



# CLEAN Bulk Ports

The next generation in clean bulk ports  
Case Studies of bulk handling systems to stop dust pollution

Frank van Laarhoven



# LOCATION

**Sea Ports &  
developed  
railroad  
infrastructure**



**Fast growing bulk  
export industry**



**Millions of tons  
of bulk cargo!**



**All create a  
number of  
environmental  
challenges**



## CURRENT BULK HANDLING METHODS

Many companies are now looking at systems to reduce levels of contamination, but also cost effective systems to meet current environmental guidelines

? £ € \$



## CURRENT BULK HANDLING METHODS

# SOURCES OF DUST

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



## SOURCES OF DUST

During these processes the commodity is handled multiple times resulting in losses and dust!



**Transfer  
Points**



**Open  
Wagons**



**Stockpiling  
Commodities**



**Ship  
Loading**



## CONTAINERISED BULK HANDLING

A new method to  
handle bulk is available

# Containerised BULK HANDLING

FILL | TRANSPORT | STORE | LOAD

## CONTAINERISED BULK HANDLING

What is the CBH System?





## CONTAINERISED BULK HANDLING

What is the CBH System?

CBH uses sealed open-top containers

**For:**  
Storage  
Transport  
Unloading  
**of bulk commodities**



## CONTAINERISED BULK HANDLING

What is the CBH System?

Transport of commodity  
is done by:



**ROAD**



**RAIL**



**OR BOTH  
(BI-MODAL)**

## CONTAINERISED BULK HANDLING

What is the CBH System?

CBH also uses a rotating spreader

**RAM Revolver®**



## CONTAINERISED BULK HANDLING

What is the CBH System?

CBH also uses a rotating spreader

That...



**Handles the container**



**Lifts the lid**



**Rotates the container**

## CONTAINERISED BULK HANDLING

# Low Environmental Impact

### Containerised Bulk Handling:

Reduces pressure from Authorities for compliance with environmental guidelines

Reduces material loss by up to 3% with sealed container technology

## CONTAINERISED BULK HANDLING

# BULK EXPORT

# CONTAINERISED BULK HANDLING - EXPORT

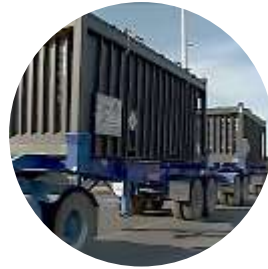


## CONTAINERISED BULK HANDLING - EXPORT

**1**

### Fill & Seal Container

- Existing equipment used
- Self locking lid system
- No loss of commodity
- No clean up
- No contamination

**2**

### Send Container By Rail or Road

- Sealed containers – No dust!
- No contamination
- No loss of commodity
- Existing infrastructure used

**3**

### Store at Port

- Fast & effective loading
- No stockpile – No dust
- No contamination of commodity
- Store multiple types of commodity in same area with no cross contamination

**4**

### Unload using RAM Revolver

- For all types of crane
- Loads of up to 1,000TPH
- SWL up to 45T
- Twistlock & grippers secure container during rotation



