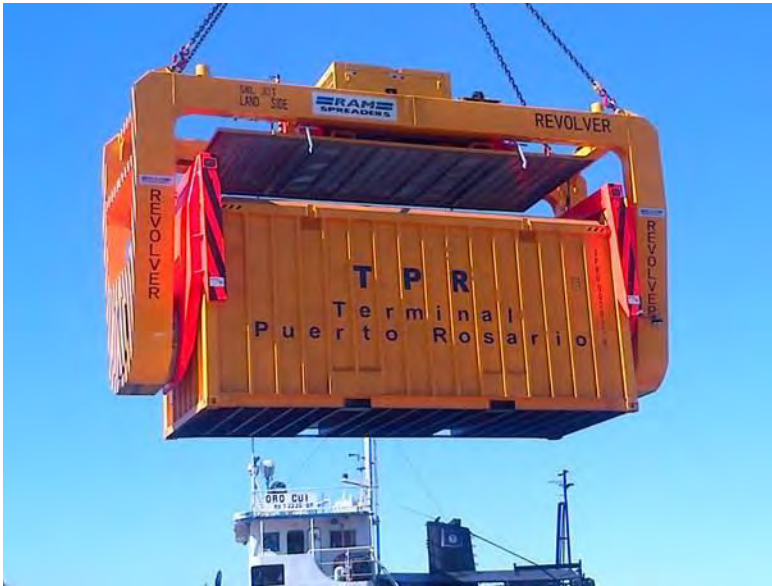


COPPER
MHC Crane

TPR Chile



TERMINAL
PUERTO ROSARIO



GRAIN
MHC Crane

COSTING CAPITAL

MHC Model

- Cranes x 2 = USD\$8,000,000
- Containers x 30 = USD\$ 300,000
- CHE = USD\$ 500,000
- Revolvers = USD\$1,500,000

= 10 million

Ships Crane Model

- Revolvers x 2 = USD\$ 800,000
- Misting System = USD\$ 200,000
- Container = USD\$ Leased
- Fork Truck = USD\$ Leased

= 1 million

CONTAINERIZED BULK HANDLING PROCESS

Loading commodity



Land Transport



Quay Side



With Revolver®



Load Ship at Port



Lift from Storage



CONTAINERIZED BULK HANDLING BENEFITS

✓ Flexible Berths – **No fixed bulk berths**

✓ Fast to start

✓ No dust

✓ Low cost



CONTAINERIZED BULK HANDLING EQUIPMENT - INTERGRATED APPROACH

Revolver®



Cranes



Dust Suppression



Containers



Container Handlers



REVOLVER trailer system



Cost

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

Environmental

- Zero dust, no clean up
- Best practice by EPA with fast approval

Safe & Fast

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

Proven & Reproducible

- Providing a simple proven turnkey solution to exporters

Join the revolution

CBH Companies

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



**“not often do you get a solution
that is the lowest cost but also the
best practice environmentally”**

Thank You