## CONTAINERISED BULK HANDLING

# MISTING SYSTEM

## CONTAINERISED BULK HANDLING

# MISTING SYSTEM



MISTING SYTEM

**OFF**



MISTING SYSTEM

**ON**

contamination  
material loss

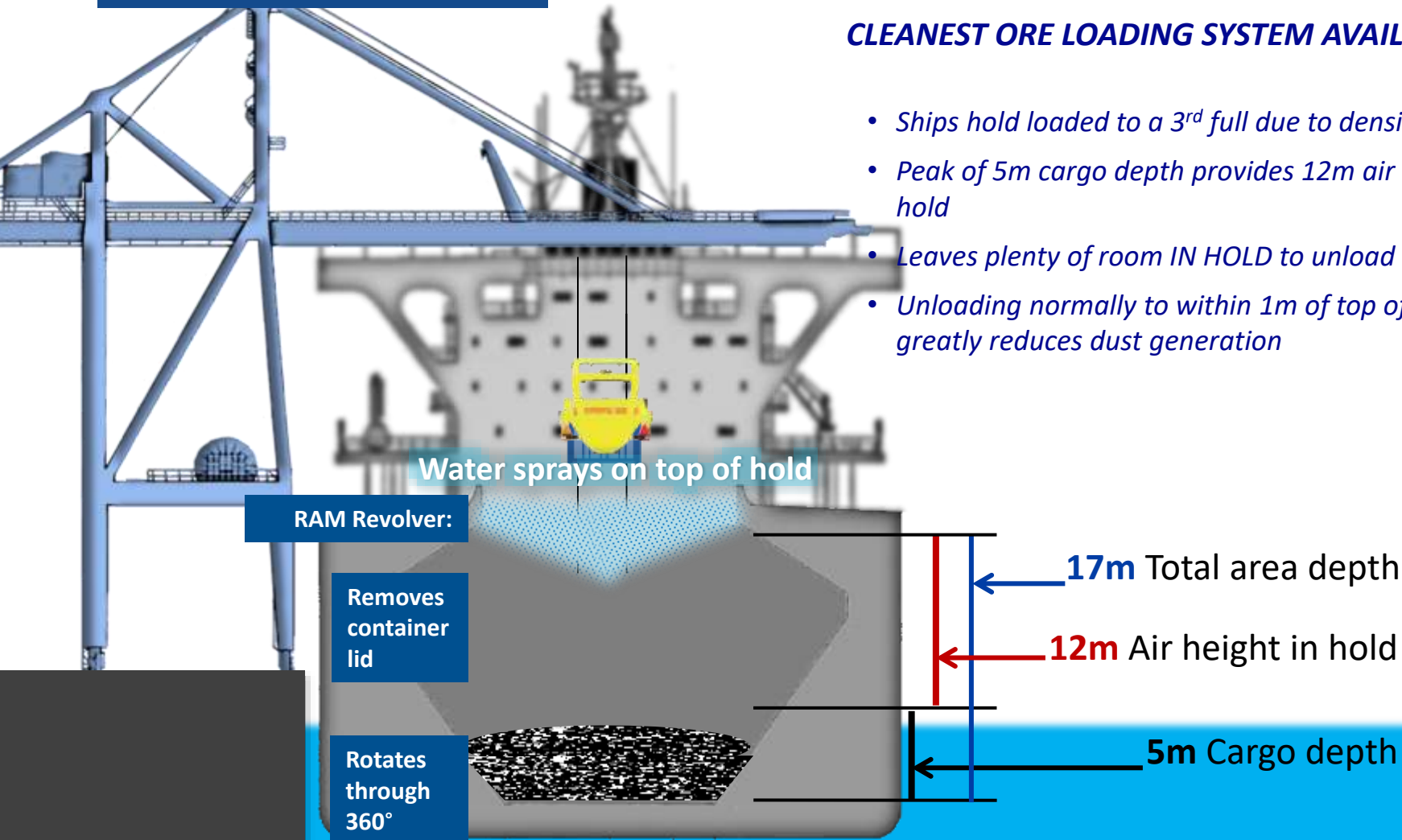
# LOADING PROCESS

# CONTAINERISED BULK HANDLING

## LOADING PROCESS

**ROTARY LOADING WITH VIRTUALLY NO DUST GENERATED  
CLEANEST ORE LOADING SYSTEM AVAILABLE**

- Ships hold loaded to a 3<sup>rd</sup> full due to 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 reduces dust generation





## CASE STUDIES

**COMPANY:** *TRANSNET PORT ELIZABETH*

**COMMODITY:** *MANGANESE*

**EQUIPMENT:** *SHIP TO SHORE CRANE*

*video*

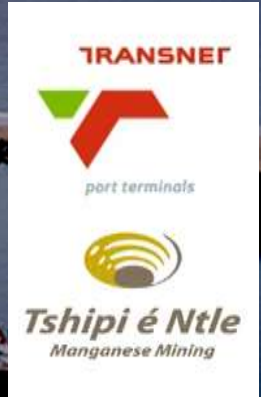
CASE STUDY 1

PORT ELIZABETH

## CASE STUDIES



## CASE STUDIES – Port Elizabeth



### CONTAINER & CBH BULK HANDLING TERMINAL





## CASE STUDIES – Port Elizabeth



CONTAINER & CBH BULK HANDLING TERMINAL

VEHICLE EXPORT TERMINAL



# CASE STUDIES

CBH has been in operation since 2014 at Port Elizabeth Container Terminal.

Handling an increasing large volume of bulk, in 2019 Transnet Port Terminals (TPT) placed a repeat order for a further 4 units of RAM CBH.



## Dust Free Loading in Port Elizabeth

Delivery of 4 Revolver® spreaders helps Transnet Port Terminals commit to its sustainability agenda and reduce dust.

April 2019



### Summary

Following the introduction of Containerised Bulk Handling at Port Elizabeth Container Terminal (PECT) in South Africa, Transnet Port Terminals (TPT) placed a repeat order with RAM spreaders of 4 units of the RAM Revolver® bulk handling spreader.



TPT handles large volumes of bulk exports annually at its Port Elizabeth Container Terminal and recently employed containerised bulk handling. The terminal invested in 4 units of RAM Revolvers, to help them service their base of customers better.



### Flexible Approach & Clever Use of Capital

Containerised Bulk Handling (CBH) allows for easy handling of bulk materials with a simple spreader change on the cranes. The cost of the CBH system is a fraction of the cost of new bulk loaders.

Speaking at the handing over ceremony of the Revolver's, RAM Spreaders Cameron Hay commented "Since the first order of Revolvers in PE more than 5 years ago the CBH system has grown significantly. These new revolvers will allow TPT to ensure environmental compliance"

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

### A Route to Market for Miners

Mining companies are now able to find a new route to market using CBH for exporting bulk through standard container terminals, which until now has only been possible with heavy investment and an expensive infrastructure.



### Clean & Green!

PECT is located near to the main town of Port Elizabeth and like all cities dust is a sensitive issue.

The Containerised Bulk Handling system, using a hatch misting system is the greenest loading system in the world with zero fugitive dust emissions. It achieves this through a 2 pronged method:

1. The Revolver® adds very little energy to the bulk material as it tips at the very bottom of the hatch.
2. A hatch based dust suppression system mounted on the hatch, which stops any small amount of dust from rising up.

### Local Community-Supporting Local School

RAM Spreaders & Transnet Port Terminals are both socially aware companies, who as a result of the bulk handling project, are helping to support the local community by employing a number of local technical staff and provide training programs to help further their skills in this new technology.

The local Green Apple Pre-school close to the Port Elizabeth Container Terminal is also benefiting from the new project, with RAM & TPT helping to subsidise teachers and provide funding to help the school add three new classrooms. This will allow more children in the area to receive a decent foundation education and in turn help the local area continue to prosper.

## CASE STUDIES - Riga

**LOCATION:** Riga

**COMMODITY:** Biomass

**EQUIPMENT:** MHC Crane



## CASE STUDIES - Riga

Riga Universal Terminal (RUT) became **the first** terminal in Europe to introduce the **Containerised Bulk Handling** system.

Since its introduction RUT have **doubled** their biomass export to cope with the increased demand and bring in new levels of revenue.

## CASE STUDIES - Riga

With the system capable of lifting 35m<sup>3</sup> per cycle, RUT utilized their existing MHC

...and projected a **30 lifts per hour** capacity

allowing them to handle large volumes of biomass per hour

CUBIC METERS PER CYCLE 35.00  
 MOVES PER HOUR 30.00

M<sup>3</sup> PER HOUR 1,050

## CASE STUDIES - Riga



*The main benefit from introducing the new technology is a significant optimization of terminal expenses and an increase in performance.*

*Now we can perform dry bulk handling operations involving a significantly smaller number of machines and human resources.*



**Atis Šulte**  
Sales & Business  
Development Director

*Saving on resources amount to almost 50%, he added.*



## CASE STUDIES – Poti - Georgia

**LOCATION:** Poti - Georgia

**COMMODITY:** Copper Concentrate

**EQUIPMENT:** MHC



## CASE STUDIES – Poti - Georgia

CBH introduced to support local dry bulk clients...

...with local companies importing, blending and exporting locally mined copper concentrate gives the port flexibility to handle all commodities with existing equipment using CBH.



## CASE STUDIES – Poti - Georgia

With the port located close to a residential area, school and recreational park...

...CBH adds very little energy to the bulk material when unloded, and a dust suppression misting system contains the dust plume within the ships hatch.



## CASE STUDY - TESTIMONIAL

### Environmental Benefits

*“Turning DP World Adelaide from a standard container terminal into a bulk handling terminal raised an interesting reaction”.*

*“The sailing squadron next to the terminal came to me one day to protest about the new system of bulk export being introduced at the terminal, and they wouldn’t allow us to operate the system as it would create red dust on their sailing boats”.*

*“They had slack jaws when I told them **the system had already been running for six months with zero emissions**”*

**DPW Adelaide**



**Ray Lee**

Regional Director  
DPW Australia | 2009-2011

## CASE STUDY - TESTIMONIAL

### ...and terminal growth

*“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

**DPW Adelaide**

## CASE STUDY - TESTIMONIAL

### Low capital expenditure

*“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  
Patrick Ports & Stevedoring

**Patrick | Asciano**

## CASE STUDY - TESTIMONIAL

# High loading rates minimize shipping costs

### 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 Park Mines

**North Park Mines**

## CASE STUDY – Further Examples

### MHC Crane Application



RUT Latvia - Grain



South Africa- Coal



Chile – Copper/ Potassium Salt



Maputo - Coal



Congo – Iron Ore



Chile – Copper/Zinc



Cuba - Zinc



USA – Wood Chip/Pellet



Mexico – Lead/Copper/Zinc

## CASE STUDY – Further Examples

### Bridge & Reach Stacker Application



Peru - Copper



Mauritania - Magnetite



Bolivia - Urea



Turkey - Copper



Chile - Copper



Arizona/Mexico - Copper



## CASE STUDY – Further Examples

### Ship Crane and STS Crane Applications



Argentina – Soya/Rice



South Africa- Manganese



Australia - Copper



Chile - Zinc



Argentina - Grain



Australia – Iron Ore



USA – Wood Chip/Pellet

## CONTAINERISED BULK HANDLING - Benefits

**C**ontainerizes the bulk  
**L**ow set up cost  
**E**nvironmentally friendly  
**A**ward winning solution  
**N**o contamination



**COST**



## CONTAINERISED BULK HANDLING - Benefits

- ✓ **Flexible Berths** – No fixed bulk berths
- ✓ **Fast to start**
- ✓ **No dust**
- ✓ **Low cost**

## CONTAINERISED BULK HANDLING - Benefits



### **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

# CONTAINERISED BULK HANDLING - Equipment

## INTEGRATED APPROACH

Revolver®



Cranes



Dust Suppression



Container Handlers



Containers



REVOLVER trailer system



# CONTAINERISED BULK HANDLING – Equipment Application

Ship to Shore  
Crane



Mobile Harbour  
Crane



Ship  
Crane



Reach  
Stacker



Bridge  
Crane



## CONTAINERISED BULK HANDLING – Commodities Handled



## CONTAINERISED BULK HANDLING – Companies

**Exxaro**

**Grinrod**

**DP World**

**Eletheni/ SNR**

**BHP B**

**Oz Minerals**

**Hillgrove Copper**

**Transnet**

**FQML**

**TPR Argentina**

**Ironclad**

**Patrick**

**MMG Las Bambas**

**Riga Universal Terminals**

**ETI Bakir**

**Port of Quijarro**

**HPH Timsa**





**AWARD WINNING**



**Containerised Bulk Handling** with **RAM Revolver®**  
is recognized by the bulk handling industry  
**as an innovative and environmentally friendly solution**

**IBJ - 2014**

**Environmental Protection Award**



RAM Spreaders &  
Patrick Ports and  
Stevedoring  
Australia



*For contamination & dust free  
Containerised Bulk Handling*

**IBJ - 2016**

**Innovative Technology Award**

RAM Spreaders &  
MMG Las Bambas  
Peru



*For Bi-Modal Containerised Bulk Handling  
from Las Bambas Mine to Matarani Port*